

# Broadband Internet Access Service Is a Telecommunications Service

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## I. INTRODUCTION

In December 2017, in the *Restoring Internet Freedom Order*,<sup>1</sup> the FCC reclassified broadband Internet access service from a *telecommunications service* to an *information service*. The justification for the reclassification rests primarily on a reinterpretation of relevant statute. The purpose of this paper is to examine and evaluate this interpretation and reclassification in the context of the relevant precedent.

The *Restoring Internet Freedom Order* first reinterprets *broadband Internet access service*,<sup>2</sup> which was defined in the 2015 *Open Internet Order*.<sup>3</sup> To determine whether broadband Internet access service fits the *information service* definition in the Communications Act, the Order then reinterprets the meaning of the word *capability* as used in the definition of *information service*,<sup>4</sup> reevaluates the capabilities of broadband Internet access service,<sup>5</sup> and reevaluates the functionality provided by the Domain Name System (DNS) and caching,<sup>6</sup> in each case reversing the evaluations of the 2015 *Open Internet Order*.

To determine whether broadband Internet access service is *solely* an information service, the *Restoring Internet Freedom Order* reevaluates whether the transmission components of the service are separable from what it perceives as the information service components of the service. To do so, the Order reevaluates consumer perception of the service<sup>7</sup> and the nature of the service offered,<sup>8</sup> reversing the evaluations of the 2015 *Open Internet Order*.

In addition to statutory interpretation, the *Restoring Internet Freedom Order* looks back to relevant precedent from both the FCC and the courts.<sup>9</sup> The Order claims that its reclassification of broadband Internet access service is “consistent with classification precedent prior to the [2015 *Open Internet Order*], which consistently found that ISPs offer a single, integrated service.”<sup>10</sup> The Order claims that classifications of earlier forms of Internet access correctly found either that the entire service was solely an information service, or that at a minimum the component of the service outside of “last mile” transmission was an information service.<sup>11</sup> The Order further claims that a body of precedent from FCC and court decisions during the 1970s

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1. Restoring Internet Freedom, *Declaratory Ruling, Report and Order, and Order*, 33 FCC Rcd 311, 318-19, para. 21 (2018) [hereinafter *Restoring Internet Freedom Order*].

2. *Id.* at paras. 26-29.

3. Protecting and Promoting the Open Internet, *Report and Order on Remand, Declaratory Ruling, and Order*, 30 FCC Rcd 5601, 5682, para. 187 (2015) [hereinafter 2015 *Open Internet Order*].

4. *Restoring Internet Freedom Order*, 33 FCC Rcd at 322-25, paras. 30-32.

5. *Id.* at para. 33.

6. *Id.* at paras. 34-44.

7. *Id.* at paras. 46-48.

8. *Id.* at paras. 49-50.

9. *Id.* at paras. 51-57.

10. *Id.* at para. 51.

11. *Id.* at para. 54.

through 1990s “served as the backdrop for the 1996 Act and informed the FCC’s original interpretation and implementation of the statutory definitions of ‘telecommunications,’ ‘telecommunications service,’ and ‘information service,’” and that this body of precedent supports reclassification of broadband Internet service as an information service.<sup>12</sup>

The *Restoring Internet Freedom Order* states that its reclassification is “consistent with the Supreme Court’s holding in *Brand X*,” the 2005 Supreme Court case<sup>13</sup> in which the Court upheld the FCC’s determination that a prior form of Internet access service was an information service.<sup>14</sup> The Order claims that its “reliance on classification precedent . . . includes not only the [FCC’s] classification decisions, but the Supreme Court’s subsequent analysis in *Brand X*.”<sup>15</sup> Specifically, the Order claims that the 2015 *Open Internet Order*’s classification of broadband Internet access service “stands in stark contrast to the [FCC]’s historical classification precedent and the views of all Justices in *Brand X*.”<sup>16</sup>

However, the *Brand X* Court set out specific guidelines for determining whether the telecommunications components of an Internet access service are separable from any information service components of that service. The Court stated that “[t]he entire question is whether the products here are functionally integrated (like the components of a car) or functionally separate (like pets and leashes)” and “[t]hat question turns not on the language of the Act, but on the factual particulars of how Internet technology works and how it is provided.”<sup>17</sup>

In this Article, we take up the challenge set out by the *Brand X* Court and evaluate whether the telecommunications components of broadband Internet access service are separable from any information service components of that service based on the factual particulars of how Internet technology works and how it is provided. We similarly evaluate whether broadband Internet access service is a telecommunications service or an information service.

We do so by examining the relevant precedent from the FCC and the courts from the 1970s through 2017. The examination integrates a technological perspective (i.e., how technology works) into each part of that precedent in order to understand the precedent and how it is relevant to broadband Internet access service. In this examination, we also proffer our opinion of where precedent has misinterpreted or misapplied the factual particulars of the relevant technology. In doing so, we find that many of the fundamental claims in the *Restoring Internet Freedom Order* conflict with the factual particulars of how Internet technology works and how it is provided.

In Section II, we examine the definitions of *telecommunications service* and *information service*. In Section II.A, we begin with a pair of 1976 National Association of Regulatory Utility Commissioners (NARUC) court

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12. *Id.* at para. 29.

13. *Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs.*, 545 U.S. 967 (2005) (*Brand X*).

14. *Restoring Internet Freedom Order*, 33 FCC Rcd at 318, para. 20.

15. *Id.* at para. 57.

16. *Id.* at para. 54.

17. *Brand X*, 545 U.S. at 991.

decisions that established a two-part test for whether a service is classified as a common carrier service. We find that if a communications service passes both tests, then its classification as a common carrier communications service is not a matter of FCC discretion. In contrast, if a communications service fails either test, the FCC retains the discretion to require the provider to provide the service on a common carrier basis if doing so is in the public interest.

In Section II.B, we examine the FCC's 1980 *Computer II Final Decision*, which established the FCC's framework for determining which services are subject to Title II of the Communications Act. The Order defined *basic services* and *adjunct-to-basic services* (subject to Title II) and *enhanced services* (not subject to Title II). We use our examination of technological characteristics of transmission, address translation, and storage later in the Article to evaluate broadband Internet access service, DNS, and caching. We examine the Order's discussion of integrated information services (e.g., data processing) that use telecommunications as an input, a model to which we will return when evaluating broadband Internet access service. We further find that a basic service offered to the public passes both NARUC tests and thus must be classified as a common carrier service.

In the remainder of Section II, we examine the adaptation and implementation of the FCC's definitions of *basic service* and *enhanced service* into the definitions of *telecommunications service* and *information service*, which first appear in the 1982 *Modification of Final Judgement* and then in the Telecommunications Act of 1996 ("1996 Act"). We find that the definition of *telecommunications service* implements and replaces the two NARUC tests and that adjunct-to-basic services now fall under the telecommunications systems management exception as telecommunications services. We further find that address translation and storage are part of a telecommunications service when used to facilitate a telecommunications service and are part of an information service when used to facilitate an information service. Under the 1996 Act, information services are competitive because the underlying telecommunications offered by a facilities-based information service provider is available with common carriage protections.

In Section III, we examine precursors to dial-up Internet access service. In two court decisions and one FCC order, the services were declared to include both telecommunications and an information service. However, the information service components (protocol conversion and introductory information content) would later become obsolete, rendering the remaining service as a telecommunications service.

In Section IV, we take a detour and review the pertinent aspects of dial-up Internet access and broadband Internet access. We explain that the model used in *Computer II* and the *MFJ* of using telecommunications as an input to create an integrated information service (e.g., data processing) do not apply to the Internet. We review the layers and geography of the Internet and explain why the most fundamental Internet standards dictate that the end-to-end transmission of IP packets must be separable from applications such as email, webpage hosting, and cloud computing. As we will later discuss, this mandated separability is a decisive factor in the consideration of the classification of broadband Internet access service.

In Section V, we examine the classification of dial-up Internet access service in the 1997 *Universal Service Order* and the 1998 *Stevens Report*. The *Stevens Report* classified *dial-up Internet access service* as an information service on the basis of bundled email, webpage hosting, and webpage caching. We find that the Report erred; on the basis of technological characteristics, it should have determined that the telecommunications component of the service was separable from these applications. The Report should have concluded that dial-up Internet access service comprises two separable services: an end-to-end Internet access service (which should likely have been granted forbearance from Title II requirements due to the competitive ISP market) and a bundle of information services (e.g., webpage hosting and email).

In Section VI, we examine the classification of early forms of broadband Internet access service. We find that the 1998 *Advanced Services Order* properly classified xDSL-based advanced service as a telecommunications service based on technological characteristics of the service and that bundled applications such as email and webpage hosting are separable information services. We then examine the 2002 *Cable Modem Declaratory Ruling* and the 2005 *Wireline Broadband Classification Order*, which classified their respective forms of Internet access (*cable modem service* and *wireline broadband Internet access service*) as solely information services on the basis of bundled applications (including email and webpage hosting) and the functionality of DNS and caching. We find, however, that these orders made multiple errors in these determinations. First, the orders neglected to properly determine the scope of the telecommunications component of the service. Second, on the basis of technological characteristics, the orders should have found that DNS and caching fall within the telecommunications systems management exception. Third, on the basis of technological characteristics, the orders should have determined that the telecommunications component of the service was separable from applications such as email and webpage hosting.

In Section VI, we also examine *Brand X*. We find that the Court relied on several incorrect representations: that cable modem service by itself provides consumers with a capability for manipulating information, that cable modem service changes the form or content of Internet data, that consumers may not use the underlying telecommunications without information processing capabilities provided by cable modem service, and that a cable modem provider's DNS server is essential to providing cable modem service. Based on these incorrect representations, the Court accepted the FCC's claim that the information service capabilities and the underlying telecommunications are functionally integrated.

In Section VII, we examine the classification of broadband Internet access service in the 2015 *Open Internet Order*. We find that the Order properly classified the service as solely a telecommunications service based on technological characteristics of the service and that bundled applications such as email and webpage hosting are separable information services.

Finally, in Section VIII we examine the reclassification of broadband Internet access service in the 2017 *Restoring Internet Freedom Order*. We first find that the Order improperly reinterpreted the definition of broadband Internet access service to include applications such as online storage, parental

controls, and email. We then find that the Order neglected to properly determine the scope of the telecommunications component of the service. We further find that the Order made several critical errors in its reversal of the 2015 *Open Internet Order*'s determination that DNS and caching provided by an ISP fall within the telecommunications systems management exception. These errors include misrepresenting the impact of DNS and caching on the broadband Internet access service, misinterpreting the application of the telecommunications systems management exception, and misconstruing precedent. We continue our examination to find that the *Restoring Internet Freedom Order*'s reinterpretation of *capability* in the definition of *information service* both misconstrued precedent and produced an internal inconsistency that invalidated the interpretation. Finally, we find that the Order did not properly apply the *Brand X* guidelines for determining whether the telecommunications components of broadband Internet access service are separable from any information service capabilities of the service. A proper application of the *Brand X* guidelines would have determined that these are separable and that the telecommunications service is exactly what the 2015 *Open Internet Order* defined and interpreted as broadband Internet access service.

The *Restoring Internet Freedom Order* also leveraged the reclassification to repeal almost all of the net neutrality rules placed on broadband Internet access service in the 2015 *Open Internet Order*.<sup>18</sup> The public interest analysis that underlies the repeal is interesting; however, it is outside the scope of this paper.

## II. TELECOMMUNICATIONS SERVICE VERSUS INFORMATION SERVICE

### A. *NARUC I & NARUC II (1976)*

In a pair of decisions in 1976, the D.C. Circuit Court of Appeals considered whether a particular mobile service was properly classified as a common carrier service or as a noncommon carrier service.<sup>19</sup> The court established a two-part test. The first part is specific to communications—a communications service is a common carrier service only if the service “be such that customers ‘transmit intelligence of their own design and choosing.’”<sup>20</sup> The second part is general to all common carrier services—a service is a common carrier (or “public”) service only if it is offered to the public and the service provider “undertakes to carry for all people indifferently.”<sup>21</sup> In contrast, a noncommon carrier (or “private”) service “is

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18. 2015 *Open Internet Order*, 30 FCC Rcd at 5746-47, para. 337.

19. Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC, 525 F.2d 630 (D.C. Cir. 1976) (*NARUC I*); Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC, 533 F.2d 601 (D.C. Cir. 1976) (*NARUC II*).

20. *NARUC II*, 533 F.2d at 609 (citation omitted).

21. *NARUC I*, 525 F.2d at 641 (citations omitted).

distinguished by its being set aside for the use of particular customers, so as not to be generally available to the public.”<sup>22</sup>

Furthermore, the court explained that if a communications service passes both tests, then its classification as a common carrier communications service is not a matter of FCC discretion.<sup>23</sup> In contrast, if a communications service fails either test, the FCC retains the discretion to require the provider “to serve all potential customers indifferently, thus making [the service a common carrier service] within the meaning of the [Communications Act],” if doing so is in the public interest.<sup>24</sup>

*NARUC I* and *NARUC II* thereby set the framework for both discretionary and non-discretionary determinations by the FCC that a service is a common carrier service.<sup>25</sup> Throughout this Article, we focus on the non-discretionary determination of whether broadband Internet access service is a common carrier service.<sup>26</sup>

### B. *Computer II* (1980)

By 1980, distributed computing services were offered to the public using microcomputers and word processors, which were in turn utilizing underlying common carrier telecommunication facilities.<sup>27</sup> In 1980, the FCC considered regulation of such computer processing services in its *Computer II Final Decision*.<sup>28</sup> Two of the issues facing the FCC in this proceeding were (1) the regulatory treatment of computer processing services, and (2) the regulatory treatment of common carriers in the provision of such services.<sup>29</sup> Both issues required a classification of computer processing services and of the underlying transmission service.<sup>30</sup>

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22. *Id.* at 642.

23. *Id.* at 644. Of course, the FCC may exercise its forbearance authority, if appropriate under Title I.

24. *Id.* at 644, n.76. *See also* Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities et al., *Report and Order and Notice of Proposed Rulemaking*, 20 FCC Rcd 14853, 14875-76, para. 41, n.108 (2005) [hereinafter *Wireline Broadband Classification Order*] describing *NARUC I* (“In the absence of an express statutory requirement that a particular service be offered on a common carrier basis, the [FCC] and the courts have interpreted whether the public interest requires a common carrier service based on a number of factors related to the service at issue.”), and *V.I. Tel. Corp. v. FCC*, 198 F.3d 921, 924 (D.C. Cir. 1999) describing *NARUC I* and *NARUC II* (“[A] carrier has to be regulated as a common carrier if it will make capacity available to the public indifferently or if the public interest requires common carrier operation.”) (citation omitted).

25. Comments of Barbara A. Cherry & Jon M. Peha at 3-4, *Protecting and Promoting the Open Internet*, GN Docket No. 14-28 (Dec. 22, 2014) [hereinafter *Cherry & Peha Comments*].

26. The discretionary determination relies on a public interest analysis, rather than statutory interpretation, and is outside the scope of this paper.

27. *See* Amendment of Section 64.702 of the Commission’s Rules & Regulations (Second Computer Inquiry), *Final Decision*, 77 FCC 2d 384, 391-93 paras. 19-23 (1980) [hereinafter *Computer II*]. Personal computers and TCP/IP would further transform the landscape in the 1980s.

28. *Id.*

29. *Id.* at para. 16.

30. *Id.* at para. 24.



The policy goals in the proceeding were: (1) to “not directly or indirectly inhibit the offering of [computer processing] services,” and (2) to “assur[e] nondiscriminatory access to common carrier telecommunications facilities by all providers of [computer processing] services.”<sup>31</sup>

To distinguish between computer processing services and the underlying transmission service, the FCC created two classifications of services: *basic service* and *enhanced service*.<sup>32</sup> Basic service was described as the offering of “a pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer supplied information.”<sup>33</sup> Examples of basic service include telephone exchange service, telephone toll service, and data transmission service.<sup>34</sup> Enhanced services were defined as “services, offered over common carrier transmission facilities used in interstate communications, which employ computer processing applications that act on the format, content, code, protocol or similar aspects of the subscriber’s transmitted information; provide the subscriber additional, different, or restructured information; or involve subscriber interaction with stored information.”<sup>35</sup> Examples of enhanced service include email and data processing services involving the use of communication facilities.<sup>36</sup>

The classification of a service turns on the functionality provided.<sup>37</sup> A basic service offers to end users transmission of a user’s information over a communications path.<sup>38</sup> Basic services may be offered to end users and to enhanced service providers, e.g., exchange services.<sup>39</sup> An enhanced service offers to end users an application that provides the user with additional information, transformed information, and/or interaction with information.<sup>40</sup>

The delineation between basic and enhanced services was designed as a bright-line test; a service would be deemed either a basic or enhanced service but not both.<sup>41</sup> The boundary between basic and enhanced service is critical. The FCC placed an upper bound on the scope of a basic service, describing it as “limited to the offering of transmission capacity between two or more points suitable for a user’s transmission needs and subject only to the technical parameters of fidelity or distortion criteria, or other conditioning.”<sup>42</sup>

This framework for classification would later serve as a model for the *Modification of Final Judgement* (discussed in Section II.C) and for the *Telecommunications Act of 1996* (hereafter *1996 Act*, discussed in Section

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31. *Id.* at para. 116.

32. *Id.* at para. 92.

33. *Id.* at para. 96.

34. *Id.* at para. 94.

35. 47 C.F.R. § 64.702(a).

36. *Computer II*, 77 FCC 2d at 420-21, para. 97.

37. Robert Cannon, *The Legacy of the Federal Communications Commission’s Computer Inquiries*, 55 FED. COMM. L.J., 167, 186 (2003).

38. *Id.* at 183-85.

39. *Id.*

40. *Id.* at 185-86.

41. *Id.* at 187 (citing *Computer II*, 77 FCC 2d at para. 97).

42. *Computer II*, 77 FCC 2d at 419-20, para. 95.

II.D).<sup>43</sup> The definition of *telecommunications service* in the *1996 Act* and the framework set out by *NARUC I* and *NARUC II* will later set the landscape that determines whether broadband Internet access service is a common carrier service, as we will discuss in Section VII.<sup>44</sup>

Since one of the issues in the proceeding was the regulation of computer processing services, the role of computer processing in basic services and in enhanced services deserves additional attention here. Clearly computer processing is used in the offering of computer processing services. However, the FCC recognized that computer processing is also used in the provision of basic services.<sup>45</sup> Although enhanced services may “employ computer processing applications that act on the format, content, code, protocol, or similar aspects of the subscriber’s transmitted information,” the use of computer processing by a service does not imply that it is an enhanced service.<sup>46</sup> To determine whether the use of computer processing in the provision of a service results in the classification of that service as an enhanced service, the FCC set out a “facilitates” test.<sup>47</sup> If such computer processing is used in a manner that facilitates the use of—but does not alter the fundamental character of—the basic service, then it is considered to be an *adjunct-to-basic service*.<sup>48</sup> Such adjunct-to-basic services are regulated in the same fashion as is the basic service.<sup>49</sup> For example, the FCC explained that “[u]se internal to the carrier’s facility of companding techniques, bandwidth compression techniques, circuit switching, message or packet switching, error control techniques, etc. that facilitate economical, reliable movement of information does not alter the nature of the basic service.”<sup>50</sup>

A few types of computer processing—routing, addressing, address translation, storage, and protocol conversion—feature prominently in later proceedings and play an outsized role in the current debate over whether broadband Internet access service is a telecommunications service.<sup>51</sup> Routing that facilitates the use of—but does not alter the fundamental character of—end-to-end transmission is part of the basic service.<sup>52</sup> Network services often append a variety of types of addresses to communications for the purpose of managing the network service.<sup>53</sup> Addressing that facilitates the use of—but does not alter the fundamental character of—end-to-end transmission is also

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43. See *infra* §§ II.C and II.D.

44. See *infra* § VII.

45. *Computer II*, 77 FCC 2d at 421, para. 98.

46. 47 CFR § 64.702(a).

47. Cannon, *supra* note 37, at 189.

48. *Id.*

49. Amendment of Section 64.702 of the Commission’s Rules & Regulations (Third Computer Inquiry), *Report and Order*, 104 FCC 2d 958, 965-66, para. 7 (1986) [hereinafter *Computer III*].

50. *Computer II*, 77 FCC 2d at 419-20, para. 95.

51. See *infra* §§ VI-VIII.

52. *Computer II*, 77 FCC 2d at 421, para. 98 (discussing both circuit-switching and packet-switching).

53. See, e.g., JAMES F. KUROSE & KEITH W. ROSS, *COMPUTER NETWORKING: A TOP-DOWN APPROACH* § 2.1.2 (Pearson ed., 7th ed. 2017).

part of the basic service.<sup>54</sup> Similarly, address translation that facilitates the use of—but does not alter the fundamental character of—end-to-end transmission is part of the basic service.<sup>55</sup> Thus, services such as “call forwarding, speed calling, [and] directory assistance” used in conjunction with plain-old-telephone-service are part of the basic service.<sup>56</sup> In contrast, reverse directory assistance (from telephone number to name) does not facilitate the use of the basic service and is thus an enhanced service.<sup>57</sup>

“[S]torage within the network [that] is used only to facilitate the transmission of the information from the origination to its destination” is similarly part of a basic service.<sup>58</sup> In particular, the FCC explained that “packet switching, for example, is a store and forward technology that may be employed in providing basic services.”<sup>59</sup> In contrast, storage used to offer an enhanced service (e.g., voice-mail, email, or automatic call answering) is part of that enhanced service.<sup>60</sup>

Protocol conversion is similarly part of a basic service when it is used to facilitate the transmission of information and part of an enhanced service when it is used to act on the subscriber’s transmitted information.<sup>61</sup> Protocol conversion for the purpose of transmitting information without change in form or content is part of the basic transmission service.<sup>62</sup> In contrast, protocol conversion for the purpose of “allowing disparate terminals to communicate with one another” is an enhanced service.<sup>63</sup> The FCC further explained this delineation in the *Non-Accounting Safeguards Order*, discussed in Section II.E.<sup>64</sup>

Having established these two classifications—basic service and enhanced service—the FCC considered the regulatory treatment of each. There are two important questions here. First, how should a basic service be regulated? For instance, must a facilities-based enhanced service provider offer the underlying basic service to enhanced service providers, and if so, on what terms? Second, how should an enhanced service be regulated?

The FCC considers two cases: (1) an enhanced service offered by a provider that obtains the underlying basic service from itself (a *facilities-based enhanced service*), and (2) an enhanced service offered by a provider that obtains the underlying basic service from another provider (a *non-facilities-based enhanced service*).<sup>65</sup> In the Internet, it is common that an end user obtains a basic service (i.e., broadband Internet access service) from a

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54. Amendment of Section 64.702 of the Commission’s Rules & Regulations (Second Computer Inquiry), *Notice of Inquiry and Proposed Rulemaking*, 61 FCC 2d 103, 108-09, para. 18 (1976) [hereinafter *Computer II NOI*].

55. *Id.*

56. *Computer II*, 77 FCC 2d at 421, para. 98.

57. Cannon, *supra* note 37, at 189.

58. *Computer II*, 77 FCC 2d at 419-20, para. 95.

59. *Id.* at para. 97, n.35.

60. *Id.* at paras. 97-98.

61. *Id.* at para. 99.

62. *Id.*

63. *Id.*

64. *See infra* § II.E.

65. *See infra* § V.B.

common carrier and separately obtains an enhanced service (i.e., an application) from a noncommon carrier.<sup>66</sup> However, at the time of the *Computer II Final Decision* this was not yet common, and thus the Order focussed on the case in which an enhanced service provider obtains the basic service from a common carrier, combines it with enhanced service capabilities, and sells the resulting service.<sup>67</sup>

A basic service passes the first *NARUC* test (that a common carrier communications service transmits intelligence of a customer's own design and choosing) because it offers "a pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer supplied information."<sup>68</sup>

If the basic service is offered to the public, then it also passes the second *NARUC* test (that the service provider "undertakes to carry for all people indifferently"). If so, then a basic service is a common carrier service, which without FCC discretion and by statute is regulated under Title II of the Communications Act.<sup>69</sup> However, this case was not yet common.

It remains to be determined the regulatory status of a basic service in the case that a facilities-based enhanced service provider does not wish to offer the underlying basic service to the public or to enhanced service providers on a common carrier basis. The question at hand is whether this basic service *must be offered* to non-facilities-based enhanced service providers on a common carrier basis. If the basic service is not offered to the public, it may fail the second *NARUC* test, and in this case it is within the FCC's discretion to require the basic service provider "to serve all potential customers indifferently, thus making [the service a common carrier service] within the meaning of the [Communications Act]," if doing so is in the public interest.<sup>70</sup>

Although such a public interest analysis is outside the scope of this paper, a brief review will inform the ensuing discussion. Recall that one of the policy goals in the proceeding was to "assur[e] nondiscriminatory access to common carrier telecommunications facilities by all providers of enhanced services."<sup>71</sup> The FCC recognized that "enhanced services are dependent upon

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66. See, e.g., KUROSE & ROSS, *supra* note 53, at Ch. 2.

67. *Computer II*, 77 FCC 2d at 387, para. 5.

68. *Id.* at para. 96 (referring to the test in Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC, 533 F.2d 601, 609 (D.C. Cir. 1976) (*NARUC II*)).

69. *Id.* at para. 114.

70. Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC, 525 F.2d 630, 644, n.76 (D.C. Cir. 1976) (*NARUC I*); see also Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities et al., *Report and Order and Notice of Proposed Rulemaking*, 20 FCC Rcd 14853, 14875-76, para. 41 n.108 (2005) [hereinafter *Wireline Broadband Classification Order*], describing *NARUC I* ("In the absence of an express statutory requirement that a particular service be offered on a common carrier basis, the [FCC] and the courts have interpreted whether the public interest requires a common carrier service based on a number of factors related to the service at issue"), and V.I. Tel. Corp. v. FCC, 198 F.3d 921 (D.C. Cir. 1999) describing *NARUC I* and *NARUC II* ("a carrier has to be regulated as a common carrier if it will make capacity available to the public indifferently or if the public interest requires common carrier operation") (internal quotations and citation omitted).

71. *Computer II*, 77 FCC 2d at 429, para. 116.

the . . . offering of basic services.”<sup>72</sup> The underlying basic service provides “a ‘pure transmission’ service which forms the basis upon which all ‘enhanced’ services are provided.”<sup>73</sup> In the case in which a facilities-based enhanced service provider does not wish to offer the basic service to the public, the FCC found that it was in the public interest to require that the basic service be offered to all other enhanced service providers on the same terms and conditions as it offered the basic service to itself.<sup>74</sup> Thus, even in this case, the basic service is a common carrier service regulated under Title II.<sup>75</sup> Furthermore, the FCC specifically rejected the theory that bundling enhanced capabilities with an underlying common carrier basic service removes the basic service from Title II.<sup>76</sup>

The result in either case is that basic service is a common carrier service, and thus must be offered without unreasonable discrimination, per Section 202 of the Communications Act.<sup>77</sup> Basic service providers thus “no longer control the use to which [a basic service] is put,” and thus a basic service may be used by a consumer “for voice, data, video, facsimile, or other [applications].”<sup>78</sup>

The FCC turned next to the classification and regulatory treatment of enhanced services.<sup>79</sup> There are two important questions here. First, does an enhanced service contain a common carrier service? Second, if not, is it in the public interest to require an enhanced service to be regulated as a common carrier service?

At the time of *Computer II*, the FCC viewed the relationship between basic service and enhanced service using an input model.<sup>80</sup> The basic service was an input that an enhanced services provider combined with computer processing to produce an enhanced service (warning: the input model does not apply to the Internet, as we will discuss in later sections of this Article<sup>81</sup>). Thus, the FCC considered enhanced services in which “communications and data processing technologies have become intertwined so thoroughly as to produce a form different from any explicitly recognized in the Communications Act.”<sup>82</sup>

If an enhanced service is intertwined with the underlying basic service to the extent that it no longer transmits intelligence of a customer’s own design and choosing, then it fails the first *NARUC* test. If an enhanced service

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72. *Id.* at para. 231.

73. *Id.* at para. 90 (quoting Amendment of Section 64.702 of the Commission’s Rules and Regulations (Second Computer Inquiry), *Tentative Decision and Further Notice of Inquiry and Rulemaking*, 72 FCC 2d 358, 398, para. 75).

74. *Computer II*, 77 FCC 2d at 474-75, paras. 229-31.

75. *Id.* at para. 231.

76. Independent Data Communications Manuf. Association, Inc., *Memorandum Opinion and Order*, 10 FCC Rcd 13717, 13720, 13722-23, paras. 18, 41-45 (1995) [hereinafter *Frame Relay Order*].

77. 47 U.S.C. § 202.

78. *Computer II*, 77 FCC 2d at 419, para 94.

79. *Id.* at para. 114.

80. *Id.* at para. 5.

81. *See infra* § 4.

82. *Computer II*, 77 FCC 2d at 430, para. 120.

is not offered to the public, then it fails the second *NARUC* test.<sup>83</sup> If an enhanced service fails either test, it is not mandated to be a common carrier service.<sup>84</sup> In this case, the FCC asked whether it would be in the public interest to require an enhanced service to be regulated as a common carrier service.<sup>85</sup> Recall that one of the policy goals in the proceeding was to "not directly or indirectly inhibit the offering of enhanced services."<sup>86</sup> The FCC found that it was not in the public interest to regulate enhanced services that failed either *NARUC* test as a common carrier service.<sup>87</sup> The rationale given for this decision is twofold. First, this lightweight approach would afford enhanced service providers "tremendous flexibility because there is no restriction on the types of services they may provide."<sup>88</sup> Second, the requirement that the underlying basic service be offered on a nondiscriminatory basis enables competition in enhanced services.<sup>89</sup>

The policy outcome of the *Computer II Final Decision* is that the enhanced services market is competitive because the underlying basic service is available to enhanced service providers on a common carrier basis.<sup>90</sup> The importance of the common carrier status of the underlying basic service cannot be overstated. The availability of the underlying basic service on a nondiscriminatory basis is essential to the decision to classify facilities-based enhanced services as noncommon carrier services. Without such access to basic service, basic and enhanced services could not be designed and offered separately, and the development of an enhanced service market would be crippled. However, the existence of an underlying basic service and the regulatory status of the underlying transmission would both be questioned in future proceedings.

### C. Modification of Final Judgement (1982)

The 1982 *Modification of Final Judgement (MFJ)* was a consent decree that broke AT&T up into a company offering long distance phone service and a set of companies offering local phone service.<sup>91</sup> The *MFJ* included restrictions on the services that regional Bell Operating Companies (RBOCs) were allowed to offer, in order to "prevent the occurrence or recurrence of anticompetitive conduct."<sup>92</sup> The restrictions were intended to ensure that enhanced service providers could obtain access to basic service and avoid the

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83. See *supra* § 2.A.

84. Cherry & Peha Comments, *supra* note 25, at 3-4.

85. *Computer II*, 77 FCC 2d at 428, para. 114.

86. *Id.* at para. 116.

87. *Id.* at paras. 114-18. The FCC retained regulatory authority over enhanced services under Title I.

88. *Id.* at para. 117.

89. See *id.* at para. 116.

90. *Id.* at paras. 127-28.

91. *United States v. Am. Tel. & Tel. Co.*, 552 F. Supp. 131 (D.D.C. 1983) (*MFJ*).

92. *Id.* at 186.

type of discrimination and cross-subsidization that were the basis for the lawsuit.<sup>93</sup>

To delineate the services that RBOCs were allowed to offer, the *MFJ* defined *telecommunications service* based on the FCC's description of basic service and defined *information service* based on the FCC's definition of enhanced service.

First, the *MFJ* defined a pure transmission capability:<sup>94</sup>

"Telecommunications" means the transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received, by means of electromagnetic transmission, with or without benefit of any closed transmission medium, including all instrumentalities, facilities, apparatus, and services (including the collection, storage, forwarding, switching, and delivery of such information) essential to such transmission.

Telecommunications is limited to transmission and management of such transmission, as is a basic service.<sup>95</sup> The *MFJ*'s definition takes the FCC's description of a basic service as transmission "between two or more points" and clarifies that the points are specified by the user.<sup>96</sup> The *MFJ*'s definition also takes the FCC's description of a basic service as providing a "pure transmission capability . . . that is virtually transparent in terms of its interaction with customer supplied information" and clarifies that the information is of the user's choosing and that telecommunications does not change the form or content of this information.<sup>97</sup> Both clarifications are consistent with the first *NARUC* test—that a common carrier communications service transmit intelligence of a customer's own design and choosing.<sup>98</sup>

Second, the *MFJ* defined telecommunication facilities:<sup>99</sup>

"Telecommunications facilities" means equipment (including without limitation wire, cable, microwave, satellite, and fibre-optics) that transmit information by electromagnetic means or which directly support such transmission, but does not include customer premises equipment.

Finally, the *MFJ* defined a telecommunications service offered for payment: "Telecommunications service" means the offering for hire of

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93. *Id.* at 142.

94. *Id.* at 229.

95. *Id.*

96. *Computer II*, 77 FCC 2d at 419-20, para. 95.

97. *Id.* at para. 96.

98. Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC, 533 F.2d 601, 609 (D.C. Cir. 1976) (*NARUC II*).

99. United States v. Am. Tel. & Tel. Co., 552 F. Supp. 131, 229-30 (D.D.C. 1983) (*MFJ*).

telecommunications facilities, or of telecommunications by means of such facilities.<sup>100</sup>

A telecommunications service thus passes the second *NARUC* test—that the service provider “undertakes to carry for all people indifferently.”<sup>101</sup> Putting together these definitions, note that a *telecommunications service* could be either: (a) the offering for hire of the transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received ..., or (b) the offering for hire of equipment ... that transmit information ....<sup>102</sup>

The first version of a telecommunications service is similar to the FCC's description of a basic service in *Computer II*.<sup>103</sup> The second version of a telecommunications service is similar to the FCC's description of a *communications service* in its *Computer I Final Decision*.<sup>104</sup> Both versions would later become relevant as dial-up Internet access service developed.

The *MFJ* also adapted the FCC's definition of an enhanced service to create a definition of an *information service*.<sup>105</sup>

“Information service” means the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information which may be conveyed via telecommunications, except that such service does not include any use of any such capability for the management, control, or operation of a telecommunication system or the management of a telecommunications service.

In this definition, the *MFJ* restated the functionality provided by an enhanced service from “services ... which employ computer processing applications that act on the format, content, code, protocol or similar aspects of the subscriber's transmitted information; provide the subscriber additional, different, or restructured information; or involve subscriber interaction with stored information,”<sup>106</sup> into “the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information ....”<sup>107</sup>

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100. *Id.* at 229.

101. Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC, 525 F.2d 630, 641 (D.C. Cir. 1976) (*NARUC I*) (citations omitted).

102. *MFJ*, 552 F. Supp. at 229-30.

103. Cannon, *supra* note 37, at 183-85.

104. In *Computer I*, the FCC distinguished *communications services* and *data processing services*, and disallowed the use of communications services equipment for data processing services. Regulatory and Policy Problems Presented by the Interdependence of Computer & Communication Services, *Final Decision and Order*, 28 FCC 2d 267, 273-74, para. 20 (1971) [hereinafter *Computer I*]; see also Cannon, *supra* note 37, at 173-79. This equipment-based approach was changed in *Computer II* to a services-based approach. *Computer II*, 77 FCC 2d at 391-93, paras. 19-24.

105. *MFJ*, 552 F. Supp. at 229.

106. 47 C.F.R. § 64.702(a).

107. *MFJ*, 552 F. Supp. at 229.



The list of functionalities is parallel: “that act on the format, content, code, protocol or similar aspects of the subscriber’s transmitted information” becomes “transforming, [or] processing ... information;” “provide the subscriber additional, different, or restructured information” becomes “generating, acquiring, ... retrieving, ... [or] making available information;” and “involve subscriber interaction with stored information” becomes “storing ... [or] utilizing... .. information.”<sup>108</sup>

The *MFJ*’s definitions of telecommunications service and information service would later serve as the basis for similar terms used in the *Telecommunications Act of 1996*, which in turn remain the relevant statutory terms today.<sup>109</sup>

Because the *MFJ*’s definition of telecommunications mirrors the FCC’s description of basic service in *Computer II*, a telecommunications service offers transmission of a user’s information.<sup>110</sup> The *MFJ* included in telecommunications more than just that used for voice applications.<sup>111</sup> It discussed multiple subsets of exchange service, including exchange service for the purpose of originating or terminating interexchange telecommunications (*exchange access service*), and exchange service for the purpose of originating, terminating, switching, forwarding, or routing of telecommunications to or from information services providers (*information access service*).<sup>112</sup> Similarly, because the *MFJ*’s definition of information service mirrors the FCC’s definition of basic enhanced service in *Computer II*, an information service offers an application that provides the user with additional information, transformed information, and/or interaction with information.<sup>113</sup>

The *MFJ* also clarifies the role of computer processing in telecommunications and information services. Similar to the approach taken by the FCC in *Computer II* to address computer processing in basic services and in enhanced services, telecommunications includes “all instrumentalities, facilities, apparatus, and services (including the collection, storage, forwarding, switching, and delivery of such information) essential to such transmission.”<sup>114</sup> The FCC called such computer processing *adjunct-to-basic services* and regulated them in the same fashion as the basic service that it facilitates, whereas the *MFJ* simply included such services in the definition of telecommunications.<sup>115</sup> To maintain the bright line between telecommunications service and information service, the *MFJ* correspondingly excluded from an information service “any use of any

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108. Compare the definition of enhanced service in 47 C.F.R. § 64.702(a) with the definition of information service in *MFJ*, 552 F. Supp. at 229.

109. See *infra* § II.D.

110. Compare the description of basic service in *Computer II*, 77 FCC 2d at 419-20, para. 95, with the definition of telecommunications service in *MFJ*, 552 F. Supp. at 229.

111. *MFJ*, 552 F. Supp. at 228-29.

112. *Id.*

113. Compare the definition of enhanced service in 47 C.F.R. § 64.702(a) with the definition of information service in *MFJ*, 552 F. Supp. at 229.

114. Cannon, *supra* note 37, at 189; *MFJ*, 552 F. Supp. at 229.

115. Compare the description of adjunct-to-basic service in *Computer III*, 104 FCC 2d at 965-66, para. 7, with the definition of telecommunications in *MFJ*, 552 F. Supp. at 229.

[capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information] for the management, control, or operation of a telecommunication system or the management of a telecommunications service."<sup>116</sup> Thus—in the *MFJ* as under *Computer II*—routing, addressing, address translation, storage, and protocol conversion are part of a telecommunications service when used to facilitate that telecommunications service and are part of an information service when used to facilitate that information service.<sup>117</sup>

Having established these two categories—telecommunications service and information service—the *MFJ* court considered which services RBOCs could offer and on what terms.<sup>118</sup> As in *Computer II*, the key issues included the regulatory classification of a telecommunications service and the terms on which a telecommunications service is available to information service providers.<sup>119</sup>

The *MFJ* left unchanged the regulatory classification of telecommunications services as common carrier communications services regulated under Title II.<sup>120</sup> In the case in which a telecommunications provider offers such service to the public, it is a telecommunications service classified as a common carrier service, under both the *MFJ* and *Computer II*.<sup>121</sup> However, whereas the FCC also determined that it was in the public interest to classify a basic service as a common carrier service if a facilities-based enhanced service provider does not wish to offer the basic service to the public, the *MFJ* simply prohibited RBOCs from offering any such telecommunications on a noncommon carrier basis.<sup>122</sup> The result is that telecommunications service is a common carrier service, and thus must be offered without unreasonable discrimination, per Section 202 of the Communications Act.

The *MFJ* court turned next to the issue of whether RBOCs should be allowed to offer facilities-based information services. The *MFJ* court was similarly concerned, as was the FCC, that if RBOCs were allowed to offer facilities-based information services, they would have the incentive and ability to discriminate against competing non-facilities-based information service providers and could do so by “providing more favorable access to [telecommunications] for their own information services than to the information services provided by competitors, and ... to subsidize the prices of their [information] services with revenues from the local exchange monopoly.”<sup>123</sup>

The relation of an information service to telecommunications mirrors that of enhanced service to the underlying basic service. In the FCC’s *Computer II*, basic services “serve as the foundation for all enhanced

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116. *MFJ*, 552 F. Supp. at 229.

117. *See supra* § II.B.

118. *MFJ*, 552 F. Supp. at 186-94.

119. *Id.* at 189-90, 195.

120. *Id.* at 231-32.

121. *See supra* § II.B.

122. *MFJ*, 552 F. Supp. at 228.

123. *Id.* at 189.

services.”<sup>124</sup> The *MFJ*’s definition of information service transforms the FCC’s phrase “offered over common carrier transmission facilities” into “which may be conveyed via telecommunications,” taking advantage of the definition of *telecommunications* and clarifying that an information service is offered over telecommunications.<sup>125</sup> Furthermore, the *MFJ* states that “[a]ll information services are provided directly via the telecommunications network.”<sup>126</sup>

In *Computer II*, common carrier regulation of basic services “assur[es] nondiscriminatory access . . . by all providers of enhanced services.”<sup>127</sup> The *MFJ* court was similarly concerned that absent regulation, RBOCs “could discriminate by providing more favorable access to the local network for their own information services than to the information services provided by competitors.”<sup>128</sup> To address this concern, the *MFJ* not only continued common carrier regulation of telecommunication services, it also prohibited RBOCs from offering information services.<sup>129</sup>

Furthermore, whereas the FCC’s *Computer II* did not address enhanced capabilities offered over noncommon carrier services, the *MFJ*—by differentiating between *telecommunications* and *telecommunications service*—considered information services offered *via telecommunications* but not *via a telecommunications service*.<sup>130</sup> This expansion of scope resulted in a prohibition on RBOCs not only from offering information services via their own telecommunications services, but also from offering information services via other telecommunications.<sup>131</sup>

The *MFJ* court did not disturb the FCC’s regulation of information services.<sup>132</sup> Thus, if an enhanced service was deemed to be a noncommon carrier service, then an information service would be similarly deemed to be a noncommon carrier service.

#### *D. Telecommunications Act of 1996*

In 1996, Congress passed a broad revision of the Communications Act, the Telecommunications Act of 1996 (“1996 Act”).<sup>133</sup>

The principle purpose of the 1996 Act was “to provide for a procompetitive, de-regulatory national policy framework designed to accelerate rapidly private sector deployment of advanced telecommunications

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124. *Computer II*, 77 FCC 2d at para. 116.

125. Compare the definition of enhanced service in 47 C.F.R. § 64.702(a) with the definition of information service in *MFJ*, 552 F. Supp. at 229.

126. *MFJ*, 552 F. Supp. at 189.

127. *Computer II*, 77 FCC 2d at 429, para. 116.

128. *MFJ*, 552 F. Supp. at 189.

129. *Id.* at 227. This prohibition was removed in 1991 by the District Court of the District of Columbia. Cannon, *supra* note 37, at 199.

130. Compare the definition of enhanced service in 47 C.F.R. § 64.702(a) with the definition of information service in *MFJ*, 552 F. Supp. at 229.

131. *MFJ*, 552 F. Supp. at 229.

132. *Id.* at 231-32.

133. Telecommunications Act of 1996, Pub. L. No. 104-104 (1996) [hereinafter 1996 Act].

and information technologies and services to all Americans by opening all telecommunications markets to competition.”<sup>134</sup> It thus had similar goals to *Computer II*, except that it foresaw that nondiscriminatory access to telecommunications services for information services may eventually be achieved by increasing competition in telecommunications services and thus exercising forbearance.<sup>135</sup> Both the expectation of competition in telecommunication services and the lack of such competition would become important in later proceedings.<sup>136</sup>

The 1996 Act placed into statute revisions to the *MFJ*’s definitions for telecommunications service and information service.

The 1996 Act first adapted the *MFJ*’s definition of *telecommunications*: The term “telecommunications” means the transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.<sup>137</sup>

This definition is identical to the first part of the *MFJ*’s definition of telecommunications. It removed the qualifying phrase “by means of electromagnetic transmission, with or without benefit of any closed transmission medium,”<sup>138</sup> which is not needed since Title II of the Communications Act pertains to “communication by wire or radio.”<sup>139</sup> It also removed explicit inclusion of “all instrumentalities, facilities, apparatus, and services (including the collection, storage, forwarding, switching, and delivery of such information) essential to such transmission,” which is not needed due to the corresponding exclusion of such functionalities from information service.

Because the 1996 Act’s definition of telecommunications mirrors the *MFJ*’s corresponding definition, telecommunications remains limited to transmission of information of the user’s choosing and management of such transmission.<sup>140</sup>

Although the 1996 Act also updated the *MFJ*’s definition of *telecommunications equipment*, that definition is not relevant to the discussion here.

The 1996 Act then adapted the *MFJ*’s definition of *telecommunications service*: The term “telecommunications service” means the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.<sup>141</sup>

Whereas the *MFJ* included the offering of either telecommunications facilities or of telecommunications by means of telecommunications facilities, the 1996 Act focused on telecommunications regardless of the

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134. See S. REP. NO. 104-230, at 113 (1996) [hereinafter *1996 Act Conference Report*].

135. *Computer II*, 77 FCC 2d at 389-90, para. 15.

136. See *infra* §§ V-VIII.

137. 47 U.S.C. § 153(50).

138. *United States v. Am. Tel. & Tel. Co.*, 552 F. Supp. 131, 229 (D.D.C. 1983) (*MFJ*).

139. 47 U.S.C. § 201.

140. Compare the *MFJ*’s definition of telecommunications in *MFJ*, 552 F. Supp. at 229 with the 1996 Act’s definition of telecommunications at 47 U.S.C. § 153(50).

141. 47 U.S.C. § 153(53).

facilities used.<sup>142</sup> This approach is consistent with the change in focus from equipment in the FCC's *Computer I* to the focus on functionality in the FCC's *Computer II*.<sup>143</sup> In addition, the 1996 Act clarified that "for hire" means "for a fee directly to the public, or to such classes of users as to be effectively available directly to the public," consistent with Title II's application to common carriers.<sup>144</sup>

Finally, the 1996 Act adapted the *MFJ*'s definition of *information service*.<sup>145</sup>

The term "information service" means the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications, and includes electronic publishing, but does not include any use of any such capability for the management, control, or operation of a telecommunications system or the management of a telecommunications service.

The list of capabilities is the same as in the *MFJ*'s definition.<sup>146</sup> As with the *MFJ*'s definitions of telecommunications service and information service—and as with the FCC's prior classifications of basic service and enhanced service—telecommunications service still offers transmission of a user's information, while an information service still offers an application that provides the user with additional information, transformed information, and/or interaction with information.<sup>147</sup>

The 1996 Act also excluded from an information service "any use of any [capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information] for the management, control, or operation of a telecommunication system or the management of a telecommunications service"—commonly referred to as the telecommunications systems management exception.<sup>148</sup> Thus—as under *Computer II* and the *MFJ*—routing, addressing, address translation, storage, and protocol conversion are part of a telecommunications service when used to facilitate that telecommunications service and are part of an information service when used to facilitate that information service.<sup>149</sup>

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142. Compare the *MFJ*'s definition of telecommunications service in *MFJ*, 552 F. Supp. at 229 with the 1996 Act's definition of telecommunications service at 47 U.S.C. § 153(53).

143. See *supra* note 105.

144. 47 U.S.C. § 153(53).

145. *Id.* at § 153(24).

146. Compare the definition of information service in *MFJ*, 552 F. Supp. at 229 with the definition of information service at § 153(24).

147. Compare the *MFJ*'s definition of telecommunications service in *MFJ*, 552 F. Supp. at 229 with the 1996 Act's definition of telecommunications service at 47 U.S.C. § 153(53), and compare the definition of information service in *MFJ*, 552 F. Supp. at 229 with the definition of information service at § 153(24).

148. 47 U.S.C. § 153(24).

149. Compare the definition of information service in *MFJ*, 552 F. Supp. at 229 with the definition of information service at § 153(24).

Having established these two classifications—telecommunications service and information service—Congress considered the regulatory treatment of each.<sup>150</sup> *Computer II* considered both non-facilities-based enhanced service and facilities-based enhanced service, while the *MFJ* addressed only non-facilities-based information service, due to the prohibition of RBOCs offering information services.<sup>151</sup> The 1996 Act returned to the approach taken in *Computer II*, considering both facilities-based information service and non-facilities-based information service.<sup>152</sup>

In the 1996 Act, the relation of an information service to telecommunications remained as it was under the *MFJ*, similar to the relation of enhanced service to basic service.<sup>153</sup> Whereas in the *MFJ*, an information service “may [be] conveyed via telecommunications,” in the 1996 Act an information service must now be an offering “via telecommunications.”<sup>154</sup> As in the *MFJ*, in the 1996 Act, the use of telecommunications is not restricted to voice applications.<sup>155</sup> Finally, as in the *MFJ*, an information service may be offered either via a telecommunications service or via private telecommunications.<sup>156</sup>

The 1996 Act dictated that telecommunications service shall be a common carrier service under the Communications Act.<sup>157</sup> The two *NARUC* tests are embedded in the definition of *telecommunications service*.<sup>158</sup> Thus, telecommunications offered to the public is a telecommunications service, without FCC discretion, and by statute is regulated under Title II.<sup>159</sup> Under the 1996 Act, the discretionary ability of the FCC to require telecommunications to be offered on a common carrier basis (i.e., as a telecommunications service), if doing so is in the public interest, remains intact.<sup>160</sup>

This leaves open the question that arose in *Computer II* about the regulatory status of telecommunications in the case in which a facilities-based information service provider does not wish to offer the underlying telecommunications to the public. *Computer II* recognized that “enhanced services are dependent upon the . . . offering of basic services.”<sup>161</sup> The 1996 Act similarly recognized that an information service is an offering “via

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150. 47 U.S.C. § 153(51).

151. See *supra* §§ II.B and II.C.

152. The 1996 Act does not prohibit common carriers from offering information services.

153. Compare the definition of information service in *MFJ*, 552 F. Supp. at 229 with the definition of information service at § 153(24).

154. *Id.*

155. Compare the *MFJ*'s definition of telecommunications in *MFJ*, 552 F. Supp. at 229 with the 1996 Act's definition of telecommunications at 47 U.S.C. § 153(50).

156. 1996 Act Conference Report, S. REP. NO. 104-230, at 115 (1996).

157. 47 U.S.C. § 153(51).

158. See *supra* § II.A. See also *United States Telecom Ass'n v. FCC*, 825 F.3d 674, 711 (D.C. Cir 2016) (*USTelecom*) (“US Telecom cites no case, nor are we aware of one, holding that when the [FCC] invokes the statutory test for common carriage, it must also apply the *NARUC* test.”).

159. See *Cherry & Peha Comments*, *supra* note 25, at 3-4.

160. *Id.*

161. *Computer II*, 77 FCC 2d at 474-75, para. 231.

telecommunications,” and sets forth the purpose of “ensur[ing] the ability of . . . information providers to seamlessly and transparently transmit and receive information between and across telecommunications networks.”<sup>162</sup> In *Computer II*, the FCC found that it was in the public interest to require that the underlying basic service be offered to all other enhanced service providers on the same terms and conditions as it offered the basic service to itself.<sup>163</sup> The 1996 Act similarly required that the underlying telecommunications service be available to non-facilities-based information services on the same terms and conditions as the corresponding telecommunications is available to the carrier’s facilities-based information service.<sup>164</sup> Thus, under the 1996 Act, information services are competitive, because the underlying telecommunications offered by a facilities-based information service provider is available with common carriage protections.<sup>165</sup>

Finally, Congress turned to the classification and regulatory treatment of information services. As in *Computer II*, there are two important questions. First, does an information service contain a common carrier service? Second, if not, is it in the public interest to require an information service to be regulated as a common carrier service? Although dial-up Internet access service was beginning to be offered to the public, frustratingly this was not yet the manner in which Congress discussed information services.<sup>166</sup> The view, as under *Computer II*, remained that of an input model.<sup>167</sup> In this model, telecommunications is an input that an information service provider combines with information service capabilities to produce an information service. The 1996 Act did not explicitly answer the question of whether an information service contains a common carrier service.<sup>168</sup> That question would later be addressed in numerous proceedings discussed below. However, the 1996 Act specified that “[a] telecommunications carrier shall be treated as a common carrier under this Act only to the extent that it is engaged in providing telecommunications services,”<sup>169</sup> and thus information services are regulated under Title I.

### *E. Non-Accounting Safeguards Order (1996)*

Following passage of the Telecommunications Act of 1996, the FCC took a number of actions to implement the law. The *Non-Accounting Safeguards Order* concerned services that a RBOC could only offer through

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162. 47 U.S.C. § 256(a)(2).

163. *Computer II*, 77 FCC 2d at 474-75, paras. 229-31.

164. See 47 U.S.C. § 251(g).

165. *Id.*

166. See *infra* § V.

167. *Computer II*, 77 FCC 2d at 387, para. 5.

168. The FCC would later determine that telecommunications service and information services are mutually exclusive categories, as discussed in § II.E.

169. 47 U.S.C. § 153(51).

a separate affiliate.<sup>170</sup> As part of the proceeding, the FCC examined the relationship between *enhanced services*, as defined in *Computer II*, and *information services*, as defined in the 1996 Act.<sup>171</sup> The Order concluded that “all of the services that the [FCC] has previously considered to be ‘enhanced services’ are ‘information services.’”<sup>172</sup>

The Order then considered the role of protocol conversion and protocol processing in classification of a service. It found that *end-to-end protocol conversion*, which “enables an end-user to send information into a network in one protocol and have it exit the network in a different protocol,” is an information service because it was classified as an enhanced service.<sup>173</sup> It also found that a protocol processing service that “interpret[s] and react[s] to protocol information associated with the transmission of end-user content” is an information service, because the market for such services is highly competitive.<sup>174</sup>

However, the Order also concluded that the three categories of protocol processing services that “result in no net protocol conversion to the end-user” were classified as basic services and would be classified under the telecommunications systems management exception as telecommunications services: “protocol processing 1) involving communications between an end user and the network itself (e.g., for initiation, routing, and termination of calls) rather than between or among users; 2) in connection with the introduction of a new basic network technology (which requires protocol conversion to maintain compatibility with existing CPE); and 3) involving internetworking (conversions taking place solely within the carrier’s network to facilitate provision of a basic network service, that result in no net conversion to the end user).”<sup>175</sup>

The Order concluded that services previously classified as adjunct-to-basic would be classified under the telecommunications systems management exception as telecommunications services.<sup>176</sup> Finally, the Order concluded that telecommunications services and information services are mutually exclusive.<sup>177</sup>

None of these decisions in the Order disturb our analysis above of the 1996 Act.

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170. Implementation of the Non-Accounting Safeguards of Sections 271 and 272 of the Communications Act of 1934, as Amended, *First Report and Order and Further Notice of Proposed Rulemaking*, 11 FCC Rcd 21905 (1996) [hereinafter *Non-Accounting Safeguards Order*].

171. *Id.* at paras. 99-107.

172. *Id.* at para. 102.

173. *Id.* at para. 104.

174. *Id.*

175. *Id.* at para. 106.

176. *Id.* at para. 107.

177. *Id.* at para. 102.



### III. PRECURSORS TO DIAL-UP INTERNET ACCESS SERVICE

During the 1980s, the use of personal computers became widespread.<sup>178</sup> The core protocols of the Internet—the Internet Protocol (IP) and the Transmission Control Protocol (TCP)—were standardized and became the dominant method of offering packet switching.<sup>179</sup> Regulatory treatment of precursors to dial-up Internet access service was set forth in two court orders and an FCC order during 1987-1990.

#### A. *United States v. Western Electric* (1987)

The *MFJ* prohibited RBOCs from providing information services.<sup>180</sup> In *United States v. Western Electric*, the D.C. District Court considered those companies' request for the removal of this restriction.<sup>181</sup> The court rejected the request for a complete removal of the restriction.<sup>182</sup> However, the court separately considered whether RBOCs should be allowed "to acquire and operate the infrastructure necessary for the transmission of information services generated by others."<sup>183</sup>

The type of service motivating the court was "videotex."<sup>184</sup> These services were precursors to dial-up Internet access.<sup>185</sup> They were offered using a combination of the Public Switched Telephone Network (PSTN) and packet switched networks.<sup>186</sup>

The Teletel service, offered by the French state-owned telephone company, offered consumers access to unaffiliated third-party content.<sup>187</sup> Teletel only worked with Minitel terminals and required users to have both telephone service and Teletel service.<sup>188</sup> A user would connect to the Teletel service by establishing a data connection over the PSTN service between the end-user device and a Teletel access point.<sup>189</sup> The Teletel service would transmit data between the access point and content servers over a packet switched network operated by the French state-owned telephone company,

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178. *History of Personal Computers*, WIKIPEDIA, [https://en.wikipedia.org/wiki/History\\_of\\_personal\\_computers](https://en.wikipedia.org/wiki/History_of_personal_computers) [<https://perma.cc/AQ99-8FD3>].

179. *Internet Engineering Task Force, Transmission Control Protocol*, RFC 791 (Sept. 1981) (*IP Standard*), <https://tools.ietf.org/html/rfc791> [<https://perma.cc/NCB6-4NVZ>]; *Internet Engineering Task Force, Transmission Control Protocol*, RFC 793 (Sept. 1981) (*TCP Standard*), <https://tools.ietf.org/html/rfc793> [<https://perma.cc/WAZ4-9N5G>].

180. *United States v. Am. Tel. & Tel. Co.*, 552 F. Supp. 131, 227 (D.D.C. 1983) (*MFJ*).

181. *United States v. W. Elec.*, 673 F. Supp. 525, 529 (D.D.C. 1987) (*Western Electric* 1987).

182. *Id.* at 552.

183. *Id.* at 587.

184. *Id.* at 587-88.

185. *See, e.g.*, JULIEN MAILLAND & KEVIN DRISCOLL, *MINITEL: WELCOME TO THE INTERNET* (MIT Press, 1st ed, 2017).

186. *Id.*

187. *Western Electric* 1987, 673 F. Supp. at 588-89.

188. *Id.*

189. *Id.*

which was itself layered over the French PSTN.<sup>190</sup> Because the Teletel service was offered by the same company that owned and operated the underlying PSTN, this was a facilities-based service.<sup>191</sup>

CompuServe's CIS offered consumers file transfer, email, and newsgroups, but not yet Internet access.<sup>192</sup> Content was provided by the users themselves, by unaffiliated third parties, and by CompuServe.<sup>193</sup> CIS worked with personal computers and required users to have both telephone service and CIS.<sup>194</sup> A user would connect to CIS by establishing a data connection over the PSTN service between the personal computer and a CIS access point.<sup>195</sup> CIS would transmit data between the access point and content servers over a packet switched network operated by CompuServe, which was itself layered over leased PSTN lines.<sup>196</sup> Because CIS was not offered by the same company that owned and operated the underlying PSTN, this was a non-facilities-based service.<sup>197</sup>

The court placed both facilities-based service (e.g., the Teletel service in France) and non-facilities-based service (e.g., the CompuServe Information Service (CIS) in the United States) in the "videotex" category.<sup>198</sup> However, the remainder of the decision focuses solely on the question of whether RBOCs should be allowed "to acquire and operate the infrastructure necessary for the transmission of information services generated by others," namely to offer a facilities-based service.<sup>199</sup>

While the court does not formally define the terms, it describes three components in the transmission of information services generated by others: *gateways*, *gateway facilities*, and *gateway functions*.<sup>200</sup> The *gateways* converted signals between the communication protocol used by end terminals and the communication protocol used by the packet switched network and by the information servers.<sup>201</sup> *Gateway facilities* consisted of the devices required to construct a packet switched network on top of the PSTN.<sup>202</sup>

The court observed that "the infrastructure necessary for the transmission of information services consists primarily of various low-level gateway functions that do not involve control of or interaction with information content."<sup>203</sup> The court considered the following *gateway functions*: (1) data transmission, (2) address translation, (3) protocol

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190. *Id.*

191. *Id.*

192. *See, e.g., CompuServe*, WIKIPEDIA, <https://en.wikipedia.org/wiki/CompuServe> [<https://perma.cc/TD9F-TEDH>].

193. *Id.*

194. *Id.*

195. *Id.*

196. *Id.*

197. *Id.*

198. *United States v. W. Elec.*, 673 F. Supp. 525, 588 (D.D.C. 1987) (*Western Electric* 1987).

199. *Id.* at 587.

200. *Id.* at 591-92.

201. *Id.* at 591.

202. *Id.* at 591-92.

203. *Id.* at 592.

conversion, (4) billing management,<sup>204</sup> and (5) introductory information content.<sup>205</sup>

Data transmission in gateway service includes demodulation, error rate measurement, and rendering of characters on the display.<sup>206</sup> The court classified this function as telecommunications, and thus RBOCs could offer this function under the *MFJ*.<sup>207</sup>

Address translation in gateway service consisted of translation from a short code dialed by the user to a corresponding phone number for the gateway service.<sup>208</sup> Such address translation is akin to that provided for 800 numbers, which the FCC designated as an adjunct-to-basic service,<sup>209</sup> and the court similarly classified this function as telecommunications.<sup>210</sup>

Protocol conversion in gateway service consisted of “altering and reconfiguring message content at the machine level . . . in order to facilitate the communication between information service providers.”<sup>211</sup> Under the *MFJ*, protocol conversion is part of a telecommunications service when used to facilitate that telecommunications service and is part of an information service when used to facilitate that information service.<sup>212</sup> The court in *United States v. Western Electric* similarly classified protocol conversion that does not change form or content as telecommunications, and classified “protocol conversion services that manipulate content beyond that which is necessary for the transmission of [information] services” as an information service.<sup>213</sup> However, the court separately considered “those protocol conversion functions that are necessary to enhance transparency of communication between consumers and information service providers,” such as those used in the Teletel service to convert the communications protocol used in the simple Minitel terminals to the communications protocol used in the packet switched network and by the information servers.<sup>214</sup> Because this type of protocol conversion is used “to facilitate the communication between information service providers,” the court considered this to be an information service.<sup>215</sup> However, the court found that such limited functionality posed no significant risk of anticompetitive conduct, and it granted a modification of the *MFJ* to allow RBOCs to offer this gateway function.<sup>216</sup>

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204. We don’t consider billing management further, as it is not relevant to the ensuing analysis.

205. *Western Electric 1987*, 673 F. Supp. at 592-596.

206. *Id.* at 592.

207. *Id.* at 592-93.

208. *Id.* at 593.

209. Federal-State Joint Board on Universal Service, *Report and Order*, 12 FCC Rcd 8776, 9175-76, para. 780 (1997) [hereinafter *Universal Service First Report and Order*].

210. *Western Electric 1987*, 673 F. Supp. at 593.

211. *Id.* at 593.

212. *See supra* § II.C.

213. *Western Electric 1987*, 673 F. Supp. at 594.

214. *Id.* at 593-94.

215. *Id.*

216. *Id.*

The court limited introductory information content in gateway service to the display of a welcoming page and provider listings.<sup>217</sup> The court classified the offering of such content as an information service, but it found that such limited content posed no significant risk of anticompetitive conduct and granted a modification of the *MFJ* to allow RBOCs to offer this gateway function.<sup>218</sup>

In summary, the court found that gateway service included both telecommunications and an information service.<sup>219</sup> The telecommunications component was already allowed under the *MFJ*.<sup>220</sup> The court granted modifications of the *MFJ* to allow RBOCs to offer “information services needed for transmission that only insignificantly affect content” but not to offer information services that “constitute content.”<sup>221</sup> These information services consisted of protocol conversion and introductory information content.<sup>222</sup>

It is worth noting that the information services needed for transmission would become obsolete within the next decade.<sup>223</sup> The type of protocol conversion discussed here was no longer required when more sophisticated end-user devices (e.g., personal computers) started using the same communications protocol (namely TCP-IP) as the content servers.<sup>224</sup> Furthermore, the introductory information content discussed here was no longer required when search engines were introduced into the Internet.<sup>225</sup> Without either of these functionalities, the remaining gateway service was considered by the court to be a telecommunications service.<sup>226</sup>

### B. Gateway Services Order (1988)

In the year following the *United States v. Western Electric* decision, the FCC considered the request of Bell Atlantic, a RBOC, to offer a facilities-based gateway service.<sup>227</sup> The gateway service would offer consumers access to unaffiliated third-party content.<sup>228</sup> The service would work with personal computers, and the consumer would be required to have both telephone service and the Bell Atlantic gateway service.<sup>229</sup> A user would connect to the

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217. *Id.* at 595.

218. *Id.* at 594-95.

219. *Id.* at 592-97.

220. *See supra* § II.C.

221. *United States v. W. Elec.*, 673 F. Supp. 525, 595 (D.D.C. 1987) (*Western Electric 1987*).

222. *Id.* at 593-95.

223. KUROSE & ROSS, *supra* note 53, at § 4.1.2; ANDREW S. TANENBAUM & DAVID. J. WEATHERALL, *COMPUTER NETWORKS* § 7.3.6 (Prentice Hall, 5th ed. 2011).

224. KUROSE & ROSS, *supra* note 53, at § 4.1.2.

225. TANENBAUM & WEATHERALL, *supra* note 223, at § 7.3.6.

226. *Western Electric 1987*, 673 F. Supp. at 593-95.

227. The Bell Atlantic Telephone Companies Offer of Comparably Efficient Interconnection to Providers of Gateway Services, *Memorandum Opinion and Order*, 3 FCC Red 6045 (1988) [hereinafter *Gateway Services Order*].

228. *Id.* at 3-4.

229. *Id.*

gateway service by establishing a data connection over the PSTN service between the personal computer and a gateway service access point.<sup>230</sup> The gateway service would transmit data between the access point and content servers over a packet switched network operated by a Bell Atlantic contractor.<sup>231</sup> The Bell Atlantic gateway service was similar to the French Teletel service, except that personal computers replaced Minitel terminals.<sup>232</sup>

The gateway functions included data transmission, protocol conversion, and introductory information content.<sup>233</sup> Data transmission included transmission across Bell Atlantic's packet switched network, as well as transmission across the underlying PSTN network.<sup>234</sup> Protocol conversion consisted of conversion between the communications protocol used by the consumer's modem and that used by the packet switched network and presumably by the information servers.<sup>235</sup> The introductory information content consisted of a menu of enhanced service providers and a rudimentary search engine.<sup>236</sup>

All of these functions are similar to the corresponding functions described in the 1987 *United States v. Western Electric* decision.<sup>237</sup> Similar to that decision, the *Gateway Services Order* classified the gateway service as an enhanced service, based on the protocol conversion and on the introductory information content.<sup>238</sup> The classification as an enhanced service relies on Bell Atlantic's representation that the gateway service is overlaid on an underlying basic service and that the underlying basic service is available without discrimination to potential third-party gateway service providers.<sup>239</sup>

For the same reasons discussed in Section II.A, the protocol conversion and introductory information content discussed in the Order would become obsolete within the next decade, and absent these functions the gateway service would have been classified as a basic service.<sup>240</sup>

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230. *Id.*

231. *Id.*

232. Compare the description of *Gateway Services Order* to the description of the French Teletel service in *United States v. W. Elec.*, 673 F. Supp. 525 (D.D.C. 1987) (*Western Electric 1987*).

233. *Gateway Services Order*, 3 FCC Rcd at 6045, paras. 3-4.

234. *Id.*

235. *Id.*

236. *Id.*

237. The Order did not explain whether the communications protocol used by the content servers was that used by the consumer's modem or that used by the packet switched network. We presume the latter, since the protocol conversion is then similar to that considered in *Western Electric 1987*, 673 F. Supp. at 593 and is properly classified as an enhanced service. If the former, the protocol conversion in the Bell Atlantic service does not change form or content of the communication and would have been properly classified as an adjunct-to-basic service.

238. *Gateway Services Order*, 3 FCC Rcd at 6046, para. 7.

239. *Id.* at 12.

240. *See supra* § II.A.

*C. United States v. Western Electric (1990)*

In 1990, the D.C. Circuit Court again considered the gateway services offered by Bell Atlantic and other RBOCs.<sup>241</sup> This time, the court considered whether RBOCs may offer gateway services utilizing leased interexchange lines without charging the customer separately for interexchange service.<sup>242</sup> The *MFJ* had prohibited RBOCs from offering interexchange telecommunications services.<sup>243</sup> In this case, the RBOCs argued that the interexchange portion of the gateway service was *telecommunications* but not a *telecommunications service* because it was not a service offered to the public separately from the gateway service.<sup>244</sup> The court found that there was an interexchange telecommunications service separable from the gateway service and that the bundling of a telecommunications service with a separable information service does not convert the bundle into an information service.<sup>245</sup>

#### IV. THE ARCHITECTURE OF DIAL-UP INTERNET ACCESS AND BROADBAND INTERNET ACCESS

Both *Computer II* and the *MFJ* had envisioned that information services would be offered using an input model—namely, that the information service provider would procure telecommunications, combine it with computer processing, and sell the resulting information service to the consumer.<sup>246</sup> Furthermore, both *Computer II* and the *MFJ* had envisioned that the information service functionality (e.g. data processing) may be intertwined with the underlying telecommunications to the extent that an information service no longer transmits intelligence of a customer's own design and choosing and thus is no longer telecommunications.<sup>247</sup>

Both assumptions—that telecommunications is an input to an information service, and that information service functionality is intertwined with the underlying telecommunications—were appropriate at the time. The distributed computing applications that served as the inspiration for information services were at that time provisioned using telecommunications as an input.<sup>248</sup> Furthermore, applications offered over the PSTN often intertwined communications with data processing.<sup>249</sup>

However, both assumptions fail with the Internet. To understand why, we need to digress in this section of the paper and review Internet architecture. Section IV.A discusses Internet services and how they are organized. Section

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241. *United States v. W. Elec.*, 907 F.2d 160 (D.C. Cir. 1990) (*Western Electric 1990*).

242. *Id.* at 162.

243. *United States v. Am. Tel. & Tel. Co.*, 552 F. Supp. 131, 186 (D.D.C. 1983) (*MFJ*).

244. *Id.* at 163.

245. *Id.*

246. *See supra* § II.B-C.

247. *Id.*

248. *See supra* § II.B.

249. *Id.*

IV.B discusses the geography of the Internet and relates Internet services to the location of network elements. Section IV.C discusses the separability of Internet services offered by various providers.

#### *A. Internet Services and Layers*

A communications network is composed of a set of communications links and devices.<sup>250</sup> Each network device (e.g., a router) provides a set of *network services*.<sup>251</sup> The central tenet upon which the Internet is designed is that these network services are organized into *network layers*, and that the lower layer network services are *standardized*.<sup>252</sup>

Layering is a form of modularity.<sup>253</sup> Modular architectures are a common organizing principle for building large complex systems.<sup>254</sup> Modular architectures allow the designer of one module to interconnect this module with other modules by understanding only: (1) the network service provided by other modules, and (2) the messages transmitted between modules.<sup>255</sup> Modular architectures free the designer of one module from the requirement to understand the way in which services provided by other modules are implemented.<sup>256</sup>

Layered architectures place additional restrictions on the interconnection of various modules. First, a layered architecture imposes a vertical abstraction amongst modules.<sup>257</sup> A layered architecture defines a set of layers, and each module is implemented within a single layer.<sup>258</sup> Second, in a layered architecture, each module may only directly communicate with the layers immediately above and below it.<sup>259</sup> Thus, a module within a particular layer may offer a network service to the layer immediately above, and it may request the network services of the layer immediately below.<sup>260</sup> These two restrictions (vertical abstraction and communication between modules) limit the design space, but they have proven over the history of the Internet to provide ample benefits in the design and operation of network services.<sup>261</sup>

The reference model for the Internet is the Internet layer model, as pictured in Figure 1.<sup>262</sup> It is useful to think of the physical connection (e.g.,

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250. See KUROSE & ROSS, *supra* note 53, at § 1.1.2.

251. *Id.* Not all network services are offered to the public. A provider may implement network services that it only makes available to itself.

252. Robert Braden, *Internet Engineering Task Force, Requirements for Internet Hosts – Communications Layers*, RFC 1122 (Oct. 1989) (*Internet Layers Standard*), <https://tools.ietf.org/html/rfc1122> [<https://perma.cc/7CWU-WW7A>]; KUROSE & ROSS, *supra* note 53, at §§ 1.1, 1.5.1.

253. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.3.

254. *Id.*

255. *Id.*

256. *Id.*

257. *Id.*

258. *Id.*

259. *Id.*

260. *Id.*

261. *Id.*

262. *Id.* at § 1.4.

wire) as being located below the bottom-most layer (bit transmission) and the user (e.g., you) as being located above the top-most layer (edge provider content). In the following, we discuss the network services offered at each network layer.

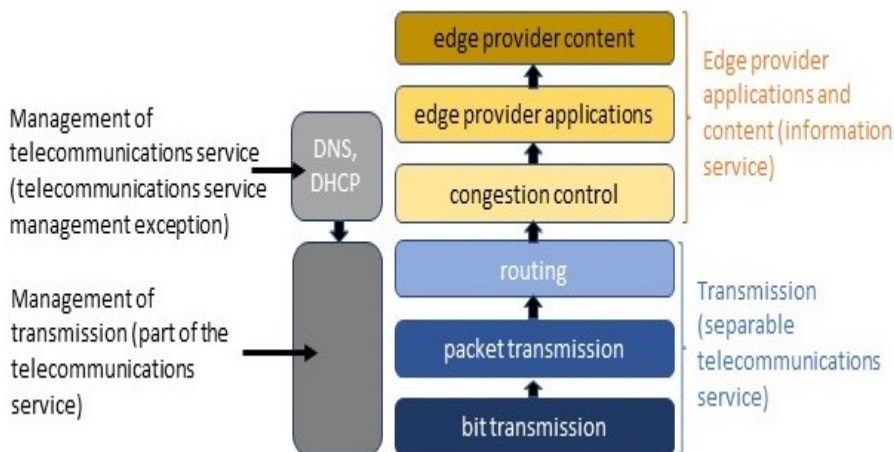


Figure 1: Internet layers.

Network service (e.g., part of Wi-Fi) at layer 1, the *physical layer*, is concerned with bit transmission.<sup>263</sup> It transmits a bit along one communications link.<sup>264</sup> This network service is implemented by modules at the physical layer at each end of a communications link.<sup>265</sup> The module in the device at the transmitting side of the communications link encodes each bit into a physical signal and transmits the signal onto the communications link.<sup>266</sup> The module in the device at the receiving side of the communications link receives the signal from the communications link and decodes the physical signal into a bit.<sup>267</sup>

Network service (e.g., the other part of Wi-Fi) at layer 2, the *data link layer*, is concerned with packet transmission.<sup>268</sup> It transmits packets from one device to another device on the same local area network.<sup>269</sup> This network service is implemented by the combination of physical layer and data link layer modules in each device along the communications path within that local area network.<sup>270</sup> The data link layer module in the source device on the local area network determines when it may access the communications link and requests the physical layer service to transmit each bit in the packet along a

263. *Id.* at Ch. 2.

264. *Id.*

265. *Id.*

266. *Id.*

267. *Id.*

268. KUROSE & ROSS, *supra* note 53, at Ch. 6.

269. *Id.*

270. *Id.*



communications link.<sup>271</sup> The data link layer module in each hub or switch along the communications path within the local area network stores and forwards each packet, using a physical layer service to receive and transmit the physical signal.<sup>272</sup> The data link layer module in the destination device on the local area network utilizes the physical layer service to receive each bit and then combines the bits back into a packet.<sup>273</sup> Prominent physical layer and data link layer services include Ethernet, Wi-Fi, DSL, DOCSIS, and 4G.<sup>274</sup>

Internet service (IP) at layer 3, the *network layer*, is concerned with routing.<sup>275</sup> The Internet Protocol (IP) service transmits packets from one end of the Internet to another end of the Internet.<sup>276</sup> This network service is implemented by the combination of physical layer through network layer modules in each end user device and in each router along the end-to-end communications path.<sup>277</sup> The IP module in the source device determines the first router on the path and requests the data link layer service to transmit each packet to that router.<sup>278</sup> The IP module in each router on the path stores, forwards, and routes each packet, using the data link layer service to receive each packet from the previous local area network and to transmit each packet onto the next local area network.<sup>279</sup> The IP module in the destination device utilizes the data link layer service to receive each packet.<sup>280</sup> All communications over the Internet use the IP service.<sup>281</sup>

The IP service thus provides the transmission, between or among points specified by the user, of information of the user's choosing.

Internet service (TCP or UDP) at layer 4, the *transport layer*, is concerned with congestion control.<sup>282</sup> TCP retransmits packets that did not arrive at the destination and limits when each packet is transmitted from the source to manage network congestion.<sup>283</sup> Almost all communications over the Internet either use the transport layer Transmission Control Protocol (TCP) or the transport layer User Datagram Protocol (UDP).<sup>284</sup>

Network services communicate via network protocols.<sup>285</sup> A *network protocol* defines "the format and the order of messages exchanged between two or more communicating entities, as well as the actions taken on the transmission and/or receipt of a message or other event."<sup>286</sup> If a network service relies on lower layer services that use incompatible protocols, then the

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271. *Id.*

272. *Id.*

273. *Id.*

274. *Id.*

275. *Id.* at Chs. 4-5.

276. *Id.*

277. *Id.*

278. *Id.*

279. *Id.*

280. *Id.*

281. *Id.*

282. *Id.* at Ch.3.

283. *Id.*

284. *Id.*

285. *Id.* at § 1.1.

286. *Id.* at 9.

network service may implement protocol conversion.<sup>287</sup> For instance, if the previous and next local area networks use different communication protocols, the IP service in a router converts from one protocol to another to implement its end-to-end service.<sup>288</sup> Each network service may append information to a packet for the purposes of managing its service. In particular, a variety of types of addresses are often appended.<sup>289</sup> However, any service at the physical layer through the transport layer must remove any such appended information before the packet is given to the layer above.<sup>290</sup>

Thus, from the point of view of an application, the information received from IP at the destination is the same (and is in the same form) as the information sent via IP at the source.<sup>291</sup> The IP service thus provides the transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received.

Internet services at layer 7, the *application layer*, offer three types of network services:<sup>292</sup>

- Internet services that offer applications to end-users. Examples are email, web browsing, video streaming, voice calling, and video chat. These are the applications end users are familiar with.
- Internet services that offer to applications more complex services than those offered by TCP or UDP. An example is the hypertext transfer protocol (http). These are usually not directly utilized by end users, but they are utilized by applications that end users are familiar with.
- Network services that manage lower layer network services. An example is IP address assignment, typically accomplished using the DHCP protocol. These are quite different in function and purpose from applications, since they are implemented by a broadband Internet access service provider in order to manage the functionality provided by the underlying layers. As explained below, these fall within the telecommunications systems management exception.

### *B. Geography of the Internet*

A variety of entities operate portions of the Internet. Networks operated by various entities are interconnected to form the Internet.<sup>293</sup> Both dial-up Internet access service and broadband Internet access service are provided

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287. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.4.

288. KUROSE & ROSS, *supra* note 53, at Ch. 4.

289. *Id.* at § 1.5.2. Data link layer protocols append Medium Access Control (MAC) addresses, IP appends IP addresses, and various applications append application layer addresses (e.g., hostnames).

290. *Id.*

291. *Id.* at Ch. 4.

292. *Id.* at Ch. 2.

293. *Id.* at §§ 1.2-1.3.

over a communications path that often crosses networks operated by different entities.<sup>294</sup>

To use *dial-up Internet access service*, the consumer purchases both local phone (telephone exchange) service and a dial-up Internet access service.<sup>295</sup> The dial-up Internet access service provider operates modem banks, leases lines, provides packet switching over those leased lines, and makes interconnection arrangements to ensure subscribers' ability to transmit data to and receive data from all Internet endpoints.<sup>296</sup> As pictured in Figure 2, both the end-user's computer and the edge provider's server implement all network layers.<sup>297</sup> Intermediate devices—including telephone switches on the route between the customer and the modem bank, telephone switches on the leased lines, and packet switches operating over the leased lines—implement the physical through network layers to provide circuit-switched and packet-switched routing.<sup>298</sup> Additional network services are provided at the transport and application layers to manage lower layer network services, e.g., translation from domain names to IP addresses.<sup>299</sup>

A common communications path for dial-up Internet access service is shown in Figure 2. The Internet connection originates on a computer, passes through a communications link to a modem inside a consumer's residence, through in-home communication links to a demarcation point where the local phone service starts, through communication links operated by the local phone company to a central office, across the local phone company's network to a modem bank operated by the dial-up Internet access service provider, across phone company lines leased by the dial-up Internet access service provider, through an interconnection point to a transit provider's network, across the transit provider's network, through another interconnection point to the edge provider's network, across the edge provider's network, and to the desired edge provider's server.

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294. *Id.*

295. *See infra* § V.B.ii.

296. *See, e.g.,* Federal-State Joint Board on Universal Service, *Report to Congress*, 13 FCC Red 11501, 11531-33, paras. 62-66 (1998) [hereinafter *Stevens Report*].

297. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.4.

298. *Id.*

299. KUROSE & ROSS, *supra* note 53, at Chs. 3-4.

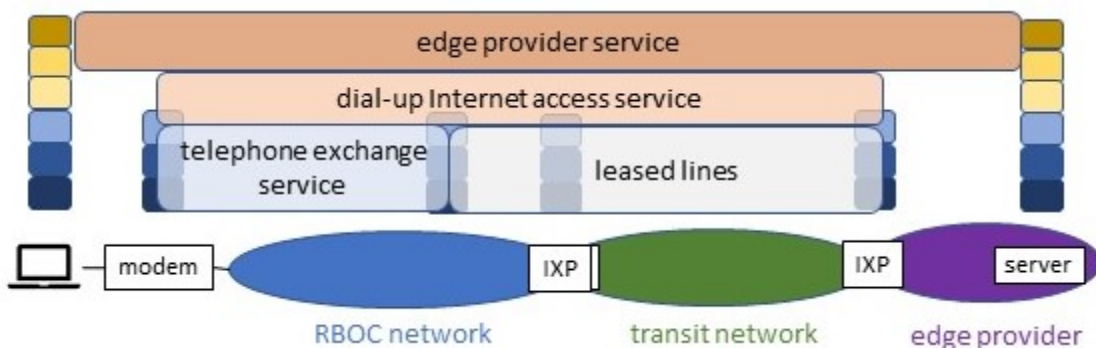


Figure 2: Dial-up Internet access service.

In contrast, to use *broadband Internet access service*, the consumer need only purchase the broadband Internet access service. The broadband Internet access service provider operates a packet-switched network and makes interconnection arrangements to ensure subscribers' ability to transmit data to and receive data from all Internet endpoints. As pictured in Figure 3, both the end-user's computer and the edge provider's server implement all network layers. Intermediate devices—principally routers—implement the physical through network layers to provide the IP service.<sup>300</sup> Additional network services are provided at the transport and application layers to manage lower layer network services, e.g., translation from domain names to IP addresses and port blocking for network security.<sup>301</sup>

A common communications path for fixed broadband Internet access service is shown in Figure 3. The Internet connection originates on a consumer's device, passes across in-home communication links (often Wi-Fi) to a cable or DSL modem inside the consumer's residence, across the broadband Internet access service provider's network, through an interconnection point to a transit provider's network, across the transit provider's network, through another interconnection point to the edge provider's network, across the edge provider's network, and to the desired edge provider's server.<sup>302</sup> For mobile broadband Internet access service, the path is similar, except that the modem is contained in the mobile device.<sup>303</sup>

300. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.4.

301. KUROSE & ROSS, *supra* note 53, at Chs. 3-4.

302. There are other common situations. First, a Content Delivery Network (CDN) may replace the transit provider's network. Second, there may be an additional broadband Internet access service provider's network in the path to the edge provider. *See id.* at §§ 1.2-1.3, 2.6.3.

303. *Id.* at Ch. 7.

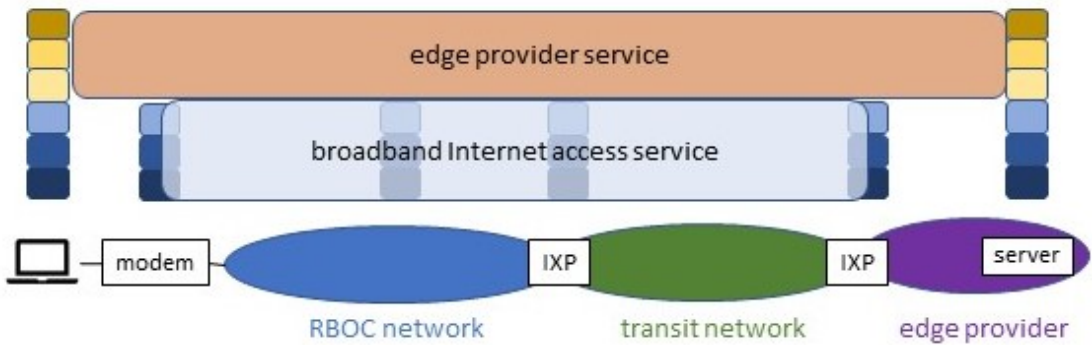


Figure 3: Broadband Internet access service.

### C. Separability of Network Services

The Internet Engineering Task Force (IETF) develops Internet standards, including the Internet Protocol (IP), used by all Internet communications, and the Transmission Control Protocol (TCP).<sup>304</sup> These protocols have standardized functions and standardized interfaces to other protocols.<sup>305</sup> Standardized software interfaces are the software equivalent of the standardized modular telephone plugs we are all familiar with. They make possible the interoperability of devices and software designed by different entities.

Modularity and standardization of interfaces are exactly what makes the Internet possible. One result of modularity and standardization of interfaces is that edge providers can design applications without the need for coordination with or permission from broadband Internet access service providers who offer the lower layer IP packet transfer service.<sup>306</sup> Another result of modularity and standardization of interfaces is that device manufacturers can design Internet-connected devices without the need for coordination with or permission from broadband Internet access service providers.<sup>307</sup>

Without modularity and standardization of interfaces, the incredibly wide variety of Internet-connected devices and Internet applications would not be possible. The modularity of network services guarantees that different entities can provide different network services and that these network services can interoperate with other.<sup>308</sup>

In order to use dial-up Internet access service, a consumer must purchase both a local phone service and a dial-up Internet access service.<sup>309</sup>

304. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.6.

305. *Id.*

306. *Id.* at § 1.4.

307. *Id.*

308. *Id.*

309. *See infra* § V.B.ii.

Modularity and standardization of interfaces guarantees that the two services can be provided by different entities.<sup>310</sup>

Similarly, in order to use email, a consumer must both purchase Internet access service and obtain access to an email service.<sup>311</sup> Modularity and standardization of interfaces again guarantees that the two services can be provided by different entities.<sup>312</sup>

The Internet's architecture guarantees that the IP packet transfer service, which provides end-to-end transmission of information of the user's choosing, is separable from the applications (such as webpage hosting, caching of newsgroup articles, and email) riding over it. Protocols at the physical, data link, and network layers are designed separately from Internet applications.<sup>313</sup> The Internet Protocol that transmits packets from one end of the Internet to another end is standardized and is independent of all of the Internet applications that are offered through it.<sup>314</sup> Protocols at the physical, data link, and network layers are implemented in the operating systems of end user devices and are not in any way integrated in those operating systems with Internet applications.<sup>315</sup> The result is that Internet applications may be offered by entities other than broadband Internet access service providers.<sup>316</sup>

It is also important to recognize that the relationship between network services is not symmetric. In a layered architecture, a module at one layer may request a network service provided by a lower layer.<sup>317</sup> Although it may pass information to a higher layer, it may not request a network service from a higher layer.<sup>318</sup> Thus, while a service at one layer may rely on the network services provided by lower layers, it may not rely on network service provided by higher layers.<sup>319</sup> For instance, while an email application (at the application layer) clearly relies on lower layer services such as the IP packet transfer service to transmit and route the packets that comprise a piece of email, the IP packet transfer service that transmits and routes packets from one end of the Internet to another does not rely on application layer services such as email.<sup>320</sup> Thus, an email service is useless without Internet access service. However, an Internet access service is useful without an email service. This lack of symmetry is fundamental to Internet design and to the separability of telecommunications service from information services.

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310. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.4.

311. KUROSE & ROSS, *supra* note 53, at § 2.3.

312. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.4.

313. *Id.*

314. *IP Standard*, *supra* note 179.

315. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.4.

316. *Id.*

317. *Id.* at § 1.3.

318. *Id.*

319. *Id.*

320. *Id.*

## V. DIAL-UP INTERNET ACCESS SERVICE

By the 1990s, a small percentage of the public was purchasing Internet access.<sup>321</sup> The principal means of access was dial-up Internet access service.<sup>322</sup> Regulatory treatment of dial-up Internet access was set forth in an FCC Order and an FCC Report during 1997-1998 following the passage of the Telecommunications Act of 1996.<sup>323</sup>

### A. *Universal Service Order (1997)*

The 1996 Act defined *telecommunications service* and directed the FCC to establish an “evolving level of telecommunications services” that shall be supported by the federal universal service system.<sup>324</sup> The FCC initially implemented this directive in the 1997 *Universal Service Order*.<sup>325</sup> The Order briefly examined the classification of dial-up Internet access service.<sup>326</sup> It first found that packet switched services may be classified as telecommunications.<sup>327</sup> It observed, without further analysis, that dial-up Internet access service may include protocol conversion and interaction with stored data that may render it an information service.<sup>328</sup> It also found that the underlying telephone service over the PSTN is separable from the dial-up Internet access service.<sup>329</sup> Finally, the Order postponed a decision about the classification of dial-up Internet access service until a future proceeding.<sup>330</sup>

### B. *Stevens Report (1998)*

In 1997, Congress directed the FCC “to report to Congress on the [FCC]’s implementation of certain provisions of the Telecommunications Act of 1996 regarding the universal service system.”<sup>331</sup> In 1998, the FCC issued the requested Report to Congress (the “Stevens Report”).<sup>332</sup> Part of the Stevens Report discussed telecommunications, telecommunications services, and information services in general.<sup>333</sup> Another part of the Report discussed dial-up Internet access service in particular.<sup>334</sup> We address these in the next two subsections.

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321. *History of the Internet*, WIKIPEDIA, [https://en.wikipedia.org/wiki/History\\_of\\_the\\_Internet](https://en.wikipedia.org/wiki/History_of_the_Internet) [<https://perma.cc/9XY8-YQC4>].

322. *Id.*

323. *See infra* §§ V.A-B.

324. 47 U.S.C. § 254(c)(1).

325. *Universal Service First Report and Order*, 12 FCC Rcd 8776.

326. *Id.* at paras. 789-90.

327. *Id.* at para. 780.

328. *Id.* at para. 789.

329. *Id.*

330. *Id.* at para. 790.

331. *Stevens Report*, 13 FCC Rcd at 11501-03, para. 1.

332. *Id.* at 11501.

333. *See infra* § V.B.i.

334. *See infra* § V.B.ii.

### 1. Telecommunications, Telecommunications Services, and Information Services

Congress required the FCC to review “the definitions of ‘information service,’ ‘local exchange carrier,’ ‘telecommunications,’ ‘telecommunications service,’ ‘telecommunications carrier,’ and ‘telephone exchange service,’” and to review “the application of those definitions . . . to mixed or hybrid services and the impact of such application on universal service definitions and support.”<sup>335</sup>

The Report first found that “Congress intended the categories of ‘telecommunications service’ and ‘information service’ to parallel the definitions of ‘basic service’ and ‘enhanced service’ developed in [the FCC’s] *Computer II* proceeding, and the definitions of ‘telecommunications’ and ‘information service’ developed in the [MFJ].”<sup>336</sup> The Report then affirmed the FCC’s “prior findings that the categories of ‘telecommunications service’ and ‘information service’ in the 1996 Act are mutually exclusive.”<sup>337</sup> The Report described and did not disturb the classification of protocol conversion and protocol processing as put forth in the *Non-Accounting Safeguards Order*.<sup>338</sup>

In section II.D, we discussed that the 1996 Act dictates that telecommunications offered to the public is a telecommunications service that without FCC discretion and by statute is regulated under Title II. We also discussed that the 1996 Act requires that the telecommunications service underlying a carrier’s facilities-based information service be available to non-facilities-based information services on the same terms and conditions as the corresponding telecommunications is available to the carrier’s facilities-based information service.<sup>339</sup> Nothing in the *Stevens Report* disturbs these conclusions.<sup>340</sup>

The Report turns next to the question of the application of those definitions to “mixed or hybrid services” as requested by Congress.<sup>341</sup> Although both *Computer II* and the *1996 Act* considered both non-facilities-based information service and facilities-based information service, the Report only addresses facilities-based service when addressing this question.<sup>342</sup>

The Report postulates two cases: (i) “the consumer is receiving two separate and distinct services,”<sup>343</sup> or (ii) the consumer is receiving a single information service in which the underlying telecommunications is “inseparable.”<sup>344</sup>

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335. *Stevens Report*, 13 FCC Rcd at 11507-08, paras. 13-14.

336. *Id.* at para. 21.

337. *Id.* at para. 39.

338. *Id.* at para. 50.

339. *See supra* § II.D.

340. *Stevens Report*, 13 FCC Rcd at 11511, para. 21.

341. *Id.* at para. 56.

342. *Id.* at para. 55.

343. *Id.* at para. 60.

344. *Id.* at para. 56.



In the case where a consumer is receiving two separate and distinct services, the Report concludes there are separate offerings of an information service and an underlying telecommunications service.<sup>345</sup> This conclusion is consistent with previous findings by the FCC starting with *Computer II*, as well as with the *MFJ*'s requirement of separability between an information service and an underlying telecommunications service.<sup>346</sup>

In the case in which a consumer is receiving a facilities-based information service where the underlying telecommunications is inseparable, the Report concludes that the single service is solely an information service.<sup>347</sup> Given *Computer II*'s focus on data processing services, the *Stevens Report*'s assumption that an inseparable service may exist may have been rationale at the time when considering telecommunications, telecommunications services, and information services in general. However, as discussed in Section IV, the assumption is not applicable to the Internet.<sup>348</sup> It should also be noted that *Computer II* was focused on enhanced services using underlying basic services, and it required that basic service be separable from enhanced service.<sup>349</sup> Unfortunately, the *Stevens Report* did not investigate whether there were any such inseparable services offered at that time.<sup>350</sup> The Report also did not discuss how the FCC would determine whether underlying telecommunications is separable or inseparable from an information service.<sup>351</sup> Furthermore, the Report reiterated that bundling an information service with an underlying telecommunications service does not render them inseparable.<sup>352</sup> If such inseparable underlying telecommunications were to exist, the Report stated that the FCC intended to consider whether the information service should contribute to universal service support, but it did not determine whether the underlying telecommunications is subject to other Title II requirements.<sup>353</sup> Finally, the Report reiterates the assumption that the market for the provision of the telecommunications underlying information services is either competitive or "subject to sufficient pro-competitive safeguards."<sup>354</sup>

## 2. Dial-up Internet Access Service

Having addressed Congress's general questions about telecommunications, telecommunications services, and information services, the Report then turned to dial-up Internet access service. Specifically,

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345. *Id.* at para. 60.

346. *See supra* §§ II.B-C.

347. *Stevens Report*, 13 FCC Rcd at 11529-30, para. 58.

348. *See supra* § IV.

349. *See supra* § II.B.

350. *Stevens Report*, 13 FCC Rcd at 11530, para. 60.

351. *Id.* at para. 56.

352. *Id.* at para. 60 ("It is plain, for example, that an incumbent local exchange carrier cannot escape Title II regulation of its residential local exchange service simply by packaging that service with voice mail.").

353. *Id.* at paras. 69-70.

354. *Id.* at para. 95.

Congress directed the FCC to review the application of the definitions of telecommunications service and information service “and the consistency of the [FCC]’s application of those definitions, including with respect to Internet access” under the section of the Communications Act directing the FCC to establish rules to enhance access to advanced telecommunications and information services for schools, health care providers, and libraries.<sup>355</sup> As part of this review, the FCC “carefully evaluated the impact of those definitions on the treatment of Internet-based offerings under the universal service system.”<sup>356</sup>

The Report acknowledged the existence of both non-facilities-based Internet access (e.g., dial-up Internet access service) and facilities-based Internet access (e.g., broadband Internet access service).<sup>357</sup> The Report, however, focused on non-facilities-based Internet access, stating that “Internet access providers, typically, own no telecommunications facilities.”<sup>358</sup> Broadband Internet access service was not yet mature, and although the Report briefly considered whether such services should contribute to Universal Service, it did not attempt to apply its general analysis of facilities-based information services to broadband Internet access service.<sup>359</sup>

The geographical scope of dial-up Internet access service is between a modem bank operated by the dial-up Internet access service provider and the desired edge provider.<sup>360</sup> The service requires the customer to obtain local phone service to provide transmission between the customer’s modem and the dial-up Internet access service provider’s modem bank and requires the dial-up Internet access service provider to transport the information across its network and make the interconnection arrangement necessary to transmit the traffic between its network and the edge providers.<sup>361</sup>

The Report sought to answer whether dial-up Internet access service is an information service, a telecommunications service, or the offering of both an information service and a separate and distinct telecommunications service.<sup>362</sup> The Report first examined whether dial-up Internet access service includes the characteristics of an information service.<sup>363</sup> It noted that dial-up Internet access service typically includes hosting of a subscriber’s webpage, caching of webpages and newsgroup articles, and email.<sup>364</sup> The analysis started by noting that under the 1987 *United States v. Western Electric* decision, gateway service was classified as an information service.<sup>365</sup>

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355. *Id.* at para. 14.

356. *Id.* at para. 13.

357. *Id.* at paras. 66-72.

358. *Id.* at para. 81.

359. *Id.* at paras. 69-70.

360. TANENBAUM & WEATHERALL, *supra* note 223, at § 1.5.

361. *Id.*

362. *Stevens Report*, 13 FCC Rcd at 11536, para. 74.

363. *Id.*

364. *Id.* at para. 76.

365. *Id.* at para. 75 (citing *United States v. W. Elec.*, 673 F. Supp. 525 (D.D.C. 1987) (*Western Electric* 1987)).

However, the Report examined dial-up Internet access service *de novo*, based on the 1996 Act.<sup>366</sup> It found that hosting of a subscriber's webpage offers a "capability for storing or making available information,"<sup>367</sup> that caching of webpages offers a "capability for acquiring, retrieving [and] utilizing information,"<sup>368</sup> and that email offers a "capability for acquiring, storing, transforming, processing, retrieving, utilizing, or making available information through telecommunications"<sup>369</sup> because the email server is operated by the dial-up Internet access service provider.

This portion of the analysis was largely rationale. However, when examining caching of webpages, the FCC should have evaluated whether this capability was for the management, control, or operation of a telecommunications system or the management of a telecommunications service. If so, it would have fallen into the telecommunications systems management exception, and would not have counted as having an information service capability.

Having found that dial-up Internet access service includes the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information, the FCC then determined whether the offering of this capability is "via telecommunications."<sup>370</sup> It noted that dial-up Internet access service is offered over several forms of underlying telecommunications: the PSTN telecommunications service that a customer separately obtains from a telephone company, the local exchange service that a dial-up Internet access service provider purchases from local exchange carriers, and the lines that a dial-up Internet access service provider leases from telecommunications carriers.<sup>371</sup>

This portion of the analysis is incomplete. The Report noted that dial-up Internet access service offers packet switched transmission (described as "data transport").<sup>372</sup> It did not, however, determine whether this transmission constitutes telecommunications. Had the FCC analyzed this, it would have concluded that packet switching is telecommunications, as had been determined in *Computer II*.

The FCC concluded that dial-up Internet access service includes an information service.<sup>373</sup> It remains to be determined whether it is solely an information service or the offering of both an information service and a separate and distinct telecommunications service. The Report first observed that dial-up Internet access service consists of an offering of packet switched

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366. *Stevens Report*, 13 FCC Rcd at 11536-37, para. 75.

367. *Id.* at para. 76 (citations and alterations omitted).

368. *Id.* (citations and alterations omitted).

369. *Id.* at para. 78 (citations and alterations omitted).

370. *Id.* at para. 66.

371. *Id.*

372. *Id.* at para. 63.

373. Noteworthy, the Report does not examine whether webpage hosting, caching of webpages and newsgroup articles, or email by a dial-up Internet access service provider is used for the management, control, or operation of a telecommunications system or the management of a telecommunications service. If so, such a capability would not render the service as an information service.

transmission, hosting of a subscriber's webpage, caching of webpages and newsgroup articles, and email.<sup>374</sup> It then claimed that the information service capabilities are "inextricably intertwined" with the packet switched transmission.<sup>375</sup> On this basis, it concluded that dial-up Internet access service is solely an information service.<sup>376</sup>

This portion of the analysis is woefully incomplete. When an information service is offered by a non-facilities-based provider, both *Computer II* and the *MFJ* had envisioned that the information service would be offered using an input model—namely, that the information service provider would procure telecommunications, combine it with computer processing, and sell the resulting information service to the consumer.<sup>377</sup> In this situation, there are two assumptions: (1) that the information service is usable by the consumer without the consumer being required to separately obtain a telecommunications service, and (2) that information service functionality is intertwined with the underlying telecommunications.

However, although a dial-up Internet access service provider still procured some telecommunications as an input, the architecture now progresses to a layered Internet model.<sup>378</sup> Both assumptions now fail.

The failure of the first assumption—that the consumer may use the information service without subscribing to a separate telecommunications service—is evident from the requirement to subscribe to local phone service in order to "dial-up." Although this failure does not affect the FCC's conclusion that dial-up Internet access service is solely an information service, this lack of attention escalates in later proceedings.<sup>379</sup>

The failure of the second assumption—that information service functionality is intertwined with the underlying telecommunications—is more critical. The analysis does not satisfy the framework posed earlier in the Report for analyzing whether the consumer is receiving two separate and distinct services. First, since the Report does not determine whether the packet switching component of the service constitutes telecommunications, it remains undetermined whether dial-up Internet access service includes telecommunications. Second, if packet switching does constitute telecommunications, the Report does not present any analysis to justify the claim that the packet switching is inextricably intertwined with the information service capabilities, other than to claim that dial-up Internet access service "conjoin[s] the data transport with data processing, information provision, and other computer-mediated offerings."<sup>380</sup> Since the FCC had repeatedly stated (including in this Report) that bundling an information service with an underlying telecommunications service together does not

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374. *Stevens Report*, 13 FCC Rcd at 11539, para. 79.

375. *Id.* at para. 80.

376. *Id.* at paras. 80-81.

377. *See supra* §§ II.B-C.

378. *See supra* § IV.

379. *See supra* §§ VI-VIII.

380. *Stevens Report*, 13 FCC Rcd at para. 81.

render them inseparable,<sup>381</sup> an analysis of whether packet switching is separable or inseparable from the information service capabilities is required.

Had the FCC conducted a proper analysis of separability, it should have discovered, as discussed in Section IV.C, that the Internet's architecture guarantees that the packet switching function offered by dial-up Internet access service providers is separable from applications such as webpage hosting, caching of newsgroup articles, and email, which may be offered by different entities.<sup>382</sup> Thus, it should have concluded the dial-up Internet access service comprises two separable services: an end-to-end Internet access service that is usable over a local phone service, and a bundle of information services (e.g., webpage hosting and email). Furthermore, it should have concluded that end-to-end Internet access service is a telecommunications service, as it comprises telecommunications and is offered to the public. Finally, it should have conducted an analysis of whether forbearance of Title II requirements for the telecommunications service component of dial-up Internet access is warranted. If so, it would likely have concluded that forbearance is warranted, due to the very large number of dial-up Internet access service providers competing for customers.<sup>383</sup> In turn, it should have noted that such competition was made possible because the underlying telecommunications was available on a common carrier basis.

Despite the incomplete analysis of separability of the information service capabilities from packet switching, there is a key observation here that will bear on later developments. Whereas an information service is in general offered *via telecommunications*, dial-up Internet access service is offered in part *via a telecommunications service*. The *telecommunications* underlying dial-up Internet access service consists in part of the *telephone exchange service* that a consumer purchases from their phone company in order to "dial-up."<sup>384</sup> This *telephone exchange service* is a *telecommunications service*, and thus dial-up Internet access service is provided in part *via a telecommunications service*, not just *via telecommunications*. In addition, the *telephone exchange service* is separable from the dial-up Internet access service, and thus from the information service capabilities offered as part of dial-up Internet access service.

## VI. EARLY BROADBAND INTERNET ACCESS SERVICE

During the late 1990s and the first decade of the 2000s, transmission technologies were developed and deployed that could obtain much higher speeds than data transmission over the PSTN. Digital subscriber line ("DSL") is a family of physical (layer 1) and data link (layer 2) protocols that telephone companies often use to transmit data between a customer's modem and a

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381. See, e.g., *id.* at para. 60.

382. See *supra* § IV.C. Such independent offerings were, however, in early stages of development. See, e.g., Outlook.com, WIKIPEDIA, <https://en.wikipedia.org/wiki/Outlook.com> [<https://perma.cc/U29F-4BNA>], discussing the 1996 introduction of the Hotmail email service.

383. *History of the Internet*, *supra* note 321.

384. *Stevens Report*, 13 FCC Rcd at 11531-32, para. 63.

network device in the telephone company's central office.<sup>385</sup> Similarly, Data Over Cable Service Interface Specification ("DOCSIS") is a family of physical and data link layer protocols that cable companies often use to transmit data between a customer's modem and a network device in the cable company's headend.<sup>386</sup> Either DSL or DOCSIS can be used to replace the need for local telephone service when accessing the Internet.<sup>387</sup> The IP (layer 3) protocol is used over DSL or DOCSIS to offer packet switching from source to destination.<sup>388</sup> The combination of IP with DSL or DOCSIS is used to provide broadband Internet access service.<sup>389</sup>

This transition from dial-up Internet access service to broadband Internet access service was a transition from non-facilities-based Internet access service to facilities-based Internet access service.<sup>390</sup> It inspired the FCC to consider the regulatory classification of facilities-based Internet access service and led to the net neutrality debate.<sup>391</sup>

#### *A. Advanced Services Order (1998) & Advanced Services Remand Order (1999)*

In the *Advanced Services Order*, the FCC considered an early version of broadband facilities-based Internet access service offered by telephone companies using DSL and packet switching technology, called *xDSL-based advanced service*.<sup>392</sup>

The first task, as usual, is to define the service. The xDSL service is described as the transmission of a "customer's data traffic" between the customer's modem and "the location selected by the customer."<sup>393</sup> It is important to note both the functionality and geographical bounds of the service.

The functionality of dial-up Internet access service consists of two parts: (a) to "enable users to access Internet content and services,"<sup>394</sup> and (b) information service capabilities such as hosting of a subscriber's webpage, caching of webpages and newsgroup articles, and email.<sup>395</sup> The functionality of xDSL-based advanced service is transmission of a customer's data traffic, which is similar to the combination of the first part of the functionality of dial-

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385. TANENBAUM & WEATHERALL, *supra* note 223, at § 2.6.3.

386. *Id.* at § 2.8.4.

387. *Id.* at §§ 2.6.3, 2.8.4.

388. KUROSE & ROSS, *supra* note 53, at Ch. 4.

389. *Id.*

390. *See infra* § V.B.ii; *see also supra* § VI.

391. *See supra* §§ VI-VIII.

392. Deployment of Wireline Services Offering Advanced Telecommunications Capability, *Memorandum Opinion and Order and Notice of Proposed Rulemaking*, 13 FCC Rcd 24011 (1998) [hereinafter *Advanced Services Order*].

393. *Id.* at para. 29-31.

394. *Stevens Report*, 13 FCC Rcd at 11531-32, para. 63.

395. *Id.* at para. 76.

up Internet access service and the local phone service used to “dial-up.”<sup>396</sup> However, the functionality of xDSL-based advanced service does not include the second part of the functionality of dial-up Internet access service, e.g., webpage hosting and email.

Although some parties would later mischaracterize xDSL-based advanced service as solely a “last-mile” service,<sup>397</sup> the *Advanced Services Remand Order* clarified that the FCC has “consistently rejected attempts to divide communications at any intermediate points of switching or exchanges between carriers” and that xDSL-based advanced service provides transmission between the customer’s modem and the other party with which the customer is communicating, e.g., a website.<sup>398</sup> The *Advanced Services Order* described the service as including: (i) the transmission of a customer’s data traffic between the customer’s modem and the telephone company’s central office (using DSL technology),<sup>399</sup> (ii) the transmission between the central office and an interconnection point across the telephone company’s packet switched network,<sup>400</sup> and (iii) interconnection arrangements with other providers as necessary to fulfill the service.<sup>401</sup> Thus, both dial-up Internet access service and xDSL-based advanced service reach the edge provider, but whereas dial-up Internet access service starts at the modem bank, xDSL-based advanced service starts at the customer’s modem since it replaces the local phone service.

The FCC sought to determine the regulatory classification of xDSL-based advanced service.<sup>402</sup> The Order first recognized that the FCC had “repeatedly held that specific packet switched services are ‘basic services,’” referring to both *Computer II* and the *Non-Accounting Safeguards Order*.<sup>403</sup> It then determined that the combination of the transmission between the customer’s modem and the telephone company’s central office and the further transmission over the packet switched network constitutes telecommunications, namely “transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.”<sup>404</sup> The FCC then noted that the xDSL-based advanced service is offered for a fee directly to the public and hence constitutes a telecommunications service.<sup>405</sup>

The FCC turned next to the situation in which an xDSL-based advanced service provider also offers an information service (e.g., email and webpage

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396. Compare the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24026-27, paras. 29-31 to the description of dial-up Internet access service in *Stevens Report*, 13 FCC Rcd at 24041, 24047, paras. 63, 76.

397. See *infra* § VIII.A.ii.

398. Deployment of Wireline Services Offering Advanced Telecommunications Capability, *Order on Remand*, 15 FCC Rcd 385, 391, para. 16 (1999) [hereinafter *Advanced Services Remand Order*].

399. *Advanced Services Order*, 13 FCC Rcd at 24026-27, para. 29.

400. *Id.* at para. 31.

401. *Id.* at paras. 45-49.

402. *Id.* at para. 33.

403. *Id.* at para. 35.

404. *Id.* at para. 34.

405. *Id.* at para. 36.

hosting) via the xDSL-based advanced service.<sup>406</sup> Recall that, as discussed in Section II.B, *Computer II* considered the situation in which a facilities-based enhanced service provider does not wish to offer the underlying basic service to the public or to other enhanced service providers.<sup>407</sup> In *Computer II*, the FCC found that it was in the public interest to require that the basic service be offered to all other enhanced service providers on the same terms and conditions as it offered the basic service to itself, and that hence the basic service is a common carrier service regulated under Title II.<sup>408</sup> Furthermore, in *Computer II*, the FCC specifically rejected the theory that bundling enhanced capabilities with an underlying common carrier basic service removes the basic service from Title II.<sup>409</sup> Also recall that, as discussed in Section III.C, the court in the 1990 *United States v. Western Electric* decision similarly found that the bundling of an information service with a separable telecommunications service does not convert the bundle into an information service.<sup>410</sup> The *Advanced Services Order* similarly found that there are two separate and distinct services.<sup>411</sup> It thus rejected any theory that the information service (e.g., email and webpage hosting) is “inextricably intertwined”<sup>412</sup> with the underlying xDSL-based advanced service.<sup>413</sup> The Order affirmed that RBOCs offering such information services are obligated to offer nondiscriminatory access to the underlying xDSL-based advanced service to competing information service providers.<sup>414</sup>

We pause here to warn readers that the phrase “Internet access service” is used inconsistently in different proceedings. In the *Stevens Report*, “dial-up Internet access service” consisted of packet switching (a layer 3 service) plus applications (a layer 7 service, including hosting of a subscriber’s webpage, caching of webpages and newsgroup articles, and email).<sup>415</sup> Dial-up Internet access service is offered via an underlying *telephone exchange service* (a layer 3 service).<sup>416</sup> In the *Advanced Services Order*, what we recognize today as an early version of broadband Internet access service was instead termed a “xDSL-based advanced service,” which consists of transmission between the customer’s modem and the central office (a layer 2 service) and end-to-end packet switching (a layer 3 service), but excludes applications such as webpage hosting and email.<sup>417</sup> To add to the confusion, the *Advanced Services Order* used the term “Internet service provider” to refer to a provider of a separable information service that offers applications (a layer 7 service, including webpage hosting and email).<sup>418</sup> Thus, the phrase

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406. *Id.*

407. *See supra* § II.B.

408. *Computer II*, 77 FCC 2d at 474-75, paras. 229-31.

409. *Frame Relay Order*, 10 FCC Rcd at 13720, 13722-23, paras. 18, 41-45.

410. *See supra* § III.C.

411. *Advanced Services Order*, 13 FCC Rcd at 24030, para. 36.

412. *Stevens Report*, 13 FCC Rcd at 11539-40, para. 80.

413. *Advanced Services Order*, 13 FCC Rcd at 24030, para. 36.

414. *Id.* at paras. 37-38.

415. *See supra* § III.B.ii.

416. *Id.*

417. *Advanced Services Order*, 13 FCC Rcd at 24026-27, para. 29-31.

418. *Id.* at para. 31.



“Internet access” in the *Stevens Report* does not refer to the same functionalities as it does in the *Advanced Services Order*.<sup>419</sup> The confusion worsens in the next few proceedings.<sup>420</sup>

Finally, the Order sought to determine whether xDSL-based advanced service qualifies as *telephone exchange service* (defined in the 1996 Act as “service within a telephone exchange, or within a connected system of telephone exchanges within the same exchange area . . . by which a subscriber can originate and terminate a telecommunications service”<sup>421</sup>) and/or *exchange access* (defined in the 1996 Act as “the offering of access to telephone exchange services or facilities for the purpose of origination or termination of telephone toll services”<sup>422</sup>).<sup>423</sup> The Order notes, as we discussed in Sections II.C-D, that neither the *MFJ* nor the 1996 Act limited these terms to the provision of voice service.<sup>424</sup> In the *Advanced Services Remand Order*, the FCC found that xDSL-based advanced service constitutes *telephone exchange service*, if the communication originates and terminates within the same local exchange area.<sup>425</sup> More commonly, the FCC found that xDSL-based advanced service typically constitutes *exchange access*, as transmission typically does not originate and terminate in the same local exchange area.<sup>426</sup>

There is a key observation here. Whereas an information service is in general offered *via telecommunications*, the *Stevens Report* found that dial-up Internet access service is offered in part *via a separable telecommunications service*, namely the *telephone exchange service* that a consumer purchases from their phone company in order to “dial-up.”<sup>427</sup> The xDSL-based advanced service replaces this telephone exchange service (for the purpose of Internet access) with the combination of (i) DSL-based transmission of a customer’s data traffic between the customer’s modem and the telephone company’s central office, and (ii) the packet switched transmission between the central office and an interconnection point across the telephone company’s packet switched network.<sup>428</sup> The Order found that xDSL-based advanced service is a telecommunications service, as was the telephone exchange service it replaced (for the purpose of Internet access).<sup>429</sup>

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419. Compare the description of dial-up Internet access in *Stevens Report*, 13 FCC Rcd at 11531-32, 11537-38, paras. 63, 76 with that of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24026-27, paras. 29-31.

420. In the next few subsections, we will also discuss *cable modem service*, *wireline broadband Internet access service*, and *broadband Internet access service*. Despite the inconsistent terminology, the pertinent concept in each proceeding is the service at issue in that proceeding, e.g., *dial-up Internet access service* in the *Stevens Report*, 13 FCC Rcd 11501 and *xDSL-based advanced service* in the *Advanced Services Order*, 13 FCC Rcd 24012.

421. 47 U.S.C. § 153(54).

422. *Id.* at § 153(20).

423. *Advanced Services Order*, 13 FCC Rcd at 24032, para. 40.

424. *See id.* at para. 41.

425. *Id.* at § III.A.

426. *Id.* at § III.B.

427. *See supra* § V.B.ii.

428. *Advanced Services Order*, 13 FCC Rcd at 24026-27, paras. 29-31.

429. *Id.* at para. 36.

The Order further found that an information service offered via xDSL-based advanced service is a separate and distinct service from the underlying xDSL-based advanced service, as was dial-up Internet access service from the underlying telephone exchange service.<sup>430</sup> Finally, the Order affirmed that RBOCs offering such information services are obligated to offer nondiscriminatory access to their xDSL-based advanced service, as they are obligated to offer to their exchange services.<sup>431</sup>

### *B. Cable Modem Declaratory Ruling (2002)*

In the *Cable Modem Declaratory Ruling* (“Declaratory Ruling”), the FCC considered an early version of broadband facilities-based Internet access service offered by cable companies using DOCSIS and packet switching technology.<sup>432</sup>

The service, called *cable modem service* in the Declaratory Ruling, is defined as “a service that uses cable system facilities to provide residential subscribers with high-speed Internet access, as well as many applications or functions that can be used with high-speed Internet access.”<sup>433</sup> In turn, “high-speed Internet access” is defined as a service that “enables consumers to communicate over the Internet at speeds that are many times faster than the speeds offered through dial-up telephone connections.”<sup>434</sup> Finally, the Internet is defined as the global information system that “(i) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ons; (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ons, and/or other IP-compatible protocols; and (iii) provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein.”<sup>435</sup>

It is important to note both the functionality and geographical bounds of the service. Putting these three definitions together, cable modem service consists of two parts: (a) a high-speed Internet access service that “enables consumers to communicate over”<sup>436</sup> “the global information system that . . . is able to support communications . . . and provides, uses or makes accessible . . . high level services layered on the communications . . . infrastructure,”<sup>437</sup> and (b) a service that provides “many applications or functions that can be used with”<sup>438</sup> the high-speed Internet access service described in part (a). The

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430. *Id.*

431. *Id.* at para. 37.

432. Internet Over Cable Declaratory Ruling et al., *Declaratory Ruling and Notice of Proposed Rulemaking*, 17 FCC Rcd 4798 (2002) [hereinafter *Cable Modem Declaratory Ruling*].

433. *Id.* at para. 31 (citations omitted).

434. *Id.* at para. 1, n.2 (citation omitted).

435. *Id.* at para. 1, n.1 (citation omitted).

436. *Id.* at para. 1 n.2 (citation omitted).

437. *Id.* at para. 1 n.1 (citation omitted).

438. *Id.* at para. 31 (citations omitted).

Declaratory Ruling describes part (b) of the cable modem service as including “e-mail, access to online newsgroups, and creating or obtaining and aggregating content” as well as a “‘first screen’ or ‘home page’ and the ability to create a personal web page.”<sup>439</sup> Part (a) of cable modem service provides similar functionality to that of xDSL-based advanced service.<sup>440</sup> Part (b) of cable modem service is similar to the applications bundled in dial-up Internet access service.<sup>441</sup> In contrast, xDSL-based advanced service did not include such applications; indeed, such applications were deemed in the *Advanced Services Order* to be a separable service.<sup>442</sup>

Regarding the geographical bounds of the service, the *Cable Modem Declaratory Ruling* describes part (a) of the cable modem service as including: (i) the transmission of data between a customer’s modem and the cable company’s headend,<sup>443</sup> (ii) the transmission between the headend and an interconnection point across the cable company’s packet switched network,<sup>444</sup> (iii) interconnection arrangements with other providers as necessary to fulfill the service,<sup>445</sup> and (iv) “Internet connectivity functions,” including “protocol conversion, IP address number assignment, domain name resolution through a domain name system (DNS), network security, and caching.”<sup>446</sup> Thus, the geographical scope is between the user’s modem and edge providers, similar to the geographical scope of xDSL-based advanced service.<sup>447</sup>

We pause here to again note the inconsistent meanings of “Internet access” in different proceedings. Recall that *dial-up Internet access service* consists of packet switching (a layer 3 service) plus applications (a layer 7 service, including hosting of a subscriber’s webpage, caching of webpages and newsgroup articles, and email), and *xDSL-based advanced service* consists of transmission between the customer’s modem and the central office (a layer 2 service) and end-to-end packet switching (a layer 3 service), but excludes applications (a layer 7 service, including webpage hosting and email).<sup>448</sup> *Cable modem service* consists of (a) high-speed Internet access service and (b) applications that can be used with high-speed Internet access service.<sup>449</sup> Part (a) of a *cable modem service* (a layer 3 service) is thus similar to *xDSL-based advanced service*. It is also similar to the combination of the packet switching component of *dial-up Internet access service* and the

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439. *Id.* at para. 18.

440. Compare the description of cable modem service in *Id.* at para. 30 to the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24026-27, paras. 29-31.

441. *Id.*

442. *Advanced Services Order*, 13 FCC Rcd at 24030, para. 36.

443. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4806-09, paras. 12-13.

444. *Id.* at paras. 14-17.

445. *Id.*

446. *Id.* at para. 17.

447. Compare the description of cable modem service in *Id.* at paras. 12-13, 14-17 to the description of xDSL-based advanced services in *Advanced Services Order*, 13 FCC Rcd at 24019, para. 16.

448. See *supra* §§ V.B.ii and VI.A.

449. See *supra* § VI.B.

underlying telecommunications.<sup>450</sup> Part (b) of a *cable modem service* (a layer 7 service) is similar to the applications component of *dial-up Internet access service*.<sup>451</sup>

In the Declaratory Ruling, the FCC sought to determine the regulatory classification of cable modem service.<sup>452</sup> The FCC should have first analyzed the characteristics of the transmission of data provided as part of the service in order to determine which parts constitute telecommunications. Although the Declaratory Ruling described the technical components of the transmission, it did not provide any such analysis.<sup>453</sup> If the FCC had first analyzed this, it would have found that the end-to-end transmission (parts i-iii of cable modem service, as described above) is a layer 3 network service (as discussed in Section IV.A). It would have further found that this end-to-end transmission is “transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received” and thus constitutes the underlying *telecommunications* referred to in the Declaratory Ruling.<sup>454</sup> Consequently, the FCC would have found that the telecommunications in cable modem service was similar to the telecommunications in xDSL-based advanced service.

Instead, the FCC started its analysis in the Declaratory Ruling by looking back to the analysis in the *Stevens Report* that led to the classification of dial-up Internet access service.<sup>455</sup> The FCC noted that the *Stevens Report* observed that some of the applications included in cable modem service—hosting of a subscriber’s webpage, caching of newsgroup articles, and email—offer a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information.<sup>456</sup> The Declaratory Ruling also stated that cable modem service generally includes using the Domain Name System (DNS), which it described as “most commonly used to provide an IP address associated with the domain name (such as [www.fcc.gov](http://www.fcc.gov)) of a computer . . . [but is] also routinely used to perform reverse address-to-name lookups and to identify and locate e-mail servers.”<sup>457</sup> The Declaratory Ruling stated that DNS is also an application that offers a capability for “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information.”<sup>458</sup>

In this part of the analysis, the Declaratory Ruling failed to analyze whether the offering of a capability for “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information” falls within the telecommunications systems management exception (i.e., “for the management, control, or operation of a

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450. See *supra* § V.B.ii.

451. *Id.*

452. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4818-19, para. 31.

453. See *id.* at paras. 12-17.

454. *Id.* at para. 34.

455. *Id.* at para. 36.

456. *Id.* at paras. 37-38.

457. *Id.* at para. 37.

458. *Id.* at para. 38.

telecommunications system or the management of a telecommunications service”).<sup>459</sup> If the FCC had analyzed this, it would have found that offering by a cable modem service provider of the domain name to IP address translation function of DNS falls within the telecommunications systems management exception, just as 800 number address translation does in telephone service. Such an analysis would have then mandated that the offering of this capability is not part of an information service.

After finding that cable modem service includes the offering of a capability for “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information,”<sup>460</sup> the FCC should have then investigated whether the offering of this capability is “via telecommunications.”<sup>461</sup> The Declaratory Ruling merely states, without analysis, that the offering of the information capabilities is “via telecommunications.”<sup>462</sup> If it had conducted such an analysis, it would have found that the underlying telecommunications replaced the need in dial-up Internet access service to separately obtain local phone service.

On this basis, the FCC concluded that cable modem service includes an information service.<sup>463</sup> It remains to be determined whether cable modem service is solely an information service or the offering of both an information service and a separate and distinct telecommunications service. The Declaratory Ruling observed that cable modem service consists of an offering of both high-speed Internet access service and applications or functions that can be used with high-speed Internet access service, namely the parts (a) and (b) discussed above.<sup>464</sup> It noted that telecommunications service is “the offering of telecommunications for a fee directly to the public,” and asked whether there was any such offering.<sup>465</sup>

The FCC stated that it was “not aware of any cable modem service provider that has made a stand-alone offering of transmission for a fee directly to the public.”<sup>466</sup> If such a stand-alone offering had been made, the FCC may have found that it was a telecommunications service.<sup>467</sup> We pause here to note the argument, which will arise again. Some parties would later claim that the underlying telecommunications is inseparable simply because cable modem service providers do not choose to offer the underlying telecommunications as a separate service.<sup>468</sup> The FCC did not make that argument, either in the Declaratory Ruling or in the ensuing *Brand X* case.<sup>469</sup> It merely stated that if a cable modem service provider did choose to offer the telecommunications

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459. *Id.* at paras. 34, 38.

460. *Id.* at para. 38.

461. *Id.* at para. 34.

462. *Id.* at paras. 39, 41.

463. *Id.* at para. 38.

464. *Id.* at para. 40.

465. *Id.* at para. 34.

466. *See id.* at para. 40.

467. *See* Brief for the Federal Petitioners at \*24, *Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs.*, 545 U.S. 967, \*24 (2005) [hereinafter *Brand X FCC brief*].

468. *See infra* § VIII.D.

469. *See, e.g., Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4829-30, para. 54; *Brand X FCC brief*, *supra* note 467, at \*24.

for a fee directly to the public, it may be a telecommunications service.<sup>470</sup> Furthermore, *Computer II*, the *MFJ*, *United States v. Western Electric (1990)*, the *Stevens Report*, and the *Advanced Services Order* had all concluded that the bundling of an information service with an underlying telecommunications service does not render them inseparable.<sup>471</sup>

The Declaratory Ruling then cited the *Stevens Report* to conclude that whether there is a separate offering of telecommunications “turns on the nature of the functions that the end user is offered,” a test that the *Brand X* Court would later accept under *Chevron* deference.<sup>472</sup> The question is thus whether the underlying telecommunications is separable from information service capabilities. The Declaratory Ruling claims that they are not<sup>473</sup> because “[a]s provided to the end user the telecommunications is part and parcel of cable modem service and is integral to its other capabilities.”<sup>474</sup>

The Declaratory Ruling’s justification of its claim that the underlying telecommunications is inseparable from the information service capabilities is woefully lacking. Its conclusion contradicts the “factual particulars of how Internet technology works and how it is provided”<sup>475</sup> (as the Court in *Brand X* would later say).

First, consider the effect of Internet architecture on separability. The Declaratory Ruling should have analyzed the relationship between the underlying telecommunications (part (a) of the cable modem service) and the applications provided as part of cable modem service (part (b) of the service, including email, access to newsgroups, webpage hosting, and a homepage). In general, an information service may be intertwined with the underlying telecommunications to the extent that it no longer transmits, between or among points specified by the user, information of the user’s choosing, without change in the form or content of the information as sent and received.<sup>476</sup> However, as discussed in Section IV.C, this is not true of Internet applications.<sup>477</sup> The modularity of network services guarantees that different entities can provide different network services, and that these network services can interoperate with other. In particular, the underlying telecommunications service is always technologically separable from Internet applications.

Second, consider the effect of market offerings on separability. The Declaratory Ruling itself notes that “cable modem service subscribers . . . may obtain many functions from companies with whom the cable operator has not even a contractual relationship,” including e-mail.<sup>478</sup> It should have similarly found that access to newsgroups, webpage hosting, and a homepage were

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470. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4829-30, para. 54.

471. *See supra* §§ II.B-C, III.C, V.B, and VI.A.

472. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4822-23, para. 38.

473. *Id.* at paras. 39-40.

474. *Id.* at para. 39 (citation omitted).

475. *Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs.*, 545 U.S. 967, 991 (2005) (*Brand X*).

476. *See, e.g., supra* § II.B.

477. *See supra* § IV.C.

478. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4815, para. 25 (citation omitted).

services available from providers with no contractual relationship with the cable modem service provider. Hence, the FCC should have found that the cable modem service was clearly technologically separable from Internet applications and that there was already a separate market for such applications. Furthermore, it follows that the telecommunications underlying the cable modem service is separable from the information service capabilities of cable modem service.

Having concluded that the underlying telecommunications is inseparable from the information service capabilities, the Declaratory Ruling concluded that the underlying telecommunications is not a telecommunications service, and that cable modem service is solely an information service.<sup>479</sup> The rationale provided is that telecommunications service is “the offering of telecommunications for a fee directly to the public” and that there is no such “offering” because the underlying telecommunications is inseparable.<sup>480</sup> (Later, in the FCC’s *Brand X* brief, the FCC would claim that “cable modem service offers subscribers [telecommunications] *only in connection with* the capability for corresponding ‘change[s] in form or content’ that occur in the course of Internet access.”<sup>481</sup>)

The Declaratory Ruling’s conclusion here is also incorrect because it erred earlier in the conclusion that underlying telecommunications is inseparable from the information service capabilities. The FCC itself interprets the word “offering,” saying that whether there is a separate offering of telecommunications “turns on the nature of the functions that the end user is offered.”<sup>482</sup> Thus, the telecommunications component of cable modem service (high-speed Internet access service) is a telecommunications service, because it is separable from the information service capabilities, and it is offered to the public for a fee.<sup>483</sup> The FCC should have noted that the courts and the FCC had always previously found that all forms of Internet access service were offered not just *via telecommunications* but *via a telecommunications service*.<sup>484</sup> Dial-up Internet access service was offered via the *telephone exchange service* that a consumer purchases from their phone company in order to “dial-up.”<sup>485</sup> The xDSL-based advanced service was a telecommunications service itself.<sup>486</sup> The FCC should have analyzed the telecommunications component of cable modem service (high-speed Internet access service) and compared it to the telecommunications components of dial-up Internet access service and the underlying telephone exchange service. If it had, it would have concluded that they are comparable. It should have also compared the telecommunications component of cable modem service to xDSL-based advanced service. If it had, it would have also

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479. *Id.* at para. 39.

480. *Id.* at para. 33.

481. *Brand X FCC brief*, *supra* note 467, at \*15-\*16 (emphasis added).

482. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4822-23, para. 38.

483. *See supra* § IV.C.

484. *See supra* §§ V.B.ii, VI.A.

485. *See supra* § V.B.ii.

486. *See supra* § VI.A.

concluded that they are comparable. It follows directly from the 1996 Act that the high-speed Internet access service component of cable modem service should be a common carrier service under the Communications Act<sup>487</sup> without FCC discretion.

The FCC also issued an NPRM bundled with the Declaratory Ruling. Having concluded in the Declaratory Ruling that cable modem service is an interstate information service, the NPRM asked whether the FCC should exercise its discretionary regulatory authority.<sup>488</sup> In particular, it asked whether “it is necessary or appropriate at this time to require that cable operators provide unaffiliated ISPs with the right to access cable modem service customers directly.”<sup>489</sup> The FCC never conducted this analysis.

Finally, had the FCC recognized that high-speed Internet access service is a telecommunications service, it should have conducted a forbearance analysis. Under *Computer II*, in the case in which a facilities-based enhanced service provider does not wish to offer the basic service to the public, the FCC had found that it was in the public interest to require that the basic service be offered to all other enhanced service providers on the same terms and conditions as it had offered the basic service to itself.<sup>490</sup> Had the FCC undertaken the public interest analysis here, it should have similarly determined that forbearance from the application of Sections 201 and 202 of Title II of the Communications Act to high-speed Internet access service is not in the public interest.

### C. *Brand X* (2005)

In *National Cable & Telecommunications Association v. Brand X Internet Services*, the Supreme Court considered whether the FCC classification of cable modem service in the *Cable Modem Declaratory Ruling* as solely an information service involved “a lawful construction of the Communications Act under [the] *Chevron* [framework].”<sup>491</sup>

The Court affirmed that all providers of telecommunications service are subject to mandatory common carrier regulation,<sup>492</sup> that the FCC must forbear from applying Title II regulations if it determines that the public interest requires forbearance,<sup>493</sup> and that the FCC may impose common carrier obligations on information service providers under its Title I ancillary authority.<sup>494</sup> The Court stated that the *Computer II* rules subjecting facilities-based enhanced service providers to common carrier regulation was under

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487. 47 U.S.C. § 153(51).

488. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4839, para. 72.

489. *Id.*

490. *Computer II*, 77 FCC 2d at 474-75, paras. 229-231.

491. *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 974 (2005) (*Brand X*)

(citing *Chevron U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837 (1984)).

492. *Id.* at 975.

493. *Id.* at 976 (citing 47 U.S.C. §§ 160(a),(b)).

494. *Brand X*, 545 U.S. at 976 (citing 47 U.S.C. §§ 151-61).



this Title I authority.<sup>495</sup> The Court, however, only addressed whether the FCC's conclusion that cable modem service did not include a telecommunications service was reasonable under Chevron deference.<sup>496</sup> It did not address the discretionary ability of the FCC to impose common carrier obligations on cable modem service.<sup>497</sup>

The *Brand X* opinion did not discuss the lack of the analysis in the *Cable Modem Declaratory Ruling* of which parts of cable modem service constitute telecommunications.<sup>498</sup> Thus, we remain unclear about which functions were considered to be telecommunications.

With respect to the information service capabilities of cable modem service, the Court set forth the FCC's representations that cable modem service "provides consumers with a comprehensive capability for manipulating information . . . for example, to browse the World Wide Web, to transfer files . . . and to access e-mail and Usenet newsgroups,"<sup>499</sup> that cable modem service "offer[s] consumers the ability to translate raw Internet data into information they may . . . view on their personal computers,"<sup>500</sup> and that "the consumer uses the [telecommunications] *always* in connection with the information-processing capabilities provided by [cable modem service]."<sup>501</sup>

However, none of these representations are true. First, cable modem service does not by itself provide consumers with a capability for manipulating information. That capability is provided by edge provider services and by the applications used by the end user.<sup>502</sup> Second, cable modem service does not translate Internet data; it transmits data without change in form or content.<sup>503</sup> Third, consumers may use the underlying telecommunications without any information processing capabilities provided by cable modem service.<sup>504</sup> This latter point is critical, as it was the cornerstone for the decision by the Court of whether there is a separable telecommunications service, as we will shortly discuss.

The Court also interpreted the *Cable Modem Declaratory Ruling* as representing that "DNS is essential to providing Internet access."<sup>505</sup> However, although the *Cable Modem Declaratory Ruling* represented that most cable modem service providers have DNS servers and that most include access to their DNS service as a part of cable modem service,<sup>506</sup> it did not represent that cable modem service is not useful if DNS service is not provided by the cable

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495. *Brand X*, 545 U.S. at 996.

496. *Cherry & Peha Comments*, *supra* note 25, at 3-4.

497. *Id.*

498. *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 997-98 (2005) (*Brand X*).

499. *Id.* at 987 (citing *Cable Modem Declaratory Ruling*, 17 FCC Rcd at para. 37; *Universal Service First Report and Order*, 12 FCC Rcd at para. 76).

500. *Id.* at 974 (citations omitted).

501. *Id.* at 988 (emphasis added).

502. *See supra* § IV.A.

503. *Id.*

504. *See supra* § IV.C.

505. *Id.* at 990 (citing *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4810, n.74, 4822-4823, 38.).

506. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at para. 17.

modem service provider.<sup>507</sup> Indeed, as discussed in the DNS standard referenced in the *Cable Modem Declaratory Ruling*, a consumer may use the DNS service provided by unaffiliated entities.<sup>508</sup> In addition, as mentioned above, the *Cable Modem Declaratory Ruling* did not analyze whether the offering of these information service capabilities falls within the telecommunications systems management exception.<sup>509</sup> The Court did not evaluate whether this lack of analysis affected its *Chevron* deference.<sup>510</sup>

Having accepted the FCC's assertion that cable modem service includes an information service, the Court turned to the determination of whether it also includes a telecommunications service.<sup>511</sup> The Court noted that the term "offering" in the definition of telecommunications service is ambiguous and granted *Chevron* deference to the FCC to interpret it for this purpose.<sup>512</sup> The Court accepted the FCC's interpretation that the determination of whether cable modem service includes an offering of telecommunications turns on "the nature of the functions the *end user* is offered."<sup>513</sup> The Court also accepted the interpretation that common usage of the word "offer" is that what a company offers is what "the consumer perceives to be the integrated finished product."<sup>514</sup> The Court thus stated that "[t]he question, then, is whether the transmission component of cable modem service is sufficiently integrated with the finished service to make it reasonable to describe the two as a single, integrated offering."<sup>515</sup> It further stated that "[t]he entire question is whether the products here are functionally integrated (like the components of a car) or functionally separate (like pets and leashes)" and "[t]hat question turns not on the language of the Act, but on the factual particulars of how Internet technology works and how it is provided."<sup>516</sup> The Court did not evaluate the claim some parties have since made that the underlying telecommunications is inseparable simply because cable modem service providers do not choose to offer the underlying telecommunications as a separate service,<sup>517</sup> because the Court did not understand the FCC as saying that "any telecommunications service that is priced or bundled with an information service is automatically unregulated under Title II."<sup>518</sup>

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507. *Id.*

508. *Internet Engineering Task Force, Domain Names – Implementation and Specification*, RFC 1035, at 4-5 (Nov. 1987), <https://tools.ietf.org/html/rfc1035> [<https://perma.cc/Z9BH-JRBT>] (*DNS Standard: Implementation and Specification*). In fact, a common configuration was that each computer would act as its own DNS server, removing the need for a broadband Internet access service provider to offer a DNS server at all.

509. *See supra* § VI.B.

510. *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 999 (2005) (*Brand X*).

511. *Id.* at 988-89.

512. *Id.*

513. *Id.* at 988 (quoting *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4822, para. 38) (emphasis in original).

514. *Id.* at 990.

515. *Id.*

516. *Id.* at 991.

517. *See infra* § VIII.D.

518. *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 997 (2005) (*Brand X*).

The Court accepted the FCC's conclusion, under *Chevron* deference, as a reasonable interpretation—that the information service capabilities and the underlying telecommunications are functionally integrated.<sup>519</sup> However, in this determination, the Court again relied on its understanding that the FCC represented that “the consumer uses the [telecommunications] *always* in connection with the information-processing capabilities provided by [cable modem service].”<sup>520</sup> As discussed above, this representation is not true. The Court was not presented with, and did not evaluate, the factual particulars of how Internet technology works<sup>521</sup>—in particular, that the underlying telecommunications is always separable from Internet applications and that the telecommunications is by itself a useable and valuable service.<sup>522</sup> The Court thus relies on the incorrect representation that the underlying telecommunications is not by itself a “finished service.”<sup>523</sup> If these factual particulars had been presented in the docket and brought to the Court's attention, the Court should have instead concluded that the underlying telecommunications is separable from the information service capabilities and constitutes a telecommunication service.

#### *D. Wireline Broadband Classification Order (2005)*

In the *Wireline Broadband Classification Order*, the FCC reconsidered the early version of broadband facilities-based Internet access service offered by telephone companies using DSL and packet switching technology.<sup>524</sup> That service had been classified as a telecommunications service in the *Advanced Services Order*.<sup>525</sup> However, the classification in the *Cable Modem Declaratory Ruling* that cable modem service is solely an information service resulted in two similar services having different classifications.<sup>526</sup>

*Wireline broadband Internet access service* is defined as “a service that uses existing or future wireline facilities of the telephone network to provide subscribers with Internet access capabilities.”<sup>527</sup> In turn, “Internet access service” is defined as “a service that always and necessarily combines computer processing, information provision, and computer interactivity with data transport, enabling end users to run a variety of applications such as e-mail, and access web pages and newsgroups.”<sup>528</sup>

It is worth noting that a broadband Internet access service does not qualify as *wireline broadband Internet access service* if the telecommunications portion of the service is not “always and necessarily”

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519. *Id.* at 991.

520. *Id.* at 988 (emphasis added).

521. *Id.* at 991.

522. *See supra* § IV.C.

523. *Brand X*, 545 U.S. at 990.

524. *Wireline Broadband Classification Order*, 20 FCC Rcd 14853.

525. *See supra* § VI.A.

526. *See supra* § VI.B.

527. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, para. 9.

528. *Id.*

combined with any information service capabilities of the service.<sup>529</sup> It follows that if the telecommunications portion of a broadband Internet access service using wireline facilities is separable from the information service capabilities of the service, then it is not subject to this Order.

The Order does not discuss in detail the various components of *wireline broadband Internet access service*.<sup>530</sup> The *Wireline Broadband Classification NPRM* describes the “data transport” component in a similar fashion to how the *Advanced Services Order* described *xDSL-based advanced service*.<sup>531</sup> The brief discussion of applications simply cites back to the *Cable Modem Declaratory Ruling*.<sup>532</sup>

As before, it is important to note both the functionality and geographical bounds of the service. The data transport portion of wireline broadband Internet access service provides similar functionality as xDSL-based advanced service and as the high-speed Internet access portion of cable modem service.<sup>533</sup> The applications portion of wireline broadband Internet access service provides similar functionality as the corresponding portion of cable modem service.<sup>534</sup> In contrast, xDSL-based advanced service did not include such applications; indeed, such applications were deemed in the *Advanced Service Order* to be a separable service.<sup>535</sup> The geographical bounds of wireline broadband Internet access service are between the user’s modem and edge providers, similar to the geographical scope of xDSL-based advanced service and of cable modem service.<sup>536</sup>

We pause here to note yet again the inconsistent meanings of “Internet access” in different proceedings. Recall that *dial-up Internet access service* consists of packet switching (a layer 3 service) plus applications (a layer 7 service), that *xDSL-based advanced service* consists of packet switching and the underlying telecommunications (a layer 3 service) but excludes applications, and that *cable modem service* consists of high-speed Internet access service (a layer 3 service) and applications (a layer 7 service).<sup>537</sup>

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529. *Id.*

530. *Id.* at paras. 9-17.

531. Compare the description of the data transport component in *Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities et al., Notice of Proposed Rulemaking*, 17 FCC Rcd 3019, 3030, para. 11, n.19 (2002) [hereinafter *Wireline Broadband Classification NPRM*], to the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24026-27, paras. 29-31.

532. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, para. 9 (including the citation to the *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4802, para. 5, n.16).

533. Compare the description of the data transport component in *Wireline Broadband Classification NPRM*, 17 FCC Rcd at 3030, para. 11, n.19 to the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24026-27, paras. 29-31.

534. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, at para. 9 (including the citation to the *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4802, para. 5, n.16).

535. *See supra* § VI.A.

536. Compare the description of wireline broadband Internet access service in *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, para. 9 to the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24019, para. 16.

537. *See supra* §§ V.B.ii, VI.A, VI.B.

*Wireline broadband Internet access service* also consists of data transport (a layer 3 service, equivalent to *xDSL-based advanced service* or *high-speed Internet access service*) and applications (a layer 7 service).<sup>538</sup> Thus, *wireline broadband Internet access service* is similar to the entire *cable modem service*, not to the *high-speed Internet access* component of *cable modem service*.

We also note another piece of evolving language. In all the court decisions and FCC actions discussed here, from *Computer II* through the *Cable Modem Declaratory Ruling*, the phrase “offering of a capability for” in the definition of information service referred to the capabilities of the information service itself, not the capabilities of other service that may ride over the information service.<sup>539</sup> Under *Computer II*, an enhanced service offers an application that provides the user with additional information, transformed information, and/or interaction with information.<sup>540</sup> However, a basic service underlying an enhanced service did not itself offer such capabilities, and thus the existence of enhanced services that offer such capabilities via the basic service did not convert the basic service into an enhanced service.<sup>541</sup> Similarly, under the *MFJ* and the 1996 Act, an information service offers “a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information.”<sup>542</sup> However, if a telecommunications service underlies an information service, the telecommunications service does not itself offer such capabilities and thus, the existence of information services that offer such capabilities via the telecommunications service does not convert the telecommunications service into an information service.<sup>543</sup> Thus, cable modem service was classified as an information service only because it offers such capabilities itself. However, the language has now begun to drift; in the *Wireline Broadband Classification Order*, *Internet access service* is defined as merely providing “a service . . . enabling end users to run a variety of applications such as e-mail, and access web pages and newsgroups.”<sup>544</sup> The Order itself later clarifies that wireline broadband Internet access service was classified as an information service only because it offers such capabilities itself.<sup>545</sup> However, we will later see arguments to the contrary.<sup>546</sup>

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538. Compare the description of wireline broadband Internet access service in *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, para. 9 to the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24026-27, paras. 29-31 and to the description of the high-speed Internet access service component of cable modem service in *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4798-99, 4802-04, paras. 1, 9, n.21.

539. See *supra* §§ II.B, II.C, II.D, V.B.ii, and VI.B.

540. See *supra* § II.B.

541. *Id.*

542. See *supra* §§ II.C-D.

543. *Id.*

544. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, para. 9.

545. See *id.* at para. 14, n.38 (“[T]o the extent a service does not provide these capabilities, but merely provides transmission whether narrowband or broadband, it would not be an information service.”).

546. See *supra* § VIII.C.iii.

The FCC sought to determine the regulatory classification of wireline broadband Internet access service. As we discussed in section VI.B regarding the *Cable Modem Declaratory Ruling*, the *Wireline Broadband Classification Order* should first have analyzed the characteristics of the transmission of data provided as part of the service in order to determine which parts constitute telecommunications. If it had, it would have found that the end-to-end transmission (the “data transport” component of the service) is a layer 3 network service, strikingly similar to xDSL-based advanced service. It would have further found, as the *Advanced Service Order* found, that this end-to-end transmission is “transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received,” and thus constitutes the underlying telecommunications referred to in the Order.<sup>547</sup>

The Order instead starts its analysis by reiterating the arguments made in the *Cable Modem Declaratory Ruling* that hosting of a subscriber’s webpage, caching of newsgroup articles, email, and DNS all offer a capability for “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information.”<sup>548</sup>

In this part of the analysis, the Order failed to analyze whether the offering of a capability for “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information” falls within the telecommunications systems management exception.<sup>549</sup> If it had, it would have found that offering by a wireline broadband Internet access service provider of the domain name to IP address translation function of DNS falls within the telecommunications systems management exception.

Having found that wireline broadband Internet access service includes the offering of a capability for “generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information,”<sup>550</sup> the FCC should have then investigated whether the offering of this capability is “via telecommunications.” The Order merely stated, without analysis, that the offering of the information capabilities is “via telecommunications.”<sup>551</sup> If it had conducted such an analysis, it would have found that the underlying telecommunications replaced the need in dial-up Internet access service to separately obtain local phone service.

On this basis, the FCC concluded that wireline broadband Internet access service includes an information service.<sup>552</sup> It remains to be determined whether wireline broadband Internet access service is solely an information service or the offering of both an information service and a separate and distinct telecommunications service. The Order observed that wireline broadband Internet access service consists of an offering of both

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547. See 47 U.S.C. § 153(50); see also *supra* §§ II.D, VI.A.

548. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14863-64, para. 14 (citing *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4823-24, para. 41).

549. See *id.* (where one would have expected to see such an analysis).

550. 47 U.S.C. § 153(24).

551. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14863-64, 14910-11, paras. 14, 104.

552. *Id.* at para. 14.

telecommunications with “powerful computer capabilities” (which presumably consists of applications such as e-mail, webpage hosting, and access to newsgroups).<sup>553</sup> It noted that telecommunications service is “the offering of telecommunications for a fee directly to the public” and asked whether there is any such offering.<sup>554</sup>

Unlike the *Cable Modem Declaratory Ruling*, which stated that the FCC is “not aware of any cable modem service provider that has made a stand-alone offering of transmission for a fee directly to the public,”<sup>555</sup> the *Wireline Broadband Classification Order* explicitly acknowledged that some providers have indicated that they currently offer, and intend to continue to offer, the underlying telecommunications service on a common carrier basis.<sup>556</sup>

To answer the question of whether the underlying telecommunications constitutes a telecommunications service, the Order cited the *Brand X* opinion, which in turn had accepted under *Chevron* deference the *Cable Modem Declaratory Ruling*’s conclusion that whether there is a separate offering of telecommunications “turns on the nature of the functions that the end user is offered.”<sup>557</sup> The question is thus whether the underlying telecommunications is separable from information service capabilities. The Order claimed that the underlying telecommunications is inseparable from (and is “inextricably intertwine[d]” with) the information service capabilities.<sup>558</sup> As in the *Cable Modem Declaratory Ruling*, its justification for inseparability was that “the telecommunications is part and parcel of, and integral to, the Internet access service capabilities.”<sup>559</sup>

As in the *Cable Modem Declaratory Ruling*, the Order’s justification of its claim that the underlying telecommunications is inseparable from the information service capabilities is woefully lacking. Its conclusion contradicts the “factual particulars of how Internet technology works and how it is provided.”<sup>560</sup>

First, as we argued above with respect to cable modem service, the Order should have analyzed the relationship between the underlying telecommunications and the applications provided as part of wireline broadband Internet access service. If it had, it would have found that the underlying telecommunications is always technologically separable from Internet applications. Additionally, it would have found that the bundled applications were available from providers with no contractual relationship with the wireline broadband access service provider.

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553. *Id.* at para. 15.

554. *Id.* at para. 104 (citing what is now 47 U.S.C. § 153(53)).

555. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4823, para. 40.

556. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14899, 14900-01, paras. 86, 89.

557. *Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs.*, 545 U.S. 967, 988 (2005) (*Brand X*) (citing *Cable Modem Declaratory Ruling*, 17 FCC Rcd 4798).

558. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, 14864, paras. 9, 15.

559. *Id.* at para. 104.

560. *Brand X*, 545 U.S. at 991.

Second, the Order should have analyzed whether there were any differences between the functionality of telecommunications services offered on a common carrier basis by the providers who indicated that they intended to continue to offer such services and the corresponding functionality of the telecommunications component of wireline broadband Internet access service offered on a noncommon carrier basis. If it had done this analysis, the FCC would have concluded that, in wireline broadband Internet access service to be offered on a noncommon carrier basis, there is no more functional integration between applications and telecommunications than in telecommunications services offered on a common carrier basis. It does not matter whether a wireline broadband Internet access services provider *chooses* to offer the underlying telecommunications as a separate service to the public. The *Brand X* opinion stated that the question of whether the two are “functionally integrated . . . or functionally separate . . . turns . . . on the factual particulars of how Internet technology works and how it is provided.”<sup>561</sup> The FCC should have concluded that the separability of applications from telecommunications services offered on a common carrier basis must thus imply that there is a similar separability of applications from telecommunications offered on a noncommon carrier basis.

Having concluded that the underlying telecommunications is inseparable from the information service capabilities, the FCC concluded that the underlying telecommunications is not a telecommunications service and that wireline broadband Internet access service is solely an information service.<sup>562</sup> The rationale is the same as in the *Cable Modem Declaratory Ruling*, namely that telecommunications service is “the offering of telecommunications for a fee directly to the public” and that there is no such “offering” because the underlying telecommunications is inseparable.<sup>563</sup>

For the same reasons we discussed in section VI.B in regard to cable modem service, the Order’s conclusion here is also incorrect. Because it erred earlier in concluding that underlying telecommunications is inseparable from information service capabilities, this conclusion is also erroneous. The underlying telecommunications is separable, and the service is offered to the public for a fee; hence, it is a telecommunications service.

Whereas the *Cable Modem Declaratory Ruling* was bundled with an NPRM that asked if and how cable modem service should be regulated, the *Wireline Broadband Classification Order* itself investigated whether to eliminate the discretionary *Computer Inquiry* requirements that applied to wireline broadband Internet access service.<sup>564</sup> The FCC conducted a cost-benefit analysis.<sup>565</sup> In the analysis, the FCC relied on the assumption that there would be enough competition between various broadband Internet access service providers (cable modem, wireline, satellite, wireless, and power line) to exert competitive pressure that would result in access to the

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561. *Id.*

562. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14910-11, para. 104.

563. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4820, para. 34.

564. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14872-98, paras. 32-85.

565. *Id.* at para 43.



telecommunications underlying broadband Internet access service to unaffiliated Internet Service Providers on a commercially reasonable basis.<sup>566</sup> Based on the analysis, the Order removed all *Computer Inquiry* requirements, including the *Computer II* requirement that wireline broadband Internet access service providers offer the underlying telecommunications on a common carrier basis.<sup>567</sup>

Our comments at the end of section VI.B concerning a public interest analysis regarding regulation of cable modem service applies equally well here. In addition, we note that the FCC's cost-benefit analysis focused on access to the telecommunications underlying broadband Internet access service to unaffiliated Internet Service Providers on a commercially reasonable basis.<sup>568</sup> It did not consider the stronger requirement of nondiscriminatory access that had been mandated in *Computer II*.<sup>569</sup> Nor did it consider the availability to consumers of the transmission service on a common carrier basis.<sup>570</sup>

## VII. BROADBAND INTERNET ACCESS SERVICE

### A. *Open Internet Order (2015)*

In the 2015 *Open Internet Order*, the FCC considered the classification of broadband Internet access service.<sup>571</sup> Unlike cable modem service, wireline broadband Internet access service, or wireless broadband Internet access service, broadband Internet access service is technologically agnostic.<sup>572</sup> It includes "services provided over any technology platform, including but not limited to wire, terrestrial wireless (including fixed and mobile wireless services using licensed or unlicensed spectrum), and satellite."<sup>573</sup>

*Broadband Internet access service* is defined as "a mass-market retail service by wire or radio that provides the capability to transmit data to and receive data from all or substantially all Internet endpoints, including any capabilities that are incidental to and enable the operation of the communications service, but excluding dial-up Internet access service."<sup>574</sup> It "encompasses any service that the [FCC] finds to be providing a functional equivalent of the service described."<sup>575</sup>

Broadband Internet access service includes applications that are offered as part of the service and that fall within the telecommunications systems management exception (management of broadband Internet access service, and the management, control, or operation of the telecommunications system

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566. *Id.* at paras. 74-75.

567. *Id.* at paras. 41-42.

568. *Id.* at para. 85.

569. *Id.*

570. *Id.*

571. 2015 *Open Internet Order*, 30 FCC Rcd 5601.

572. *Id.* at para. 336.

573. 2015 *Open Internet Order*, 30 FCC Rcd at 5746-47, para. 337.

574. *Id.* at para. 336.

575. *Id.*

used to offer broadband Internet access service).<sup>576</sup> Broadband Internet access service thus includes IP address assignment,<sup>577</sup> IP address conversion,<sup>578</sup> domain name to IP address translation provided by a broadband Internet access service provider's DNS server,<sup>579</sup> caching by a broadband Internet access service provider,<sup>580</sup> and security functionality that is used for the "management, control, or operation of the telecommunications system."<sup>581</sup>

Broadband Internet access service does not include applications that do not fall within the telecommunications systems management exception.<sup>582</sup> Broadband Internet access service thus excludes email,<sup>583</sup> cloud-based storage,<sup>584</sup> spam protection,<sup>585</sup> newsgroups,<sup>586</sup> webpage hosting,<sup>587</sup> customized homepages,<sup>588</sup> firewalls,<sup>589</sup> parental controls,<sup>590</sup> virtual private network (VPN) services,<sup>591</sup> content delivery networks (CDNs),<sup>592</sup> and hosting or data storage services.<sup>593</sup>

As before, it is important to note both the functionality and geographical bounds of the service. Broadband Internet access service provides similar functionality as xDSL-based advanced service, as the high-speed Internet access portion of cable modem service and as the telecommunications portion of wireline broadband Internet access service.<sup>594</sup> A comparison of broadband Internet access service with cable modem service is particularly informative. Broadband Internet access service is similar to the "high-speed Internet access service" component of cable modem service, including data transmission, interconnection arrangements, and "Internet connectivity functions."<sup>595</sup> Applications that do not fall within the telecommunications systems management exception are similar to the component of cable modem service described as "applications or functions that can be used with" high-speed

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576. *Id.* at para. 356.

577. *Id.* at para. 374.

578. *Id.* at para. 375.

579. *Id.* at para. 356.

580. *Id.* at para. 356.

581. *Id.* at para. 373.

582. *Id.* at para. 365.

583. *Id.* at para. 377.

584. *Id.*

585. *Id.*

586. *Id.* at paras. 347-48.

587. *Id.* at para. 347.

588. *Id.*

589. *Id.* at para. 373.

590. *Id.*

591. *Id.* at para. 340.

592. *Id.*

593. *Id.*

594. Compare the definition of broadband Internet access service in *Id.* at para. 336 to the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24026-27, paras. 29-31, the description of the high-speed Internet access service component of cable modem service in *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4799-4800, 4803, para. 1, n.21, and the description of the data transport component of wireline broadband Internet access service in *Wireline Broadband Classification NPRM*, 17 FCC Rcd at 3030, para. 11, n.19.

595. *See supra* § VI.B.

Internet access service.<sup>596</sup> The geographical bounds of broadband Internet access service are between the user’s modem and edge providers, similar to the geographical scope of xDSL-based advanced service, cable modem service, and wireline broadband Internet access service.<sup>597</sup> All of these proceedings were consistent in describing the corresponding services as end-to-end and thus as including interconnection arrangements.<sup>598</sup>

We pause here a final time to note the inconsistent meanings of “Internet access” in different proceedings. Recall that *dial-up Internet access service* consists of packet switching (a layer 3 service) plus applications (a layer 7 service), *xDSL-based advanced service* consists of packet switching and the underlying telecommunications (a layer 3 service) but excludes applications, *cable modem service* consists of high-speed Internet access service (a layer 3 service) and applications (a layer 7 service), and *wireline broadband Internet access service* also consists of data transport (a layer 3 service) and applications (a layer 7 service).<sup>599</sup> *Broadband Internet access service* consists solely of telecommunications (a layer 3 service).<sup>600</sup>

These different types of Internet access service are illustrated in Figure 4. The telecommunications components are shown in blue, and the information service capabilities are shown in orange.

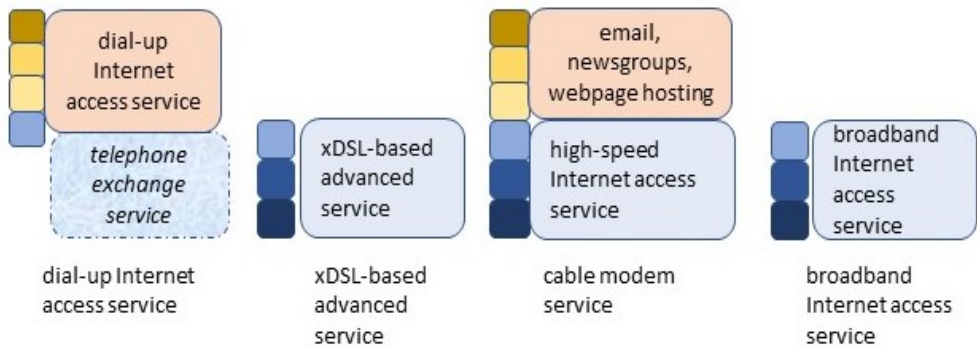


Figure 4: Different types of Internet access service.

In the *Open Internet Order*, the FCC sought to determine the regulatory classification of broadband Internet access service. Unlike the *Cable Modem*

596. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4818-19, para 31.

597. Compare the definition of broadband Internet access service in 2015 *Open Internet Order*, 30 FCC Rcd at 5745-46, para. 336 to the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24019, para. 16, the description of cable modem service in *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4806-11, paras. 12-13, 14-17, and the description of wireline broadband Internet access service in *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, para. 9.

598. Compare the definition of broadband Internet access service in 2015 *Open Internet Order*, 30 FCC Rcd at 5745-46, para. 336, to the description of xDSL-based advanced service in *Advanced Services Order*, 13 FCC Rcd at 24019, para. 16, the description of cable modem service in *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4806-11, paras. 12-13, 14-17, and the description of wireline broadband Internet access service in *Wireline Broadband Classification Order*, 20 FCC Rcd at 14860-61, para. 9.

599. See *supra* §§ V.B.ii, VI.A, VI.B, and VI.D.

600. See *supra* § VII.A.

*Declaratory Ruling* and the *Wireline Broadband Classification Order*—neither of which analyzed the characteristics of the transmission of data provided as part of the service in order to determine which parts constitute telecommunications—the 2015 *Open Internet Order* did just that.<sup>601</sup> The Order determined that the end-to-end transmission provided (i.e., the layer 3 IP packet transfer functionality) is the transmission “between or among points specified by the user . . . of information of the user’s choosing,”<sup>602</sup> without change in the form or content of the information as sent and received.<sup>603</sup>

The Order then analyzed applications that may be bundled with broadband Internet access service. It found that those applications that do not fall within the telecommunications systems management exception are information services.<sup>604</sup> This finding is consistent with the determination in the *Cable Modem Declaratory Ruling* and the *Wireline Broadband Classification Order* that email, webpage hosting, and access to newsgroups are information service capabilities.<sup>605</sup>

It remains to be determined whether the bundled service is the offering of solely an information service (broadband Internet access service and applications) or the offering of both an information service (applications) and a separate and distinct telecommunications service (broadband Internet access service). The Order first observed that broadband Internet access service is an “offering . . . for a fee directly to the public.”<sup>606</sup> Thus, the only remaining question is whether the underlying telecommunications is separable from any information service capabilities that do not fall within the telecommunications systems management exception.

The Order determined that the underlying telecommunications is separable from the applications cited in the *Cable Modem Declaratory Ruling* and in the *Wireline Broadband Classification Order*, namely email, webpage hosting, and access to newsgroups.<sup>607</sup> The separability follows from both the modularity of Internet architecture<sup>608</sup> (as discussed in Section IV.C) and the Internet standards for these applications.<sup>609</sup> Separability is also evidenced by the offerings of these applications from entities unaffiliated with the broadband Internet access service provider.<sup>610</sup> The Order similarly

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601. 2015 *Open Internet Order*, 30 FCC Rcd at 5761-63, paras. 361-62.

602. *Id.* at para. 361.

603. *Id.* at para. 362.

604. *Id.* at paras. 347, 373, 377.

605. Compare *id.* at para. 376, with *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4821-23, paras. 37-38, and *Wireline Broadband Classification Order*, 20 FCC Rcd at 14863-64, para. 14.

606. 2015 *Open Internet Order.*, 30 FCC Rcd at 5763-64, para. 363.

607. *Id.* at para. 376.

608. *Id.*, at para. 378.

609. *Id.* See Internet Engineering Task Force, Simple Mail Transfer Protocol, RFC 5321 (Oct. 2008), <https://tools.ietf.org/html/rfc5321> [<https://perma.cc/JDV6-8QN6>]; Internet Engineering Task Force, Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing, RFC 7230 (June 2014), <https://tools.ietf.org/html/rfc7230> [<https://perma.cc/Z9MD-K3FH>]; Internet Engineering Task Force, Network News Transfer Protocol (NNTP), RFC 3977 (Oct. 2006), <https://tools.ietf.org/html/rfc3977> [<https://perma.cc/7UWX-NL4J>].

610. 2015 *Open Internet Order*, 30 FCC Rcd at 5753-54, para. 348.

determined that the underlying telecommunications is separable from cloud-based storage,<sup>611</sup> spam protection,<sup>612</sup> and customized homepages,<sup>613</sup> for similar reasons.

The Order then finally turned to the consideration of other bundled applications such as DNS, caching, and security. It first analyzed the offering of DNS service by a broadband Internet access service provider.<sup>614</sup> Recall that the *Cable Modem Declaratory Ruling* had determined that DNS is an application that offers information service capabilities but had neglected to determine whether it fell within the telecommunications systems management exception when offered by a cable modem service provider.<sup>615</sup> The *Open Internet Order* conducted this analysis.<sup>616</sup> It found that domain name to IP address translation provided by a broadband Internet access service provider's DNS server facilitates the underlying broadband Internet access service<sup>617</sup> and that it does not alter the fundamental character of that service.<sup>618</sup> In *Computer II*, such functionality was classified as an adjunct-to-basic service and regulated in the same fashion as was the basic service.<sup>619</sup> The Order properly compared domain name to IP address translation to computer-provided directory assistance, which had been classified as an adjunct-to-basic service.<sup>620</sup> Similarly, the Order found that domain name to IP address translation provided by a broadband Internet access service provider's DNS server falls within the telecommunications systems management exception.<sup>621</sup>

The Order noted that a broadband Internet access service provider's DNS server may offer other functionalities that do not fall within the telecommunications systems management exception, e.g., IP address to domain name translation ("reverse look-up").<sup>622</sup> It found that the underlying telecommunications is separable from such functionality because broadband Internet access service does not in any way depend on such functionality.<sup>623</sup> It may be provided by a broadband Internet access service provider's DNS server, by an unaffiliated DNS server, or not at all.<sup>624</sup> The separability again follows from both the modularity of Internet architecture<sup>625</sup> and the Internet standards for DNS.<sup>626</sup> Separability is also evidenced by the offerings of DNS

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611. *Id.* at para. 377.

612. *Id.*

613. *Id.* at para. 347 (citation omitted).

614. *Id.* at para. 366.

615. *See supra* § VI.B.

616. 2015 *Open Internet Order*, 30 FCC Rcd at 5766-68, paras. 367-68.

617. *Id.* at para. 368.

618. *Id.* at para. 367-69.

619. *See supra* § II.B.

620. 2015 *Open Internet Order*, 30 FCC Rcd at 5768-69, paras. 368-69.

621. *Id.*

622. *Id.* at para. 369.

623. *Id.* at para. 378.

624. *Id.* at para. 369-70.

625. *See id.* at para. 378.

626. *See DNS Standard: Implementation and Specification*, *supra* note 508, at 4-5.

from entities unaffiliated with the broadband Internet access service provider.<sup>627</sup>

The Order turned next to the consideration of caching by a broadband Internet access service provider.<sup>628</sup> Recall that the FCC had previously found that webpage caching by an Internet access service provider (dial-up, cable modem, or wireline broadband) offers an information service capability.<sup>629</sup> However, none of the previous proceedings had evaluated whether this capability was for the management, control, or operation of a telecommunications system or the management of a telecommunications service.<sup>630</sup> The *Open Internet Order* observed that caching by a broadband Internet access service provider facilitates the underlying broadband Internet access service and thus falls within the telecommunications systems management exception.<sup>631</sup>

The Order finally turned to security functionality that may be provided with broadband Internet access service.<sup>632</sup> It determined that some security functions, e.g., blocking denial of service attacks, fall within the telecommunications systems management exception because they are used exclusively for the management, control, or operation of the telecommunications system.<sup>633</sup> It also found that the underlying telecommunications is separable from all other security functions, e.g., firewalls and parental controls, for the same reasons it is separable from the applications discussed above.<sup>634</sup>

Having found that the underlying broadband Internet access service is separable from the applications that do not fall within the telecommunications systems management exception, the Order concluded that broadband Internet access service is a telecommunications service.<sup>635</sup>

This classification does not require an analysis of public interest (other than that used in forbearance analysis), as it falls within the statutory mandate that all providers of telecommunications service are subject to common carrier regulation outside of the FCC's discretionary ability to impose common carrier obligations.<sup>636</sup>

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627. See 2015 *Open Internet Order*, 30 FCC Rcd at 5769-70, para. 370. Similarly, even if domain name to IP address translation provided by a broadband Internet access service provider's DNS server did not fall within the telecommunications systems management exception, the underlying telecommunications is separable from that function.

628. *Id.* at para. 372.

629. See *supra* §§ V.B.ii, VI.B, and VI.D.

630. *Id.*

631. 2015 *Open Internet Order*, 30 FCC Rcd at 5768, para. 368.

632. *Id.* at para. 373.

633. *Id.*

634. *Id.*

635. *Id.* at para. 356.

636. *Id.* at para. 384. The Order did however include a forbearance analysis.

*B. US Telecom v. FCC (2016)*

The classification in the 2015 *Open Internet Order* of broadband Internet access service as a telecommunications service was reviewed by the D.C. Circuit Court in *US Telecom v. FCC*.<sup>637</sup>

The court rejected several arguments that the FCC lacked statutory authority for the classification.<sup>638</sup> First, the court rejected the argument that the FCC only has authority to classify the transmission between the end-user's computer and the broadband provider's computer, explaining that the *Brand X* opinion "focused on the nature of the functions broadband providers offered to end users, not the length of the transmission pathway."<sup>639</sup> The court also rejected the argument that the FCC's classification of gateway service in the *Gateways Services Order* restricted the FCC's classification of broadband Internet access services, explaining that "classification of broadband 'turns . . . on the factual particulars of how Internet technology works and how it is provided.'"<sup>640</sup>

The court rejected several arguments that the classification was arbitrary and capricious.<sup>641</sup> The court accepted as reasonable the FCC's decision that the underlying telecommunications service is separable from bundled applications, stating that "the record contains extensive evidence that consumers perceive a standalone offering of transmission, separate from the offering of information services like email and cloud storage" and noting that USTA did not challenge that conclusion.<sup>642</sup> It also accepted the FCC's interpretation that the offerings of DNS and caching by a broadband Internet access service provider fall within the telecommunications systems management exception, explaining that the FCC's comparison to adjunct-to-basic services under *Computer II* was reasonable.<sup>643</sup> The court rejected the argument that the FCC must evaluate the *NARUC* test for common carriage in addition to the determination that broadband Internet access service is a telecommunications service under the 1996 Act, explaining that no such additional evaluation is necessary.<sup>644</sup>

Finally, the court rejected the argument that FCC regulation of interconnection arrangements requires that the FCC first classify the interconnection arrangements themselves as a telecommunications service, explaining that it is sufficient that interconnection arrangements are necessary to broadband Internet access service and that the service be classified as a telecommunications service.<sup>645</sup>

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637. United States Telecom Ass'n v. FCC, 825 F.3d 674 (D.C. Cir. 2016) (*USTelecom*).

638. *Id.* at 702.

639. *Id.*

640. *Id.* (quoting Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 991 (2005) (*Brand X*)).

641. *USTelecom*, 825 F.3d at 706.

642. *Id.* at 704-05.

643. *Id.* at 705-06.

644. *Id.* at 710-11.

645. *Id.* at 711-13.

## VIII. ANALYSIS OF THE RESTORING INTERNET FREEDOM ORDER (2017)

In the *Restoring Internet Freedom Order*, the FCC reconsidered the classification of broadband Internet access service and reclassified it as an information service.<sup>646</sup> In the following sections, we describe and analyze this reclassification. We start by considering the scope of the service; we then analyze the telecommunications and information service components of the service; and we finally turn to the issue of whether these components are separable.

### A. Definition and Scope of Broadband Internet Access Service

The 2015 *Open Internet Order* defined a new service—broadband Internet access service—that differed from the previously classified services (including xDSL-based advanced service, cable modem service, wireline broadband Internet access service, and wireless broadband Internet access service).<sup>647</sup> The *Restoring Internet Freedom Order* addressed the same broadband Internet access service defined in the 2015 *Open Internet Order*.<sup>648</sup> Broadband Internet access service thus remains defined as “a mass-market retail service by wire or radio that provides the capability to transmit data to and receive data from all or substantially all Internet endpoints, including any capabilities that are incidental to and enable the operation of the communications service, but excluding dial-up Internet access service.”<sup>649</sup> This definition also “encompasses any service that the [FCC] finds to be providing a functional equivalent of the service described.”<sup>650</sup>

However, the *Restoring Internet Freedom Order* substantially reinterpreted this definition. In the following two subsections, we discuss the Order’s reinterpretation of the functionality and geographical bounds of the service.

#### 1. Functionality of Broadband Internet Access Service

In order to understand the scope of broadband Internet access service, one must interpret the phrase “the capability to transmit data to and receive data from all or substantially all Internet endpoints.”<sup>651</sup> Under the 2015 *Open Internet Order*, this capability is the primary service, namely the end-to-end transmission of IP packets between or among points specified by the user, of information of the user’s choosing, without change in the form or content of

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646. *Restoring Internet Freedom Order*, 33 FCC Rcd 311.

647. *See supra* § VII.A.

648. *Restoring Internet Freedom Order*, 33 FCC Rcd at 318-19, para. 21.

649. 2015 *Open Internet Order*, 30 FCC Rcd at 5745-46, para. 336.

650. *Id.*

651. *Id.*



the information as sent and received.<sup>652</sup> The *Restoring Internet Freedom Order* acknowledges that the transmission of IP packets of information of the user's choosing is part of broadband Internet access service.<sup>653</sup>

In order to understand the scope of broadband Internet access service, one must also interpret the phrase "any capabilities that are incidental to and enable the operation of the communications service."<sup>654</sup> Under the 2015 *Open Internet Order*, these capabilities include applications that are offered as part of broadband Internet access service and that fall within the telecommunications systems management exception.<sup>655</sup> These capabilities include IP address assignment,<sup>656</sup> IP address conversion,<sup>657</sup> domain name to IP address translation provided by a broadband Internet access service provider's DNS server,<sup>658</sup> caching by a broadband Internet access service provider,<sup>659</sup> and security functionality that is used for the management, control, or operation of the telecommunications system.<sup>660</sup> Although the *Restoring Internet Freedom Order* reverses the determination that some of these applications fall within the telecommunications systems management exception (as discussed below in section VIII.C), it does not exclude any of these applications from broadband Internet access service.<sup>661</sup>

The 2015 *Open Internet Order* limited the scope of broadband Internet access service to these two sets of capabilities: the end-to-end transmission of IP packets (the primary service) and applications that under the Order fall within the telecommunications systems management exception (adjunct services).<sup>662</sup> In contrast, despite maintaining the same definition, the *Restoring Internet Freedom Order* interpreted the scope of broadband Internet access service more broadly.<sup>663</sup> The *Restoring Internet Freedom Order* explained that broadband Internet access service is intended to "cover" cable modem service and wireline broadband Internet access service, hinting that it was interpreting that broadband Internet access service as having a broader scope than how it was interpreted under the 2015 *Open Internet Order*.<sup>664</sup>

A comparison of broadband Internet access service with cable modem service is particularly informative. Under the 2015 *Open Internet Order*, broadband Internet access service is similar to the "high-speed Internet access service" component of cable modem service but not the component of cable modem service described as "applications or functions that can be used with"

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652. *Id.* at paras. 361-62.

653. *Restoring Internet Freedom Order*, 33 FCC Rcd at 341-43, para. 52.

654. 2015 *Open Internet Order*, 30 FCC Rcd at 5745-46, para. 336.

655. *Id.* at para. 356.

656. *Id.* at para. 374.

657. *Id.*

658. *Id.* at para. 356.

659. *Id.*

660. 2015 *Open Internet Order*, 30 FCC Rcd at 5771-72, para. 373.

661. *Restoring Internet Freedom Order*, 33 FCC Rcd at 318-19, para. 21.

662. 2015 *Open Internet Order*, 30 FCC Rcd at 5757-58, para. 356.

663. *Restoring Internet Freedom Order*, 33 FCC Rcd at 319, para. 22.

664. *Id.*

high-speed Internet access service.<sup>665</sup> Under the *Restoring Internet Freedom Order*, broadband Internet access service is similar to all of cable modem service.<sup>666</sup> Thus, while broadband Internet access service under the 2015 *Open Internet Order* consists solely of telecommunications (a layer 3 service), the same term under the *Restoring Internet Freedom Order* consists of high-speed Internet access service (a layer 3 service) and applications (a layer 7 service).<sup>667</sup>

The crux of the disagreement in scope concerns applications that under the 2015 *Open Internet Order* do not fall within the telecommunications systems management exception, including email,<sup>668</sup> cloud-based storage,<sup>669</sup> spam protection,<sup>670</sup> newsgroups,<sup>671</sup> webpage hosting,<sup>672</sup> customized homepages,<sup>673</sup> firewalls,<sup>674</sup> parental controls,<sup>675</sup> virtual private network (VPN) services,<sup>676</sup> content delivery networks (CDNs),<sup>677</sup> and hosting or data storage services.<sup>678</sup> Under the 2015 *Open Internet Order*, these applications are not considered to be part of broadband Internet access service because they provide neither “the capability to transmit data to and receive data from all or substantially all Internet endpoints” nor “capabilities that are incidental to and enable the operation of the communications service.”<sup>679</sup> In contrast, the *Restoring Internet Freedom Order* considers all of these applications, when provided by a broadband Internet access service provider, to be part of broadband Internet access service if they are “included” in the broadband Internet access service.<sup>680</sup>

The FCC’s only justification in the *Restoring Internet Freedom Order* for including such bundled applications in the scope of broadband Internet access service was the claim that “consumers perceive the offer of broadband Internet access service to include more than mere transmission, and . . . customers want and pay for functionalities that go beyond mere

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665. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4799-4800, para. 1.

666. *Restoring Internet Freedom Order*, 33 FCC Rcd at 318-19, para. 21.

667. Compare the definition of broadband Internet access service in the 2015 *Open Internet Order*, 30 FCC Rcd at 5745-46, para. 336 to the description of the same term in the *Restoring Internet Freedom Order*, 33 FCC Rcd at 318-19, para. 21.

668. 2015 *Open Internet Order*, 30 FCC Rcd at 5773, para. 377.

669. *Id.* at para. 377.

670. *Id.*

671. *Id.* at para. 347.

672. *Id.*

673. *Id.*

674. *Id.* at para. 373.

675. *Id.*

676. *Id.* at para. 340.

677. *Id.*

678. *Id.*

679. *Id.* at paras. 376-78.

680. *Restoring Internet Freedom Order*, 33 FCC Rcd at 323-25, paras. 31-33. However, the Order does not consider cloud-based storage, VPN services, or CDNs to be part of broadband Internet access service if they are “separate from” broadband Internet access service (*see id.* at para. 24). The Order does not explain how to determine if such applications are “included” or “separate from” broadband Internet access service (*see id.* at paras. 45-57, where one would have expected to see such an analysis).

transmission,”<sup>681</sup> and that these functionalities include “online storage, parental controls, and e-mail.”<sup>682</sup> However, neither online storage, parental controls, nor email provide “the capability to transmit data to and receive data from all or substantially all Internet endpoints.”<sup>683</sup> That capability is provided by the end-to-end transmission of IP packets.<sup>684</sup> Also, neither online storage, parental controls, nor email provide “capabilities that are incidental to and enable the operation of the communications service.”<sup>685</sup> None of these applications enable the operation of the end-to-end transmission of IP packets.<sup>686</sup>

The Order’s list of applications that it considered within the scope of broadband Internet access service went far beyond this list. The Order also determined that broadband Internet access service includes “speed test servers, backup and support services, geolocation-based advertising . . . unique programming content . . . pop-up blockers, [and] instant messaging services” when provided by a broadband Internet access service provider and “included” in the broadband Internet access service.<sup>687</sup> Similarly, none of these applications fit the definition of broadband Internet access service because none provide the capability to transmit data to and receive data from all or substantially all Internet endpoints, nor enable the operation of the end-to-end transmission of IP packets.<sup>688</sup>

The Order’s justification for including such bundled applications in the scope of broadband Internet access service is thus fallacious. If the Order wished to include such bundled applications, it should have redefined broadband Internet access service to include the capabilities of such bundled applications.

In the analysis below, it will become important to distinguish between the primary purpose of broadband Internet access service and adjunct components that may be included in or bundled with the service. The 2015 *Open Internet Order* separated the components of broadband Internet access service into the primary service (the end-to-end transmission of IP packets) and adjunct services (applications that under the Order fall within the telecommunications systems management exception).<sup>689</sup>

The *Restoring Internet Freedom Order* stated that “[t]he fundamental purpose of broadband Internet access service is to ‘enable a constant flow of computer-mediated communications between end-user devices and various servers and routers to facilitate interaction with online content.’”<sup>690</sup> The flow of communications is the end-to-end transmission of IP packets, and

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681. *Id.* at para. 46.

682. *Id.* at para. 46, n.161.

683. *See supra* § IV.A.

684. *Id.*

685. *Id.*

686. *Id.*

687. *Restoring Internet Freedom Order*, 33 FCC Rcd at 325, para. 33, n.99.

688. *See supra* § IV.A.

689. 2015 *Open Internet Order*, 30 FCC Rcd at 5757-58, paras. 355-56.

690. *Restoring Internet Freedom Order*, 33 FCC Rcd at 323-24, para. 31 (citations omitted).

computer mediation is provided by the end user devices and applications (as discussed in section IV.A). Thus, the *Restoring Internet Freedom Order* seems to endorse the view of the 2015 *Open Internet Order* that the primary service is the end-to-end transmission of IP packets and that other components of what it interprets as broadband Internet access service are adjunct.

That said, the *Restoring Internet Freedom Order* asserted that the adjunct components are nevertheless valuable to consumers.<sup>691</sup> However, the Order did not justify the claim that consumers perceive bundled applications such as online storage, parental controls, and e-mail to be part of broadband Internet access service, nor did it justify the claim that customers pay for these functionalities.<sup>692</sup> In contrast, the 2015 *Open Internet Order* provided an extensive analysis to show that customers perceive the primary service offered by broadband Internet access service as a conduit for the transmission of data across the Internet (namely, the end-to-end transmission of IP packets).<sup>693</sup> The lack of analysis in the *Restoring Internet Freedom Order* undermines its claim (discussed below in sections VIII.C-D) that broadband Internet access service is not a telecommunications service.<sup>694</sup>

## 2. Geographic Scope of Broadband Internet Access Service

As before, it is important to note the geographical bounds of broadband Internet access service. Under the 2015 *Open Internet Order* and previous orders, the geographical bounds of the relevant Internet access service were between the user's modem and edge providers.<sup>695</sup> The *Restoring Internet Freedom Order* disagreed with our interpretation of the earlier orders, but in the end, it did not define the geographical bounds of broadband Internet access any differently.<sup>696</sup>

Recall that in the *Stevens Report*, the geographical scope of dial-up Internet access service is between a modem bank operated by the dial-up Internet access service provider and the desired edge provider.<sup>697</sup> The service requires the dial-up Internet access service provider to transport the information across its network and to make the interconnection arrangements necessary to transmit the traffic between its network and the edge providers.<sup>698</sup>

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691. *Id.* at para. 46.

692. *Id.*

693. 2015 *Open Internet Order*, 30 FCC Rcd at 5750-57, paras. 341-54.

694. *Restoring Internet Freedom Order*, 33 FCC Rcd at 341-43, para. 52.

695. *See supra* § VII.A.

696. *Restoring Internet Freedom Order*, 33 FCC Rcd at 318-19, para. 21.

697. *Stevens Report*, 13 FCC Rcd at 11532-33, para. 66.

698. *See supra* § V.B.ii.

The *Restoring Internet Freedom Order* does not directly address the geographical scope of this service.<sup>699</sup>

Also recall that in the *Advanced Services Order*, xDSL-based advanced service includes: (i) the transmission of a customer's data traffic between the customer's modem and the telephone company's central office (using DSL technology),<sup>700</sup> (ii) the transmission between the central office and an interconnection point across the telephone company's packet switched network,<sup>701</sup> and (iii) interconnection arrangements with other providers as necessary to fulfill the service.<sup>702</sup> The *Restoring Internet Freedom Order* stated that "[t]he DSL transmission service previously required to be unbundled by the *Computer Inquiries* rules likewise was limited to the 'last mile' connection between the end-user and the ISP."<sup>703</sup> This statement is factually wrong. What is colloquially called the "last-mile" usually refers to the connection between the customer's modem and the telephone company's central office.<sup>704</sup> In contrast, the xDSL-based advanced service promises delivery of traffic along the entire end-to-end route.<sup>705</sup> To accomplish this, the xDSL-based advanced service transports traffic along a route between the customer's modem and the chosen ISP (which even by itself is longer than the "last-mile"), and then it makes interconnection agreements with ISPs to transport traffic along the remainder of the end-to-end route.<sup>706</sup> The *Restoring Internet Freedom Order* further states that "any interconnection obligations identified there were limited to interconnection between providers of common carrier xDSL transmission service and other telecommunications carriers (rather than providers of edge services or non-common carrier backbone services)."<sup>707</sup> However, this observation is irrelevant to the definition of the service. The *Advanced Services Order* defined the service as an end-to-end service, regardless of the obligations it placed on the service.<sup>708</sup>

To finish off the analysis, recall that the *Cable Modem Declaratory Ruling* described the high-speed Internet access service component of the cable modem service as including: (i) the transmission of data between a customer's modem and the cable company's headend,<sup>709</sup> (ii) the transmission between the headend and an interconnection point across the cable company's

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699. Compare the unchanged definition of broadband Internet access service in *Restoring Internet Freedom Order*, 33 FCC Rcd at 318-19, para 21, to the manner in which the Order discusses broadband Internet access service in para. 23 ("[t]o the extent [services offering connectivity to one or a small number of Internet endpoints for a particular device] are provided by ISPs over *last-mile capacity* shared with broadband Internet access service . . ." (emphasis added)) and in para. 222 (" . . . how any non-broadband Internet access service data services may affect the *last-mile capacity* available for, and the performance of, broadband Internet access service" (emphasis added)).

700. *Advanced Services Order*, 13 FCC Rcd at 24026-27, para. 29.

701. *Id.* at para. 31.

702. *Id.* at para. 45.

703. *Restoring Internet Freedom Order*, 33 FCC Rcd at 343-44, para. 54.

704. *See supra* § V.B.ii.

705. *See supra* § VI.A.

706. *Restoring Internet Freedom Order*, 33 FCC Rcd at 343-44, para. 54.

707. *Id.* at para. 54, n.205.

708. *See supra* § VI.A.

709. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4806-09, paras. 12-13.

packet switched network,<sup>710</sup> and (iii) interconnection arrangements with other providers as necessary to fulfill the service.<sup>711</sup> Thus, the geographical scope is between the user's modem and edge providers. Finally, recall that in the *Wireline Broadband Classification Order*, the geographical scope of wireline broadband Internet access service is similarly between the user's modem and edge providers.<sup>712</sup>

The *Restoring Internet Freedom Order* is also muddled as to the role of interconnection agreements in providing broadband Internet access service. Although the Order cited Section 257 of the Communications Act as a source of authority for the revised transparency rule,<sup>713</sup> and although interconnection agreements remain part of broadband Internet access service, the Order did not see Section 257 as a source of authority for oversight over interconnection agreements.<sup>714</sup>

The *Restoring Internet Freedom Order* also sometimes mistakenly discussed the no-blocking, no-throttling, and general conduct rules of the 2015 *Open Internet Order* as only applying to the "last-mile,"<sup>715</sup> which they decidedly did not (as discussed in section VII.A).

All that said, under the *Restoring Internet Freedom Order*, the geographical bounds of broadband Internet access service appear to remain the same as under the 2015 *Open Internet Order* and previous orders, namely between the user's modem and edge providers. The definition of the service remains (as it was under the 2015 *Open Internet Order*) "a mass-market retail service . . . that provides the capability to transmit data to and receive data from all or substantially all Internet endpoints, including any capabilities that are incidental to and enable the operation of the communications service."<sup>716</sup> The *Restoring Internet Freedom Order* discussed the service as providing capabilities beyond transmission over the "last-mile" and beyond the ISP's network.<sup>717</sup>

### *B. The Telecommunications Component of Broadband Internet Access Service*

In the *Restoring Internet Freedom Order*, the FCC revisited the regulatory classification of broadband Internet access service (as reinterpreted).<sup>718</sup> We start our analysis of the Order's reclassification with the characteristics of the transmission of data provided as part of the service in order to determine which parts constitute telecommunications. Recall that the

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710. *Id.* at paras. 14-17.

711. *Id.*

712. *See supra* § VI.D.

713. *Restoring Internet Freedom Order*, 33 FCC Rcd at 445-46, para. 232.

714. *Id.* at para. 167.

715. *Id.* ("Title II regulation and conduct rules are not warranted even as to the 'last mile[.]'").

716. *Id.* at para. 21.

717. *See, e.g., id.* at para. 54 ("transmission provided by ISPs outside the last mile was part of an integrated information service").

718. *Id.* at paras. 21-64.

2015 *Open Internet Order* determined that the end-to-end transmission provided (i.e., the layer 3 IP packet transfer functionality) is the transmission between or among points specified by the user<sup>719</sup> of information of the user's choosing,<sup>720</sup> without change in the form or content of the information as sent and received;<sup>721</sup> hence, it is telecommunications.

The *Restoring Internet Freedom Order* acknowledged that broadband Internet access service “makes use of” telecommunications and that “at least some telecommunications is being used as an input into broadband Internet access service.”<sup>722</sup>

The Order also acknowledged that “the transmission of IP packets is transmission of the user's choosing.”<sup>723</sup>

The Order appears to acknowledge that the transmission is without change in the form or content of the information as sent and received.<sup>724</sup> This is a reversal from the *Restoring Internet Freedom NPRM*, which asserted that “Internet service providers routinely change the form or content of the information sent over their networks—for example, by using firewalls to block harmful content or using protocol processing to interweave IPv4 networks with IPv6 networks.”<sup>725</sup> As a factual matter, broadband Internet access service providers do not routinely change the form or content of information, and when they do so, such changes fall into the telecommunications system management exception.<sup>726</sup>

The *Restoring Internet Freedom Order* did not analyze whether the transmission is between or among points specified by the user.<sup>727</sup> However, it did acknowledge that transmission of traffic “between aggregation points on [a broadband Internet access service provider's] network and the [broadband Internet access service provider's] connections with other networks . . . readily appears to be . . . a transmission component” of broadband Internet access service.<sup>728</sup> Thus, presumably the Order implicitly acknowledged that

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719. 2015 *Open Internet Order*, 30 FCC Rcd at 5761-62, para. 361.

720. *Id.* at para. 361.

721. *Id.* at para. 362.

722. *Restoring Internet Freedom Order*, 33 FCC Rcd at 341-43, para. 52.

723. *Id.* at para. 52, n.187 (“We find that the transmission of IP packets is transmission of the user's choosing[.]”).

724. *Id.* (“We observe that placing information in IP packets does not change the form of information . . . and also agree that changing the packet structure of an IP packet from IPv4 to IPv6 does not change the form of the information.”) (citations, internal quotations, and alterations omitted).

725. *Restoring Internet Freedom, Notice of Proposed Rulemaking*, 32 FCC Rcd 4434, 4444, para. 30 [hereinafter *Restoring Internet Freedom NPRM*].

726. Reply Comments of Scott Jordan at 6-8, *Restoring Internet Freedom*, WC Docket No. 17-108, (Aug. 30, 2017) [hereinafter *Jordan Reply Comments*] (analyzing firewalls and IP address conversion).

727. See *Restoring Internet Freedom Order*, 33 FCC Rcd at 341-43, para. 52 (where one would have expected to see such an analysis).

728. *Id.* The Order does not explain what it means by “aggregation points.” As a factual matter, the end-user side of broadband Internet access service starts with the end-user's modem, not any “aggregation point.”

this transmission is between or among points specified by the user.<sup>729</sup> This is a reversal from the *Restoring Internet Freedom NPRM*, which asserted that “broadband Internet users do not typically specify the ‘points’ between and among which information is sent online.”<sup>730</sup> As a factual matter, Internet architecture dictates that users do indeed specify the points between and among which information is transmitted.<sup>731</sup> The end user (or the application acting on behalf of the user) specifies the IP address of the other party, and that IP address is conveyed to the application by the edge provider.<sup>732</sup>

Beyond that, the *Restoring Internet Freedom Order* did not fully determine which parts of broadband Internet access service constitute telecommunications, finding it sufficient that transmission of traffic “between aggregation points on [a broadband Internet access service provider’s] network and the [broadband Internet access service provider’s] connections with other networks . . .”<sup>733</sup> does constitute telecommunications, and hence that broadband Internet access service is a service offered “via telecommunications.”<sup>734</sup> If it had, then given that the Order states that “[t]he fundamental purpose of broadband Internet access service is to ‘enable a constant flow of computer-mediated communications between end-user devices and various servers and routers to facilitate interaction with online content,’”<sup>735</sup> it would have found that the end-to-end transmission of IP packets and those functionalities that fall within the telecommunications system management exception are telecommunications.

### *C. Information Service Capabilities of Broadband Internet Access Service*

The 2015 *Open Internet Order* discussed applications in three categories,<sup>736</sup> and we do so here: (1) applications that under the 2015 *Open Internet Order* fall within the telecommunications systems management exception (e.g., domain name to IP address translation provided by a broadband Internet access service provider’s DNS server and caching by a broadband Internet access service provider), (2) applications bundled with broadband Internet access service that under the 2015 *Open Internet Order* do not fall within the telecommunications systems management exception

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729. However, the Order has an internal contradiction when it claims that the transmission is “between or among points selected by the [broadband Internet access service provider].” *Id.*

730. *Restoring Internet Freedom NPRM*, 32 FCC Rcd at 4443, para. 29.

731. *Jordan Reply Comments*, *supra* note 726, at 5-6 (analyzing the use of DNS and IP addresses in specifying the points).

732. *Id.*

733. *Id.* The Order does not explain what it means by “aggregation points.” As a factual matter, the end-user side of broadband Internet access service starts with the end-user’s modem, not any “aggregation point.”

734. *Restoring Internet Freedom Order*, 33 FCC Rcd at 341-43, para. 52 (“[W]e need not further address the scope of the ‘telecommunications’ definition.”).

735. *Id.* at para. 30.

736. *See supra* § VII.A.



(e.g., email, newsgroups, and webpage hosting), and (3) edge provider applications.

1. Applications Bundled with Broadband Internet Access Service That Under the 2015 Open Internet Order Fall Within the Telecommunications Systems Management Exception

The 2015 *Open Internet Order* considered the telecommunications systems management exception and determined that certain functionalities of broadband Internet access service fall within this exception.<sup>737</sup>

- a. DNS

As discussed in Section VII.A, the 2015 *Open Internet Order* found that domain name to IP address translation provided by a broadband Internet access service provider's DNS server facilitates the underlying broadband Internet access service<sup>738</sup> and that it does not alter the fundamental character of that service.<sup>739</sup> It thus found that this functionality falls within the telecommunications systems management exception.<sup>740</sup>

The *Restoring Internet Freedom Order* reversed this determination.<sup>741</sup> To justify the reversal, the Order first explained that "DNS . . . involves the capabilities of generating, acquiring, storing, transforming, processing, retrieving, utilizing and making available information."<sup>742</sup> However, the 2015 *Open Internet Order* agreed with this claim.<sup>743</sup> The issue is not whether domain name to IP address translation provided by a broadband Internet access service provider's DNS server has information service capabilities but whether this functionality falls within the telecommunications systems management exception.<sup>744</sup>

The *Restoring Internet Freedom Order* acknowledged that "DNS is used to facilitate the information retrieval capabilities that are inherent in Internet access,"<sup>745</sup> so the only remaining issue is whether domain name to IP address translation provided by a broadband Internet access service provider's DNS server alters the fundamental character of the broadband Internet access service. The Order claimed that "the absence of ISP-provided DNS would fundamentally change the online experience for the consumer."<sup>746</sup> This claim is factually wrong.

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737. See *supra* § VII.A.

738. See 2015 *Open Internet Order*, 30 FCC Rcd at 5768, para. 368.

739. *Id.* at para. 367.

740. *Id.*

741. *Restoring Internet Freedom Order*, 33 FCC Rcd at 325-27, para. 34.

742. *Id.*

743. 2015 *Open Internet Order*, 30 FCC Rcd at 5765-70, paras. 365-71.

744. *Id.*

745. *Restoring Internet Freedom Order*, 33 FCC Rcd at 325-27, para. 34.

746. *Id.*

To understand why it is wrong, we need to explain how DNS works. DNS consists of a database distributed amongst a hierarchy of DNS servers and an application that allows devices to query the distributed database.<sup>747</sup> Every organization with publicly accessible domain names, e.g., web servers, provides mappings between these domain names and the desired IP addresses to which traffic destined for this domain should be sent.<sup>748</sup> Such mappings are referred to as *authoritative resource records*, meaning they are the original copy.<sup>749</sup> Each such organization places these authoritative resource records into either its own DNS server or a DNS server with which the organization has contracted.<sup>750</sup> In addition to the original authoritative resource record, other DNS servers may cache (i.e., temporarily store) copies of any DNS resource records they obtain through the query process described next.<sup>751</sup> However, such copies are designated as *non-authoritative resource records* and must be updated based on the authoritative resource record whenever it changes.<sup>752</sup>

When an end user runs an application on her device and the application wishes to convert a domain name to an IP address, the application queries the distributed DNS database.<sup>753</sup> The query is transmitted to a DNS server designated by the device's operating system or home router.<sup>754</sup> The default setting in most operating systems and home routers is to use the DNS server designated by the end user's broadband Internet access service provider, which may be a DNS server operated by that broadband Internet access service provider or a DNS server operated by another entity.<sup>755</sup> However, an end user may designate another DNS server of their choice by simply entering the IP address of that server into a network settings menu.<sup>756</sup> Many entities offer DNS servers for this purpose.<sup>757</sup>

A broadband Internet access service provider's DNS server plays only a limited and replaceable role in DNS.<sup>758</sup> The authoritative resource record, containing the desired mapping from domain name to IP address, originates

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747. *Internet Engineering Task Force, Domain Names – Concepts and Facilities*, RFC 1034, at 6 (Nov. 1987), <https://tools.ietf.org/html/rfc1034> [<https://perma.cc/C6CW-L2M7>] (*DNS Standard: Concept and Facilities*).

748. *Id.* at 7-15; *DNS Standard: Implementation and Specification*, *supra* note 508, at 10-24.

749. *Id.*

750. *Id.*

751. *Id.*

752. *DNS Standard: Implementation and Specification*, *supra* note 508, at 3-4.

753. *DNS Standard: Concept and Facilities*, *supra* note 747, at 15-17; *DNS Standard: Implementation and Specification*, *supra* note 508, at 3-7.

754. *DNS Standard: Implementation and Specification*, *supra* note 508, at 4.

755. KUROSE & ROSS, *supra* note 53, at § 2.5.

756. *See, e.g., Get Started, GOOGLE PUBLIC DNS*, <https://developers.google.com/speed/public-dns/docs/using> [<https://perma.cc/N3BU-PCVR>].

757. *Id.*

758. *DNS Standard: Concept and Facilities*, *supra* note 747, at 7-15; *DNS Standard: Implementation and Specification*, *supra* note 508, at 10-24.

with the organization operating that domain name.<sup>759</sup> A broadband Internet access service provider merely caches and forwards it.<sup>760</sup>

An end user's experience would not be significantly changed if her broadband Internet access service provider did not operate its own DNS server. First, a broadband Internet access service provider may simply designate an unaffiliated entity to be the subscriber's default DNS server, in which case the end user would see no difference.<sup>761</sup> Second, the end user may simply designate a DNS server of her choice.<sup>762</sup> If a broadband Internet access service provider neither operated its own DNS server nor designated an unaffiliated DNS server, the operating system would surely prompt the user to select one in the initial one-time set-up of the device.<sup>763</sup>

Our analysis is consistent with the *Cable Modem Declaratory Ruling* and with *Brand X*. The *Brand X* Court recognized that "DNS is essential to providing Internet access."<sup>764</sup> However, although the *Cable Modem Declaratory Ruling* represented that most cable modem service providers have DNS servers and that most include access to their DNS service as a part of cable modem service,<sup>765</sup> it did not represent that cable modem service is not useful if DNS service is not provided by the cable modem service provider.<sup>766</sup> Indeed, as discussed in the DNS standard referenced in the *Cable Modem Declaratory Ruling*, a consumer may use the DNS service provided by unaffiliated entities.<sup>767</sup>

The *Restoring Internet Freedom Order* also found that the 2015 *Open Internet Order* erred in its determination that domain name to IP address translation provided by a broadband Internet access service provider's DNS server falls within the telecommunications systems management exception because "little or nothing in the DNS look-up process is designed to help an

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759. *Id.*

760. The secure version of DNS, called DNSSEC, authenticates that the IP address supplied by a DNS server is exactly that specified by the owner of the associated domain name. See Roy Arenda et al., *Internet Engineering Task Force, DNS Security Introduction and Requirements* at 7-8, RFC 4033, (Mar. 2005) [hereinafter *DNSSEC*], <https://tools.ietf.org/html/rfc4033> [<https://perma.cc/77H3-LR6X>].

761. Steve Alexander & Ralph Droms, *Internet Engineering Task Force, Dynamic Host Configuration Protocol* at 7, RFC 2132, (Mar. 1997) [hereinafter *DHCP Options Standard*], <https://tools.ietf.org/html/rfc2132> [<https://perma.cc/M5CL-9SMZ>]. In fact, per the protocol a broadband Internet access service provider need not specify a DNS server at all. See Ralph Droms, *Internet Engineering Task Force, Dynamic Host Configuration Protocol* at 5, RFC 2131, (Mar. 1997) [hereinafter *DHCP Standard*], <https://tools.ietf.org/html/rfc2131> [<https://perma.cc/7GRS-6HJJ>].

762. See, e.g., *Get Started*, *supra* note 756.

763. See, e.g., *HP Desktop PCs – Setting up Windows 10 for the First Time*, HP, <https://support.hp.com/us-en/document/c04941742> [<https://perma.cc/WPB8-TN45>].

764. Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 990 (2005) (*Brand X*).

765. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4809-11, para. 17.

766. *Id.*

767. *Id.* at para. 37, n.146; *DNS Standard: Implementation and Specification*, *supra* note 508, at 4-5. In fact, a common configuration was that each computer would act as its own DNS server, removing the need for a broadband Internet access service provider to offer a DNS server at all.

ISP ‘manage’ its network.”<sup>768</sup> The Order is again factually wrong. A broadband Internet access service provider benefits from operating its own DNS server since this may significantly reduce the volume of DNS queries passing through its network.

The *Restoring Internet Freedom Order* further claimed that because DNS “is a function that is useful and essential to providing Internet access for the ordinary consumer,” the functionality cannot fall within the telecommunications systems management exception.<sup>769</sup> To justify this claim, the Order claimed that “[t]he [FCC] and the courts made clear the narrow scope of the ‘adjunct-to-basic’ or ‘telecommunications management’ categories in numerous decisions in many different contexts.”<sup>770</sup> However, the cited FCC Orders show exactly the opposite—that functionality falls within the telecommunications systems management exception if it facilitates the underlying broadband Internet access service and does not alter the fundamental character of that service.<sup>771</sup> In particular, the *NATA Centrex Order*, which the *Restoring Internet Freedom Order* cited here, explicitly explained that speed dialing, call forwarding, and computer-assisted directory assistance are all adjunct-to-basic services, even though they are clearly useful to end users.<sup>772</sup>

To further justify the reversal, the *Restoring Internet Freedom Order* attempted to compare the domain name to IP address translation provided by a broadband Internet access service provider’s DNS server with the address translation functionality provided in the gateway service discussed in Section III.A, stating that “[t]he ‘address translation’ gateway function appears highly analogous to the DNS function of broadband Internet access service, which enables end users to use easier-to-remember domain names to initiate access to the associated IP addresses of edge providers.”<sup>773</sup> The Order claimed that the 1987 *United States v. Western Electric* court “found that address translation, which enabled the consumer [to] use an abbreviated code or signal . . . in order to access the information service provider such as through the translation of a mnemonic code into [a] telephone number, rendered gateways an information service.”<sup>774</sup> However, the court did not find that address translation rendered gateways as an information service.<sup>775</sup> Such address translation is akin to that provided for 800 numbers, which the FCC had designated as an adjunct-to-basic service, and the court similarly classified

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768. *Restoring Internet Freedom Order*, 33 FCC Rcd at 5612, para. 36.

769. *Id.* at para. 36.

770. *Id.* at para. 38.

771. *See supra* § II.B.

772. North American Telecommunications Association Petition for Declaratory Ruling Under § 64.702 of the Commission’s Rules Regarding the Integration of Centrex, Enhanced Services, and Customer Premises Equipment, *Memorandum Opinion and Order*, 101 FCC 2d 349, 360, para. 26 (1985) [hereinafter *NATA Centrex Order*].

773. *Restoring Internet Freedom Order*, 33 FCC Rcd at 5611, para. 35.

774. *Id.* at para. 35 (quoting *United States v. W. Elec.*, 673 F. Supp. 525, 593, n.307 (D.D.C. 1987) (*Western Electric* 1987)).

775. *See supra* § III.A.

this function as telecommunications, not as an information service.<sup>776</sup> The court classified gateway service as an information service based on protocol conversion and introductory information content, not based on address translation.<sup>777</sup> The following year, the *Gateway Services Order* similarly classified the gateway service as an enhanced service, again based on protocol conversion and introductory information content.<sup>778</sup>

The *Restoring Internet Freedom Order* also discounted the comparison made in the 2015 *Open Internet Order* between the domain name to IP address translation provided by a broadband Internet access service provider's DNS server and computer-provided directory assistance.<sup>779</sup> The *Restoring Internet Freedom Order* rejected the analogy to computer-provided directory assistance, claiming that the analogy to address translation in gateway service was a better fit.<sup>780</sup> However, the conflict that the Order sees in these two analogies does not exist. Under *Computer II*, computer-provided directory assistance is an adjunct-to-basic service and is regulated in the same fashion as is the basic service.<sup>781</sup> The *MFJ* defined telecommunications as including "all instrumentalities, facilities, apparatus, and services (including the collection, storage, forwarding, switching, and delivery of such information) essential to such transmission."<sup>782</sup> To maintain the bright-line between telecommunications service and information service, the *MFJ* correspondingly excluded from an information service "any use of any [capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information] for the management, control, or operation of a telecommunication system or the management of a telecommunications service."<sup>783</sup> Address translation in gateway services fall into this exclusion, and they are telecommunications. There is no conflict.

Finally, although almost all of the discussion about DNS in the *Restoring Internet Freedom Order* concerns domain name to IP address translation provided by a broadband Internet access service provider's DNS server, the Order briefly mentions that DNS "enables other capabilities critical to providing a functional broadband Internet access service to the consumer, including for example, a variety of underlying network

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776. *Western Electric 1987*, 673 F. Supp. at 593, n.308 ("While it has been argued by some that the Regional Companies are entitled to provide this service even now under the decree as part of the permissible 'forwarding or routing' functions of 'information access,'... the Court has concluded otherwise, particularly since section IV(F) prohibits interexchange routing. Accordingly, the legality of the performance of this function will require an appropriate amendment of the decree."). Section IV(F) of the decree defines *exchange access*, a form of telecommunications, and prohibits RBOCs from performing interexchange traffic routing for any interexchange carrier. The amendment of the decree to which the Court referred is thus an amendment to allow RBOCs to perform a specific type of interexchange telecommunications, not to perform information service.

777. *See supra* § III.A.

778. *Gateway Services Order*, 3 FCC Rcd at 6046, para. 7.

779. *Restoring Internet Freedom Order*, 33 FCC Rcd at 327-28, para. 35, n.114.

780. *Id.*

781. *See supra* § II.B.

782. *United States v. Am. Tel. & Tel. Co.*, 552 F. Supp. 131, 229 (D.D.C. 1983) (*MFJ*).

783. *Id.*

functionality information associated with name service, alternative routing mechanisms, and information distribution.”<sup>784</sup> However, the Order did not analyze whether these functions fall within the telecommunications system management exception.<sup>785</sup> Furthermore, the 2015 *Open Internet Order* correctly noted that a broadband Internet access service provider’s DNS server may offer other functionalities that do not fall within the telecommunications systems management exception, e.g., IP address to domain name translation (“reverse look-up”).<sup>786</sup> It found that such functionality is separable because broadband Internet access service does not in any way depend on such functionality.<sup>787</sup> It may be provided by a broadband Internet access service provider’s DNS server, by an unaffiliated DNS server, or not at all.<sup>788</sup>

### b. *Caching*

As discussed in Section VII.A, the 2015 *Open Internet Order* found that caching by a broadband Internet access service provider facilitates the underlying broadband Internet access service and thus falls within the telecommunications systems management exception.<sup>789</sup>

The *Restoring Internet Freedom Order* reversed this determination.<sup>790</sup> To justify the reversal, the Order first explained that such caching “requires ‘extensive information processing, storing, retrieving, and transforming for much of the most popular content on the Internet,’ and as such, caching involves storing and retrieving capabilities required by the ‘information service’ definition.”<sup>791</sup> However, the 2015 *Open Internet Order* agreed with this claim.<sup>792</sup> The issue is not whether caching by a broadband Internet access service provider has information service capabilities, but whether this functionality falls within the telecommunications systems management exception.

The *Restoring Internet Freedom Order* acknowledged that caching by a broadband Internet access service provider “facilitates access to third-party Web pages,”<sup>793</sup> i.e., facilitates the underlying broadband Internet access service, so the only remaining issue is whether caching by a broadband Internet access service provider alters the fundamental character of the broadband Internet access service. The *Restoring Internet Freedom Order* claimed that “without caching, broadband Internet access service would be a

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784. *Restoring Internet Freedom Order*, 33 FCC Rcd at 325-27, para. 34.

785. *See id.* at paras. 34-40.

786. 2015 *Open Internet Order*, 30 FCC Rcd at 5768-69, para. 369.

787. *Id.*

788. *DNS Standard: Concept and Facilities*, *supra* note 747, at 18; *DNS Standard: Implementation and Specification*, *supra* note 508, at 40.

789. 2015 *Open Internet Order*, 30 FCC Rcd at 5768, para. 368.

790. *Restoring Internet Freedom Order*, 33 FCC Rcd at 332, para. 41.

791. *Id.*

792. 2015 *Open Internet Order*, 30 FCC Rcd at 5770-71, para. 372.

793. *Restoring Internet Freedom Order*, 33 FCC Rcd at 332, para. 41 (quoting *Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs.*, 545 U.S. 967 (2005) (*Brand X*)) (internal quotations omitted).

significantly inferior experience for the consumer, particularly for customers in remote areas, requiring additional time and network capacity for retrieval of information from the Internet.”<sup>794</sup> This claim is factually wrong. Caching does not need to be a part of broadband Internet access service in order for information retrieval to be high quality. Content delivery networks are a mature service, and they offer caching to edge providers to increase the quality of information retrieval. Indeed, most end users today utilize video streaming services where the only caching is that within content delivery networks.<sup>795</sup>

The *Restoring Internet Freedom Order* also found that the 2015 *Open Internet Order* erred in its determination that caching by a broadband Internet access service provider falls within the telecommunications systems management exception.<sup>796</sup> Both the 2015 *Open Internet Order* and the *Restoring Internet Freedom Order* found that caching by a broadband Internet access service provider may benefit both the consumer and the broadband Internet access service provider.<sup>797</sup> The disagreement, as with DNS, is whether user benefit precludes qualification under the telecommunications systems management exception.<sup>798</sup> The *Restoring Internet Freedom Order* returned to the argument that it made with respect to DNS, that “a function that is useful and essential to providing Internet access for the ordinary consumer” cannot fall within the telecommunications systems management exception.<sup>799</sup> However, as discussed above, the cited FCC Orders show exactly the opposite.

Furthermore, if a broadband Internet access service provider chooses to implement caching inside its network and not as a content delivery network service offered to edge providers, then it is doing so in order to manage its broadband Internet access service. Indeed, broadband Internet access service providers themselves routinely describe such caching practices as “network

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794. *Id.* at para. 42.

795. KUROSE & ROSS, *supra* note 53, at § 2.6.3.

796. *Restoring Internet Freedom Order*, 33 FCC Rcd at 332-33, para. 42.

797. 2015 *Open Internet Order*, 30 FCC Rcd at 5770-71, para. 372 (“Caching . . . is simply used to facilitate the transmission of information so that users can access other services, in this case by enabling the user to obtain ‘more rapid retrieval of information’”); *Restoring Internet Freedom Order*, 33 FCC Rcd at 332-33, para. 42 (“[T]he user benefits from a rapid retrieval of information from a local cache or repository of information while the ISP benefits from less bandwidth resources used in the retrieval of data from one or more destinations.”).

798. Compare 2015 *Open Internet Order*, 30 FCC Rcd at 5768, para. 368, n.1037, with *Restoring Internet Freedom Order*, 33 FCC Rcd at 332-33, para. 42.

799. *Restoring Internet Freedom Order*, 33 FCC Rcd at 328-29, para. 36.

management” practices.<sup>800</sup> It directly follows that the practice falls within the telecommunications systems management exception.

Our analysis is consistent with previous FCC proceedings. The FCC previously found that webpage caching by an Internet access service provider (dial-up, cable modem, or wireline broadband) offers an information service capability.<sup>801</sup> However, none of the previous proceedings evaluated whether this capability was for the management, control, or operation of a telecommunications system or the management of a telecommunications service.<sup>802</sup>

To further justify the reversal, the *Restoring Internet Freedom Order* attempted to compare caching by a broadband Internet access service provider with the provision of storage space in the gateway service discussed in Section III.A, stating that this function “appears highly analogous to caching.”<sup>803</sup> The Order claimed that the 1998 *United States v. Western Electric* court classified this function as an information service.<sup>804</sup> However, the analogy is factually wrong. The provision of storage space at issue in *United States v. Western Electric* was the provision of “storage space in their gateways for databases created by others” and the “leas[ing of] that space to information service providers and end users.”<sup>805</sup> Leasing of storage space to edge providers is the service provided by content delivery networks (CDNs).<sup>806</sup> As both the 2015 *Open Internet Order* and the *Restoring Internet Freedom Order* explain, CDN service is distinct from the type of caching by a broadband Internet access

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800. See *Information About the Network Practices, Performance Characteristics & Commercial Terms of AT&T's Mass Market Broadband Internet Access Services*, AT&T, <https://www.att.com/gen/public-affairs?pid=20879> [<https://perma.cc/JU6U-EKG6>] (last visited Aug. 16, 2017) (where AT&T describes its caching practice as a “a reasonable network management video optimization technique”); *Open Internet Information: Frequently Asked Questions about Network Management*, SPRINT, [https://www.sprint.com/legal/open\\_internet\\_information.html](https://www.sprint.com/legal/open_internet_information.html) [<https://perma.cc/6KBX-QRVK>] (last visited Aug. 16, 2017) (where Sprint describes its caching practice as a “reasonable network management practice[] . . . consistent with mobile broadband industry standards and guidance provided by the [FCC]”); *Important Information About T-Mobile's Broadband Internet Access Services and T-Mobile's Open Internet Disclosures*, T-MOBILE, <https://www.t-mobile.com/company/company-info/consumer/internet-services.html> [<https://perma.cc/5SMS-9RZW>] (last visited Aug. 16, 2017) (where T-Mobile describes its caching practice as a “network management practice” to “manage the flow of data on its network”); *Explanation of Video Optimization Deployment*, VERIZON, <https://www.verizonwireless.com/support/video-optimization/> [<https://perma.cc/FQY6-ZMYU>] (last visited Aug. 16, 2017) (where Verizon Wireless explains that its caching practice is a “network management technology . . . designed to transmit data more efficiently, ease capacity burdens on the network, primarily from video files, and improve the user experience with faster downloads and decreased Internet latency.”).

801. See *supra* §§ V.B.ii, VI.B, and VI.D.

802. *Id.*

803. *Restoring Internet Freedom Order*, 33 FCC Rcd at 333-34, para. 43.

804. *Id.*

805. *United States v. W. Elec.*, 714 F. Supp. 1, 19 (D.D.C. 1988) (*Western Electric* 1988).

806. KUROSE & ROSS, *supra* note 53, at § 2.6.3.



service provider at issue here and is an information service separate from broadband Internet access service.<sup>807</sup>

## 2. Applications Bundled with Broadband Internet Access Service That Under the 2015 Open Internet Order Do Not Fall Within the Telecommunications Systems Management Exception

The second category of applications discussed in the 2015 *Open Internet Order* consists of applications bundled with broadband Internet access service that under the 2015 *Open Internet Order* do not fall within the telecommunications systems management exception, including email, cloud-based storage, spam protection, firewalls, and parental controls.<sup>808</sup> The 2015 *Open Internet Order* classified these applications as information services, and the *Restoring Internet Freedom Order* did not disturb this classification.<sup>809</sup> We discuss the separability of the telecommunications component of broadband Internet access service from these applications in Section VII.D.ii.

## 3. Edge Provider Applications

The third category of applications discussed in the 2015 *Open Internet Order* consists of applications offered by edge providers.<sup>810</sup> The 2015 *Open Internet Order* classified these applications as information services, and the *Restoring Internet Freedom Order* did not disturb this classification.<sup>811</sup>

However, the *Restoring Internet Freedom Order* claimed that a consumer's ability to use broadband Internet access service to utilize applications offered by edge providers renders broadband Internet access service as solely an information service.<sup>812</sup> There are two components to this argument: (1) that the capabilities offered by edge providers' applications constitute "capabilities" of broadband Internet access service itself,<sup>813</sup> and (2) that the underlying telecommunications component of broadband Internet access service is inseparable from these applications.<sup>814</sup>

Recall that the 1996 Act defined information service as "the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications."<sup>815</sup> With respect to the first component of the argument, the *Restoring Internet Freedom Order* stated that "[b]ecause broadband

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807. 2015 *Open Internet Order*, 30 FCC Rcd at 5770-71, para. 372; *Restoring Internet Freedom Order*, 33 FCC Rcd at 320, para. 24.

808. See *supra* § VII.A.

809. *Restoring Internet Freedom Order*, 33 FCC Rcd at 446-47, para. 233, n.848.

810. 2015 *Open Internet Order*, 30 FCC Rcd at 5771-72, para. 373.

811. *Restoring Internet Freedom Order*, 33 FCC Rcd at 446-47, para. 233, n.848.

812. *Id.* at para. 49.

813. *Id.* at para. 30.

814. *Id.* at para. 49.

815. 47 U.S.C. § 153(53).

Internet access service necessarily has the capacity or potential ability to be used to engage in the activities within the information service definition—'generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications'—we conclude that it is best understood to have those 'capabilit[ies].'"<sup>816</sup> The Order further explained that the activities to which it was referring are those provided by edge provider applications, including social media applications, websites, online streaming applications, audio applications, gaming applications, file sharing applications, cloud storage applications, image editors, document editors, email, and cloud computing applications.<sup>817</sup> The Order claimed that "providing customers with the 'capability' for such interactions with third party providers" constitutes a capability of the broadband Internet access service itself.<sup>818</sup> Indeed, the Order explicitly rejected the argument that "in order to be considered an 'information service,' an ISP must not only offer customers the 'capability' for interacting with information that may be offered by third parties ('click-through'), but must also provide the ultimate content and applications themselves."<sup>819</sup>

The Order claimed that "[f]rom the earliest decisions classifying Internet access service the [FCC] recognized that even when ISPs enable subscribers to access third party content and services, that can constitute 'a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications.'" <sup>820</sup> However, the Order is wrong here. This argument—that broadband Internet access service need not itself have a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications in order to qualify as an information service—is new.<sup>821</sup>

Under the *MFJ*, RBOCs could offer telephone exchange service but were prohibited from offering information services.<sup>822</sup> Telephone exchange service enables the use of information services via the telephone exchange service.<sup>823</sup> For instance, telephone exchange service enables an end user to perform acquisition of information, namely the information transmitted via the telephone exchange service.<sup>824</sup> Telephone exchange service also enables an end user to perform storing of information, e.g., using an answering machine.<sup>825</sup> But clearly this does not make telephone exchange service an information service.

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816. *Restoring Internet Freedom Order*, 33 FCC Rcd at 322-23, para. 30

817. *Id.*

818. *Id.* at para. 30.

819. *Id.* at para. 31.

820. *Id.* at para. 32.

821. *See supra* §§ V.B.ii, VI.A-D, VII.A-B.

822. *United States v. Am. Tel. & Tel. Co.*, 552 F. Supp. 131, 227 (D.D.C. 1983) (*MFJ*).

823. *See supra* § II.B.

824. *Id.*

825. *See, e.g., Answering machine*, WIKIPEDIA, [https://en.wikipedia.org/wiki/Answering\\_machine](https://en.wikipedia.org/wiki/Answering_machine) [<https://perma.cc/4P2C-KQ3D>].

The 1996 Act incorporated the *MFJ*'s list of capabilities.<sup>826</sup> Telecommunications service offers transmission of a user's information, while an information service offers an application that provides the user with additional information, transformed information, and/or interaction with information.<sup>827</sup> When a telecommunications service underlies an information service, the telecommunications service does not itself offer such capabilities, and thus the existence of information services that offer such capabilities via the telecommunications service does not convert the telecommunications service into an information service under the 1996 Act.<sup>828</sup>

None of the ensuing FCC actions or court decisions alter our analysis. The *Stevens Report* concluded that dial-up Internet access service is an information service because ISP-provided webpage hosting,<sup>829</sup> webpage caching,<sup>830</sup> and email<sup>831</sup> offered such capabilities, not because dial-up Internet access service enabled an end user to utilize third-party information service applications.<sup>832</sup> The *Cable Modem Declaratory Ruling* similarly noted that the *Stevens Report* observed that some of the applications included in cable modem service—hosting of a subscriber's webpage, caching of newsgroup articles, and email—offer a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information.<sup>833</sup> The *Wireline Broadband Classification Order* similarly clarifies that wireline broadband Internet access service was classified as an information service only because it offered such capabilities itself.<sup>834</sup>

The assertion that broadband Internet access service offers the capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications is thus factually wrong. Broadband Internet access service enables end users to utilize information services.<sup>835</sup> These information services offer the

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826. See *supra* § II.C.

827. See *supra* § II.D.

828. *Id.*

829. *Stevens Report*, 13 FCC Rcd at 11537-38, para. 76.

830. *Id.*

831. *Id.* at para. 78.

832. To justify its claim that it is sufficient that broadband Internet access service need not itself have a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications in order to qualify as an information service, the *Restoring Internet Freedom Order* quotes the *Stevens Report*'s statement that "[s]ubscribers can retrieve files from the World Wide Web, and browse their contents, because their service provider offers the 'capability for . . . acquiring, . . . retrieving [and] utilizing . . . information.'" (*Restoring Internet Freedom Order*, 33 FCC Rcd at 324-25, para. 32.) However, as discussed in section 5.B.ii, the *Stevens Report*'s finding that dial-up Internet access service is an information service principally relies on the inclusion in the service of webpage hosting, webpage caching, and email.

833. *Cable Modem Declaratory Ruling*, 17 FCC Rcd at 4821-23, paras. 37-38. It also failed to analyze whether the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information falls within the telecommunications systems management exception.

834. *Wireline Broadband Classification Order*, 20 FCC Rcd at 14863-64, para. 14, n.38 (" . . . to the extent a service does not provide these capabilities, but merely provides transmission whether narrowband or broadband, it would not be an information service").

835. See *supra* § IV.A.

capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications.<sup>836</sup> However, broadband Internet access service does not itself offer end users information service capabilities, other than those that fall within the telecommunications systems management exception.<sup>837</sup>

US Telecom made a similar argument in *USTelecom v. FCC* as did the *Restoring Internet Freedom Order*, namely that broadband Internet access service is an information service because it “offer[s] consumers the capability to acquir[e] and retriev[e] information from websites, to stor[e] information in the cloud, to transform[] and process[] information by translating plain English commands into computer protocols, to utiliz[e] information through computer interaction with stored data, and to generat[e] and mak[e] available information to other users by sharing files.”<sup>838</sup> The *USTelecom* court explicitly rejected this argument<sup>839</sup> and found that the record contains extensive evidence that broadband Internet access service is a standalone offering of transmission separate from the offering of information services that do offer such capabilities.<sup>840</sup>

It is thus not a reasonable interpretation of the phrase “‘information service’ means the offering of a capability” that the capability *not* be provided by the information service itself.<sup>841</sup>

However, even if one were to accept that as a reasonable interpretation, the *Restoring Internet Freedom Order* not only claimed that broadband Internet access service *includes* an information service due to these capabilities, it further claimed that broadband Internet access service is *solely* an information service.<sup>842</sup> As we will now discuss, this line of reasoning leads to the preposterous result that no service that provides consumers with the ability to utilize applications offered by edge providers could possibly *include* a telecommunications service, nevertheless *solely be* a telecommunications service. The Order seems to have defined the information service component of broadband Internet access service as “providing customers with the ‘capability’ for such interactions with third party providers.”<sup>843</sup> The Order also clarified that a broadband Internet access service provider “may choose to offer the transmission component . . . of wireless broadband Internet access service as a telecommunications service only if the entity that provides the transmission voluntarily undertakes to provide it indifferently on a common carrier basis.”<sup>844</sup> However, the transmission component of the broadband Internet access service clearly provides customers with the capability for such interactions with third party providers. The Order’s reasoning would lead one

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836. *Id.*

837. *See supra* § VII.A.

838. Brief for the Petitioners at 30, *United States Telecom Ass’n v. FCC*, 825 F.3d 674 (D.C. Cir 2016) [hereinafter *USTelecom brief*] (internal quotation marks omitted).

839. *United States Telecom Ass’n v. FCC*, 825 F.3d 674, 704-05 (D.C. Cir 2016).

840. *Id.*

841. 47 U.S.C. § 153(24) (emphasis added).

842. *Restoring Internet Freedom Order*, 33 FCC Rcd at 338-39, para. 49.

843. *Id.* at para. 30.

844. *Id.* at para. 179, n.671.

to conclude that if a broadband Internet access service provider chooses to offer the transmission component of the service as a telecommunications service, then this transmission component is simultaneously a telecommunications service (because the service provider voluntarily undertakes to offer it as such) and an information service (because the service provides customers with the capability for such interactions with third-party providers). However, the Order itself stated that “[t]he [FCC] has consistently held that categories of telecommunications service and information service are mutually exclusive; thus, because it is an information service, Internet access cannot be a telecommunications service.”<sup>845</sup>

The Order’s interpretation of the phrase “‘information service’ means the offering of a capability”<sup>846</sup> is not consistent with the claim that the categories of telecommunications service and information service are mutually exclusive. The Order’s reasoning is thus logically inconsistent with itself. The reasonable conclusion is to reject the Order’s interpretation of “‘information service’ means the offering of a capability”<sup>847</sup> and thus to reject the Order’s claim that a consumer’s ability to use broadband Internet access service to utilize applications offered by edge providers renders broadband Internet access service as solely an information service.

*D. Separability of the Telecommunications Component of Broadband Internet Access Service from Information Service Capabilities of the Service.*

In Sections VIII.B and VIII.C, we discussed the telecommunications and information service components of broadband Internet access service. In this final Section, we turn to the separability of the telecommunications component from any information service capabilities of the service. It remains to be determined whether the offering of both the telecommunications component of broadband Internet access service and bundled applications is the offering of solely an information service (broadband Internet access service and applications, as described in the *Restoring Internet Freedom Order*<sup>848</sup>) or the offering of both an information service (applications) and a separate and distinct telecommunications service (broadband Internet access service, as described in the 2015 *Open Internet Order*<sup>849</sup>).

The *Restoring Internet Freedom Order* did not disturb the finding of the 2015 *Open Internet Order* that broadband Internet access service is an “offering . . . for a fee directly to the public.”<sup>850</sup> Having found so, the only remaining question is whether the underlying telecommunications is separable from any information service capabilities.

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845. *Id.* at para. 62.

846. 47 U.S.C. § 153(24) (emphasis added).

847. *Id.* (emphasis added).

848. *Restoring Internet Freedom Order*, 33 FCC Rcd at 338-39, para. 49.

849. *See supra* § VII.A.

850. *Restoring Internet Freedom Order*, 33 FCC Rcd at 318-19, para. 21.

The 2015 *Open Internet Order* determined that the underlying telecommunications is separable from applications that under the 2015 *Open Internet Order* do not fall within the telecommunications system management exception.<sup>851</sup> These include the applications cited in the *Cable Modem Declaratory Ruling* and the *Wireline Broadband Classification Order*, namely email, webpage hosting, and access to newsgroups.<sup>852</sup> These also include cloud-based storage,<sup>853</sup> spam protection,<sup>854</sup> and customized homepages.<sup>855</sup> The 2015 *Open Internet Order* also found that even if domain name to IP address translation provided by a broadband Internet access service provider's DNS server did not fall within the telecommunications systems management exception, this functionality "is not so inextricably intertwined with broadband Internet access service so as to convert the entire service offering into an information service."<sup>856</sup> The Order explained that "third-party-provided-DNS is now widely available, and the availability of the service from third parties cuts against a finding that Internet transmission and DNS are inextricably intertwined."<sup>857</sup>

In contrast, the *Restoring Internet Freedom Order* claimed that the underlying telecommunications is inseparable from the information service capabilities offered as part of what the Order interpreted as broadband Internet access service.<sup>858</sup> The Order claimed that such applications are "functionally integrated information processing components that are part and parcel of the broadband Internet access service offering itself."<sup>859</sup> The Order's primary argument in support of this claim is that broadband Internet access service providers offer a service that is understood by consumers to include such bundled applications, as discussed in section VIII.A.<sup>860</sup>

However, even if consumer perception of broadband Internet access service includes such bundled applications, it does not follow that such bundled applications are "functionally integrated"<sup>861</sup> with or "inextricably intertwined"<sup>862</sup> with the underlying telecommunications component of the service, nor that the underlying telecommunications is "inseparable" from these applications. For guidance on application of these terms, we look back to the history of their use.

There are two components to the claim in the *Restoring Internet Freedom Order* that the underlying telecommunications is inseparable from bundled applications: (1) that broadband Internet service providers do not

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851. *See supra* § VII.A.

852. *Id.*

853. 2015 *Open Internet Order*, 30 FCC Rcd at 5773, para. 377.

854. *Id.*

855. *Id.* at para. 348.

856. *Id.* at para. 370.

857. *Id.*

858. *Restoring Internet Freedom Order*, 33 FCC Rcd at 325, para. 33, n.99, n.45 (describing the information service capabilities as "inextricably intertwined with the underlying service").

859. *Id.* at para. 33.

860. *See supra* § VIII.A.

861. *Restoring Internet Freedom Order*, 33 FCC Rcd at 325, para. 33.

862. *Id.* at para. 49.

choose to offer the underlying telecommunications as a separate service,<sup>863</sup> and (2) and that consumers perceive the bundled applications as an integral part of broadband Internet access service.<sup>864</sup>

As discussed in sections II.B and II.C, both *Computer II* and the *MFJ* had envisioned that information service functionality (e.g., data processing) may be intertwined with the underlying telecommunications to the extent that an information service no longer transmits intelligence of a customer's own design and choosing and thus is no longer telecommunications.<sup>865</sup> As discussed in section V.B, the FCC first faced this issue in a version of Internet access service in the 1998 *Stevens Report*.<sup>866</sup> The Report determined that a service is the offering of solely an information service if the information service capabilities are "inextricably intertwined" with the underlying telecommunications and that a service is the offering of both an information service and a separate and distinct telecommunications service if the information service capabilities are not "inextricably intertwined."<sup>867</sup> However, *Computer II*, the *MFJ*, *United States v. Western Electric (1990)*, the *Stevens Report*, and the *Advanced Services Order* had all concluded that the bundling of an information service with an underlying telecommunications service does not render them inseparable.<sup>868</sup> The *Brand X* Court did not evaluate the claim that the underlying telecommunications is inseparable simply because cable modem service providers do not choose to offer the underlying telecommunications as a separate service because the Court stated that it did not understand the FCC as saying that "any telecommunications service that is priced or bundled with an information service is automatically unregulated under Title II."<sup>869</sup>

Instead, the test for whether underlying telecommunications is separable turns on the nature of the functions offered. As discussed in Section VI.C, the *Brand X* Court stated that "[t]he entire question is whether the products here are functionally integrated (like the components of a car) or functionally separate (like pets and leashes)" and "[t]hat question turns not on the language of the Act, but on the factual particulars of how Internet technology works and how it is provided."<sup>870</sup>

The *Restoring Internet Freedom Order*'s primary argument that broadband Internet access service providers offer a service that is understood by consumers to include such bundled applications<sup>871</sup> is thus not sufficient to demonstrate that the underlying telecommunications is "inseparable" from these bundled applications. The Order must also show that the "factual

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863. *Id.* at paras. 174-80.

864. *Id.* at para. 46.

865. *See supra* §§ II.B-C.

866. *See supra* § V.B.

867. *Stevens Report*, 13 FCC Rcd at paras. 56, 80.

868. *See supra* §§ II.B, II.C, III.C, V.B, VI.A.

869. *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 997 (2005) (*Brand X*).

<sup>870</sup>. *Brand X*, 545 U.S. at 391.

<sup>871</sup>. *Restoring Internet Freedom Order*, 33 FCC Rcd at 335, para. 46.

particulars of how Internet technology works and how it is provided”<sup>872</sup> demonstrates that the telecommunications components of broadband Internet access service are inseparable from applications offered as part of the service such as email, cloud-based storage, spam protection, firewalls, and parental controls. Similarly, the Order must show that the “factual particulars of how Internet technology works and how it is provided”<sup>873</sup> demonstrates that the telecommunications components of broadband Internet access service are inseparable from the provider’s DNS and caching functions.

The Order did make a secondary argument that “information processes must be combined with transmission in order for broadband Internet access service to work.”<sup>874</sup> However, the Order did not explain whether such “information processes” include email, cloud-based storage, spam protection, firewalls, and parental controls, and if so why the underlying telecommunications is inseparable from these applications.<sup>875</sup> Nor did the Order explain why the underlying telecommunications is inseparable from the provider’s DNS and caching.<sup>876</sup>

The *Restoring Internet Freedom Order* considered the telecommunications component of broadband Internet access service to be an “input” into broadband Internet access service.<sup>877</sup> This input model—namely, that the information service provider would procure telecommunications, combine it with computer processing, and sell the resulting information service to the consumer—was appropriate at the time of *Computer II* and the *MFJ* when applied to data processing services of that era. The information service functionality (e.g., data processing) could have been intertwined with the underlying telecommunications to the extent that the information service no longer transmitted intelligence of a customer’s own design and choosing, and thus it was no longer telecommunications.

However, both assumptions—that telecommunications is an input to an information service and that information service functionality is intertwined with the underlying telecommunications—fail with the Internet. Indeed, as discussed in Section IV.C, the central tenet of Internet architecture dictates that telecommunications service is separable from information services.<sup>878</sup> Thus, any claim that these applications are “functionally integrated” with and “inextricably intertwined” with the underlying telecommunications, and hence that the underlying telecommunications is inseparable from these applications, is factually wrong. The separability follows from both the modularity of Internet architecture<sup>879</sup> (as discussed in Section IV.C) and the

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872. *Brand X*, 545 U.S. at 391.

873. *Id.*

874. *Restoring Internet Freedom Order*, 33 FCC Rcd at 338-39, para. 49.

875. *Id.*

876. *See, e.g., id.* at paras. 34-44 (where one would have expected to see this analysis).

877. *Id.* at para. 52.

878. *See supra* § IV.C.

879. 2015 *Open Internet Order*, 30 FCC Rcd at 5773-74, para. 378.



Internet standards for these applications.<sup>880</sup> Separability is also evidenced by the offerings of these applications from entities unaffiliated with the broadband Internet access service provider.<sup>881</sup> The end-to-end transmission of IP packets and applications such as email, web browsing, or cloud storage are not “functionally integrated (like the components of a car).”<sup>882</sup> By Internet standards themselves, the end-to-end transmission of IP packets is mandated to be separable from the applications that ride over it.<sup>883</sup>

The *Restoring Internet Freedom Order* similarly claimed that the underlying telecommunications is inseparable from other bundled applications, including “speed test servers, backup and support services, geolocation-based advertising . . . unique programming content . . . pop-up blockers, [and] instant messaging services” provided by a broadband Internet access service provider if they are “included” in the broadband Internet access service.<sup>884</sup> The Order also made this claim without explanation or substantiation beyond that they are “functionally integrated information processing components that are part and parcel of the broadband Internet access service offering itself.”<sup>885</sup> This claim is similarly factually wrong.

In summary, the *Restoring Internet Freedom Order* fails to meet the guidelines put forth in *Brand X* for determining whether the telecommunications component of the service is separable from any information capabilities of the service.

Finally, even if there were information service capabilities offered by broadband Internet access service, and even if these capabilities were inextricably intertwined with the underlying telecommunications components of the service, the Order would have one believe that these information service capabilities are the primary service. However, it is unbelievable that consumers purchase broadband Internet access service in order to use DNS and that the underlying telecommunications components of the service are adjunct to DNS. Similarly, it is unbelievable that consumers purchase broadband Internet access service in order to use a broadband provider’s email, webpage hosting, or cloud-storage services and that the underlying telecommunications components of the service are adjunct to these. Clearly, the underlying telecommunications components of the service are the primary service, and information service components of broadband Internet access service (if any) are adjunct to the primary service. The Order admitted as much when it said that “[t]he fundamental purpose of broadband Internet access service is to ‘enable a constant flow of computer-mediated

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880. See *Internet Engineering Task Force, Simple Mail Transfer Protocol*, RFC 5321 (Oct. 2008), <https://tools.ietf.org/html/rfc5321> [<https://perma.cc/897M-HMJW>]; *Internet Engineering Task Force, Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing*, RFC 7230 (June 2014), <https://tools.ietf.org/html/rfc7230> [<https://perma.cc/739W-HRTN>]; *Internet Engineering Task Force, Network News Transfer Protocol (NNTP)*, RFC 3977 (Oct. 2006), <https://tools.ietf.org/html/rfc3977> [<https://perma.cc/B2TJ-WAA2>].

881. See 2015 *Open Internet Order*, 30 FCC Rcd at 5753-54, para. 348.

882. *Brand X*, 545 U.S. at 991.

883. See *supra* § IV.C.

884. *Restoring Internet Freedom Order*, 33 FCC Rcd at 325, para. 33, n.99.

885. *Id.* at para. 33 (citations omitted).

communications between end-user devices and various servers and routers to facilitate interaction with online content.”<sup>886</sup>

In conclusion, because the telecommunications component of what the *Restoring Internet Freedom Order* interpreted as broadband Internet access is separable from what the Order saw as the information capabilities of the service, that telecommunications component is a telecommunications service. Furthermore, that telecommunications service is exactly what the 2015 *Open Internet Order* interpreted as broadband Internet access service.<sup>887</sup>

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886. *Id.* at para. 31.

887. Having found that broadband Internet access service fits the statutory definition of an information service, the *Restoring Internet Freedom Order*, 33 FCC Rcd 311, conducted an analysis to determine whether it is in the public interest to require that broadband Internet access service be offered on a common carrier basis, under the FCC’s discretionary authority to do so. However, this public interest analysis is outside the scope of this paper.