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GUIDANCE TO PROPONENTS OF COST MODELS IN UNIVERSAL SERVICE PROCEEDING: SWITCHING, INTEROFFICE TRUNKING, SIGNALING, AND LOCAL TANDEM INVESTMENT

CC Docket Nos. 96-45 and 97-160

In the Universal Service Order released May 8, 1997, the Commission, acting on the recommendation of the Federal-State Joint Board, concluded that non-rural carriers should receive universal service support based on the forward-looking cost of providing the supported services.[1] The Commission concluded that universal service support for non-rural carriers should be determined by subtracting a benchmark revenue amount from the forward-looking economic cost of providing the supported services.[2] The Commission concluded that it could not select a mechanism for computing forward-looking costs because none of the mechanisms that had been submitted for consideration was sufficiently developed at that time.[3] The Commission concluded that it should continue to review two cost models, the Hatfield Model and the Benchmark Cost Proxy Model (BCPM).[4] The Commission further concluded that it would select the platform design features[5] of a forward-looking economic cost mechanism by December 31, 1997, and select a complete mechanism, including input values, by August 1998.[6]

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[1] Federal-State Joint Board on Universal Service, CC Docket No. 96-45, *Report and Order*, FCC 97-157 (rel. May 8, 1997) (*Order*) at para. 224.

[2] *Order* at paras. 199-201.

[3] *Order* at para. 245.

[4] The proponents of the Hatfield Model are AT&T and MCI. The proponents of BCPM are US West, Sprint, and BellSouth. *See Order* at Appendix J for a description of the Hatfield Model and BCPM.

[5] In the context of a forward-looking economic cost mechanism, the "platform" refers to the fixed algorithms and assumptions built into a cost model, as contrasted with user-specified "inputs" into a cost model. *See* Federal-State Joint Board on Universal Service, Forward Looking Mechanism for High Cost Support for Non-Rural LECs, CC Docket Nos. 96-45 and 97-160, Further Notice of Proposed Rulemaking, FCC 97-256 (rel. Jul. 18, 1997) (*FNPRM*) at paras. 17-18.

[6] *Order* at para. 245.

In a Further Notice of Proposed Rulemaking in this proceeding (*FNPRM*), the Commission established a multi-step approach to refining and selecting a mechanism for determining a non-rural carrier's forward-looking economic cost of providing to rural, insular, and high cost areas services supported by universal service mechanisms.[7] In the *FNPRM*, the Commission stated that the Common Carrier Bureau (Bureau) would "issue orders and public notices on a regular basis explaining its analysis of the model submissions and industry comments and to select particular design features."[8] The Commission further stated that it expected that "such guidance from the Bureau will provide the proponents with necessary direction to refine their models."[9]

This Public Notice offers guidance to the model proponents on issues that the Commission announced that it would address in the first stage of the model development process.[10] Specifically, issues addressed in this Public Notice include the platform issues relating to switching, interoffice trunking, signaling, and local tandem investment.[11] The Bureau expects that models that conform to the guidance in this Public Notice will be more likely to be considered favorably in this proceeding.

The Commission established criteria for its forward-looking economic cost mechanism in the *Order*.[12] Among these criteria is the requirement that the models should calculate costs based on the "least-cost, most-efficient" technology to provide the supported services. The Bureau recommends that the model proponents ensure that their modules for calculating switching, trunking, signaling, and local tandem investment comply with all of the criteria set out in the *Order*, in addition to the recommendations in this Public Notice.

I. Switching

A. Mix of Host, Stand-Alone, and Remote Switches

The Bureau recommends that the models permit individual switches to be identified as host, remote, or stand-alone.[13] Although stand-alone switches are a standard component of networks in many areas, the Commission tentatively concluded in the *FNPRM* that current

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[7] In the *FNPRM*, the Commission stated that it may select one of the models under consideration, or may select a hybrid model incorporating the best features of the two models or design components developed by the Commission staff or other parties. *FNPRM* at para. 35.

[8] *FNPRM* at para. 26.

[9] *Id.*

[10] *See FNPRM* at paras. 5-6, App. A.

[11] *FNPRM* at App. A. The Commission will prescribe inputs for the selected forward-looking economic cost mechanism by August 1998. *Order* at para. 245.

[12] *Order* at para. 250. These criteria also apply to state-submitted cost studies.

[13] Both a host switch and a stand-alone switch can provide a full complement of switching services without relying on another switch. A remote switch relies on a host switch to supply a complete array of switching functions and for interconnection with other switches. *FNPRM* at para. 47. More than one remote switch may be associated with, and rely upon, a single host switch.

deployment patterns suggest that host-remote arrangements are more cost-effective than stand-alone switches in certain cases.[14] Some commenters supported this tentative conclusion.[15] The models should therefore be capable of processing, as inputs, information identifying each individual switch as a host, remote, or stand-alone. The Bureau recommends that the models be capable of accepting switch classification information from either a separate database or a software module to be developed in the future.[16]

B. Switch Costs

Each model currently calculates switching cost per line using a single cost curve that its proponents have developed. Consistent with our recommendation that the models identify switches as host, remote, or stand-alone, the Bureau recommends that the components of the models that estimate switching investment costs employ separate cost curves for host, remote, and stand-alone switches.[17] This flexibility will allow the Commission to prescribe inputs for switching costs according to switch type. Actual cost curves for host, remote, and stand-alone switches will be determined in the input-selection stage of this proceeding.[18]

The Bureau believes that it is important to allocate costs between host switches and remote switches so that the efficiencies generated by the use of host-remote arrangements are shared by all users in the wire centers benefiting from such arrangements. Host switches generally cost more than stand-alone switches, and remote switches generally cost less than stand-alone switches. The advantage of using host-remote configurations lies in the cost savings across the several wire centers in which the host-remote arrangement is used, compared to the cost of placing stand-alone switches in each of those wire centers. The Bureau believes, however, that this cost savings should be allocated among all of the wire centers covered by any host-remote arrangement. We expect that the Commission will determine a specific allocation as part of the input-selection process. We also encourage the proponents to configure their models to be able to accept individual switch cost calculations that are tailored to the specific characteristics of a particular switch, and are generated by a software module to be developed in the future, in the event that the Commission determines that using such individual cost calculations will serve the goals of universal service better than

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[14] *FNPRM* at para. 122.

[15] *See* Ameritech comments at 4; Rural Utilities Service comments at 2.

[16] Such modules could be incorporated into the cost model, but we do not ask the model proponents to develop such software modules at this time.

[17] The precise nature of each curve, and the differences among the curves, if any, will be determined when the Commission selects input values for its forward-looking economic cost mechanism by August 1998. *Order* at para. 245.

[18] The Commission announced its intention to select inputs and complete its forward-looking economic cost mechanism by August 1998. *Order* at para. 245.

using cost curves.

C. Capacity Constraints

Different switches have different limits on the capacity they are capable of supporting.[19] The Commission tentatively concluded in the *FNPRM* that, when capacity constraints indicate that a single switch is insufficient to serve a particular wire center more than one switch should be assigned to that wire center.[20] Proponents of both models agree that three factors are important in determining the capacity of a switch.[21] Accordingly, the Bureau recommends that the models' algorithms for determining switch size should include switch capacity constraints based on (1) number of lines; (2) number of busy-hour call attempts;[22] and (3) busy-hour traffic (measured in hundreds of call seconds).[23] The models should be capable of determining whether the busy-hour call attempt constraint has been reached by multiplying a value, specified by the model user, for the number of call attempts per busy hour by the number of business and residential lines in the wire center. Similarly, the models should be able to determine whether the busy-hour traffic constraint has been reached by multiplying a value, specified by the model user, for the average seconds of use per call by the number of business and residential lines in the wire center. The models should be capable of accepting different inputs for business and residential lines with respect to each of the latter two constraints. For example, the models should be able to process one input for the average seconds of use per business line call, and a separate input for the average seconds of use per residential line call. We anticipate that the line count limitations chosen as inputs will take into account the percentage of lines that must be reserved for additional demand and administrative activities.[24]

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[19] *See, e.g., Nortel Product Handbook* (11th ed., 1995) at 5.1 *et seq.*; AT&T/MCI comments at 9-10; BellSouth *et al.* comments at att. 1, p. 3; Ameritech comments at 5; RUS comments at 2.

[20] *FNPRM* at para. 124.

[21] AT&T/MCI comments at 9-10; BellSouth *et al.* comments at att. 1, p. 3.

[22] Busy-hour call attempts (BHCA) are call attempts that a switch processes during a busy hour. A busy hour is the hour of the day during which the switch carries the most traffic.

[23] A constraint on busy-hour traffic is a limit on the total number of call seconds that a switch can handle during a busy hour.

[24] Bell Atlantic and NYNEX state that the administrative fill factor (AFF), which "reflects the percentage of lines that can be assigned to end users on a given switch while maintaining the ability to meet additional demand and to use lines for testing, administration, etc.," should be no higher than 95%. Joint comments of Bell Atlantic and NYNEX at att. 1, p. 3.

D. Percent of Switch Assigned to Port and to Provision of Universal Service

The Commission tentatively concluded in the *FNPRM* that the costs of providing supported services constitute only a portion of the total switch costs estimated by the models.[25] The Commission tentatively concluded that all of the line-side port costs and a percentage of usage costs should be assigned to the cost of providing the supported services.[26] Under this approach, trunk port costs should be included when calculating usage costs.[27] The models should accommodate this approach to identifying the switch costs that are attributable to providing supported services.

II. Interoffice Trunking, Signaling, and Local Tandem Investment

A. Design of the Interoffice Network

The Bureau recommends that the models' interoffice network modules be capable of accommodating a switching module, as discussed above, that identifies switches as host, remote, or stand-alone. The models' interoffice modules should therefore be capable of accommodating interoffice facilities that will successfully interconnect the switches as assigned by the switching module. As discussed above and in the *FNPRM*, the accurate computation of switching costs may require the separate identification of host, remote, and stand-alone switches.[28] As the model proponents have informed us,[29] this type of switch identification requires that the interoffice network be designed to account for individual switches' identity as a host, remote, or stand-alone switch. We therefore recommend that the model proponents ensure that their models possess this capability.

To this end, the models should accommodate an interoffice network that is capable of connecting switches designated as hosts and remotes in a way that is compatible with the capabilities of equipment and technology that is available today and current engineering practices. The model proponents should be able to demonstrate such compatibility. The models should take into account the costs of all necessary equipment, including cable, photonics and electronics, to connect hosts, remotes, and stand-alone switches in an efficient manner. This interoffice design should comport with the Commission's conclusion that the

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[25] *FNPRM* at para. 137.

[26] *FNPRM* at para. 137.

[27] *See FNPRM* at para. 135.

[28] *See FNPRM* at paras. 129-31.

[29] *See* Letter from Glenn Brown, US West, to William F. Caton, FCC, dated August 7, 1997; Letter from Chris Frentrup, MCI to William F. Caton, FCC, dated August 7, 1997.

models incorporate the "least-cost, most-efficient" means of providing supported services.[30] The Bureau recommends, to protect adequately against network failure, that the models ensure that the facilities interconnecting each office with the rest of the interoffice network provide at least one level of redundancy.[31]

B. Interoffice Cost Attributable to Providing Supported Services

Because interoffice trunking, signaling, and local tandem facilities are integral parts of the network necessary to provide the supported services, the *FNPRM* tentatively concluded that the selected mechanism should calculate specific cost estimates for these interoffice elements.[32] Consistent with this tentative conclusion, we recommend that the models be capable of calculating specific cost estimates for the interoffice trunking, signaling, and local tandem facilities that are necessary to provide supported services.

As noted in the *Order*, some interoffice trunking, signaling, and local tandem facility costs are attributable to the provision of interexchange service and other non-supported services.[33] As a result, we recommend that the models also permit the insertion of an input, specified by the model user, to determine the proportion of these interoffice costs that should be attributed to providing supported services.

III. Follow-Up Requirements

The Bureau recognizes that the model proponents may need to make certain changes to their models to bring them into conformity with the guidance provided in this Public Notice. To facilitate that process and the Bureau's review, model proponents should submit, within 10 calendar days from the release date of this Public Notice, a letter providing: (1) a list of the items discussed above with which their model already is in conformity, and a description of how their model is in conformity with those items, and; (2) a listing of the items with which their model is not yet in conformity, and a schedule for delivery of a revised model platform incorporating the above recommendations.

The model proponents should file an original and three (3) copies of these letters, referencing CC Dockets Nos. 96-45 and 97-160, with the Office of the Secretary, Federal Communications Commission, 1919 M Street, N.W., Room 222, Washington, DC 20554. The proponents should also serve seven (7) copies of their letters on Chuck Keller of the Universal Service Branch, 2100 M Street, N.W., Room 8918, Washington, D.C. 20554. The

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[30] *Order* at para. 250, criterion 1.

[31] *See, e.g.*, RUS Comments at 4.

[32] *FNPRM* at para. 141.

[33] *FNPRM* at para. 139.

proponents are also directed to serve each other with copies of their letters on the same day the letters are filed with the Commission.

Questions regarding this Public Notice should be directed to Chuck Keller (ckeller@fcc.gov) 202/418-7380; Bob Loube (rloube@fcc.gov) 202/418-7379; or Natalie Wales (nwales@fcc.gov) 202/418-7389.

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