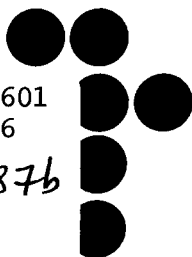


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COMMUNICATIONS  
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OPEN NETWORK ARCHITECTURE (ONA)

March 12, 1987

Seminar Notes

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
COMMUNICATIONS FORUM**

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**Raymond Dujack  
FCC**

**John G. Williams  
Telecommunications Consulting Group, Inc.**

## OPEN NETWORK ARCHITECTURE (ONA)

Raymond Dujack - Federal Communications Commission

At the outset Dujack mentioned that he was somewhat constrained in what he could say about certain ONA issues because of his personal involvement in two current proceedings that are directly related to ONA development. Both are to be resolved shortly. First, the Computer III Phase II proceeding, which, among other issues, will determine the extent to which ONA will be applicable to protocol processing services. If protocol processing is found to be an enhanced service, ONA will apply; if not: ONA will not apply. Second, the reconsideration of the Computer III Phase I order of June 16th, 1986, in which the FCC imposed the ONA requirement upon AT&T and the BOCs as one of the conditions for providing enhanced services without setting up a separate subsidiary. He said that AT&T had claimed it should not be subjected to ONA since it does not have bottleneck facilities.

Despite these constraints, Dujack asserted that there were several other areas that he could discuss. He then proceeded to define ONA from the perspective of the FCC. Putting it simply, ONA, he said, is one of the conditions that a dominant carrier must observe in order to provide unregulated communications/data processing services on a co-located basis. These are called "enhanced services" STET... in the FCC rules and "information services" in the Modified Final Judgment (MFJ). ONA, he said, is the last event in a linkage of several causal antecedents. It evolved as a consequence of the Computer II

Final Decision, which in turn came from the Computer I proceedings which began in 1966. The thematic policy of all these proceedings, he said, has been the same:

- (a) Under what circumstances may a regulated carrier provide unregulated data processing type services in conjunction with communications?
- and (b) How will we recognize a data processing service when we see it ?

In the Computer I decision, the FCC allowed carriers to provide unregulated data processing services only through a fully separated subsidiary. To classify services using communications in conjunction with computers, the FCC established four categories. Two of these - remote access data processing, hybrid data processing - fell on the unregulated side, with hybrid communications, and message switching on the regulated side. A "primary purpose test" was used to decide on which side of the regulatory boundary a service belongs. Nine years later, in the Computer II decision (1980), the four -category "primary purpose test" was discarded as being too subjective and was replaced by a binary test to establish the regulatory boundary - i.e. is a given service an enhanced or basic service? Under Computer II, an ES is not regulated and is defined to comprise of three categories which are paraphrased as follows:

- (a) Protocol processing.
- (b) Conventional data or symbol manipulating types of applications.
- (c) Information retrieval services.

However, as a condition to provide ES, the FCC kept the separate subsidiary or structural separation requirement of Computer I and specifically set out several additional conditions that must be met for a dominant carrier to offer enhanced services without

adversely affecting the rates charged to its basic service subscribers or the quality of these services. Restrictions were subsidiaries and its regulated sister companies, and a requirement was set that the separate subsidiary obtain communications service in support of its operation at tariff rates. The goal of all this was, he said, to prevent cross-subsidization of the competitive, unregulated enterprises by the "cash cow" on the regulated side of the house.

Dujack stated that the inclusion of protocol processing as an ES became an item of concern in the Computer II decision. This concern gave rise to a series of proceedings focused upon determining whether protocol processing should be classified basic or enhanced. Dominant carriers, he said, protested that the structural separation conditions, when applied to the provision of protocol conversion, are onerous and uneconomical. They claimed that these conditions would impede the development of innovative basic communication services. Several decisions, and five years later, the FCC concluded that protocol processing in general should remain an ES. But, he said, the FCC was willing to grant waivers under certain conditions, allowing carriers to provide protocol processing services on co-located basis.

The first waiver, he said, was granted for the asynchronous/X.25 conversion, such as that which would allow an IBM PC to communicate over a packet network with a host computer operating under the X.25 protocol. The waivers allowed recipients (a) to provide protocol processing by co-locating the

PAD and statistical multiplexer with the packet switch hardware, and (b) to use a common personnel pool to provide enhanced and basic services subject to the following non-structural safeguards:

(i) Carriers receiving waivers were requested to set up accounting systems that could segregate expenses and investments between regulated and unregulated operations.

(ii) Carriers were requested to share certain proprietary information with ES competitors (new network developments and proprietary information about customer demographics.)

(iii) Carriers had to meet conditions that would equalize the intrinsic facilities - related advantage that a carrier in the ES business has over non-carriers.

Dujack said that the remedies set forth by the FCC to rectify the facilities advantage (in the asynchronous/X.25 waiver order) were the beginning of ONA. The waiver order required the following:

- A carrier could not discriminate in providing communications facilities to value added network (VAN) competitors.
- Interoffice channels had to be provided on a non-discriminatory basis.
- The local loop connection from an end user to a VAN competitor had to be equivalent in quality and cost to that used by the BOC in its provision of ES.
- A BOC had to obtain under tariff, interoffice channels used for the provision of protocol conversion/ packet switching services (just like a VAN would have to do.)

Subsequently, he said, in the Computer III proceeding, this waiver order principle to cover protocol processing on a co-located basis, without structural separation (separate subsidiaries) was extrapolated to other ES: i.e., arithmetic computation, information retrieval services, etc. However, Dujack emphasized, the abolition of structural safeguards creates

the potential for cross-subsidization, and for upsetting the competitive balance in the ES industry. To avoid such irregularities the FCC formalized the cost accounting solution by initiating a separate proceeding to develop a joint cost accounting system to be uniformly applied to all dominant carriers. Also formalized was the information disclosure requirement.

Dujack stated that with regard to the non-discriminatory provision of underlying basic service to unregulated VANS, and ES providers, the FCC established a two step procedure - Step I is Comparably Efficient Interconnection (CEI), and Step II is ONA. Under the CEI process each new ES application by a carrier will require the submission of a CEI plan, which will go through a public notice and comment procedure, and finally, review by the FCC. However, he observed that the case-by-case approach of the CEI process is not particularly efficient for carriers or ES providers. Step II - ONA - requires carriers to file ONA plans with the FCC no later than Feb 1st, 1988. Under ONA, carriers will be required to provide unbundled basic service elements (available under tariff) for use by carriers and unregulated service providers alike. The introduction of ONA, he said, will bring the following features to the ES marketplace:

- Carriers won't have to file a CEI plan for each new service application.
- ES providers will have a large menu of basic services from which to configure their own ES without having to wait for a carrier to do likewise )
- ONA implementation cost will not be paid by ratepayers (the users of POTS and PLS.) It will be paid for by the unregulated operations of the carriers and by the

unregulated competitors of the carriers.

The FCC's concern with ONA, is to provide a "level playing field" for ES providers, to stimulate the proliferation of ES, and to do all of this without burdening ratepayers with higher rates or poorer service.

Dujack then proceeded to discuss "what ONA should look like." The FCC, he said, had not taken a position in this regard but has, in its Computer III order, encouraged the players in the game to work it out in the forum process. The process has a built-in tension between the ES providers, who would like to see the spectrum of basic service elements maximized, and the BOCs who might be reluctant to make the capital commitments to a wide choice menu. Recognizing this the FCC, he said, made two statements of principle in its order:

- (i) The basic service elements should be provided to the extent technically possible.
- (ii) Unnecessary unbundling is not required (carriers may use potential market demand and technical/ cost feasibility as criteria in determining whether a given basic service element be not provided.)

In closing, Dujack mentioned that the FCC's interest in ONA is primarily related to its efficacy in providing unregulated services in a monopoly environment and that ONA was a natural, evolutionary consequence of the FCC's Computer I, II, and III proceedings. In this regard, he cited the reasons offered by the Department of Justice for the adoption of ONA : reasons:

- (i) It would reduce the potential for discrimination by carriers in the provision of interconnection of ESPs to bottleneck facilities owned by the carriers.
- (ii) It would allow for the easy detection of cross-subsidies.
- (iii) The implementation of ONA by the carriers might warrant reconsideration of the information service restrictions of the MFJ.



The FCC, he said, agrees with these goals too.

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John Williams - Telecommunications Consulting Group. Inc.

Williams began by discussing the definition of ONA. ONA, he said, is not really defined in the Computer III order or the proceedings record. ONA is an attempt to solve the case-by-case waiver problem, arising from Computer II, by defining something more general. It is a statement of a problem, and a hope for a solution. While CEI is really the Computer II waiver process incorporated in Computer III, ONA is the Commission's plea for a way around the problem. The order gives indications of how this could be done. The FCC order requests the BOCs to talk to the industry in an effort to resolve the issues prior to Feb 1st, 1988.

He referred to the basis for ONA in the Computer III order, which he qualified as being an intellectual basis. As an example he cited FN/SI (Feature Node Service Interface.) Describing FN/SI, he used exhibit A to show the relationship of FN/SI to local switching. Ameritech, he said, in Feb 1985 requested information from switching manufacturers about the ability and interest of these manufacturers in making switching products that will conform to certain interface specifications that were defined as FN/SI. Ameritech talked about the FN/SI relationship to local switching 2 years ago. They suggested defining a language of primitives for the definition of local

switching functions. The definition of a switching service, including an information access interface, would then consist of a program written in this language. In the original conception of FN/SI, the description of a particular service could then reside in a device separate from the switch, called a feature node. The BOC could have a feature node the same way a competitor could. This would open up the switching network to more competition. Ameritech, he said, discussed this with the FCC and the Department of Justice. The Commission subsequently incorporated this in the order relating to ONA. Williams added that something like FN/SI could literally be a part of ONA, and symbolically it indicates the type of flexibility that ONA is capable of producing. Williams also noted that further work indicated that a separate feature node might not be feasible for certain services. In such a case, the definitions of a BOC's and a competitor's services, written in the primitive language, might both reside in the local switch. The term "code allocation" would describe such a situation.

In summary, he said that unlike the CEI, which requires a competitor to have a specific new interface for a specific new service, ONA provides a general capability allowing the competitor to program a new interface for itself.

Williams continued to describe the ONA process from his perspective. The first meeting relating to ONA was held in Reston in Oct 1986 with all seven BOCs present. The BOCs resisted the long term nature of ONA bringing up several weak arguments. Following this meeting, he said, he contributed an article to the Jan 1 87 issue of the Telecommunications magazine.

This article referred to the Oct 1986 meeting and reiterated that ONA is a long term concept whereas CEI is service specific. As such if BOCs want to do a few service specific interfaces they are entitled to service-specific relief and not general relief from structural separation. The next meeting was in Jan 1987 at Orlando and was primarily a planning meeting for the second forum to be held in Mar/Apr 1987 at Los Angeles. The next event in chronological order was a conference in Washington in early March. Many of the speakers at this conference were participants in the ONA decision process but the BOCs and audience were also allowed to voice their opinions. The useful outcome of this conference, he suggested, was that the BOCs were made to understand (hopefully) that they would not get general waivers from structural separation for a few service specific interfaces.

He then commented on what he thought is likely to happen in Feb 1988. Firstly, ONA plans will contain only service specific interfaces (CEI). Four examples of useful service specific functions are as follows:

- (i) Telemetry (infinite holding time and very low data rate.)
- (ii) Data.
- (iii) Voice storage.
- (iv) Telephone answering service.

All of these, he claimed, will be real progress. There is a need to carefully determine what service is and isn't provided, and grant waivers from structural separation accordingly. Also, the method of obtaining a "new" interface, by competitors, has to be determined. Specific CEI interfaces will get services out, let BOCs into markets without structural

separation, and take pressure off ONA on the long term.

In the long term there has to be an evolution to "real ONA." BOCs need ONA for themselves (to program switching machines.) ONA, he said, can be phased-in, in conjunction with other network goals. He asserted that "as BOCs obtain increased flexibility in exchange networks for themselves, ONA must insure that everyone (including users and competitors) has access to that flexibility."

In closing, Williams pointed out that exchange networks are really bottlenecks, and ONA is basically a "bottleneck enrichment" plan. Also, he said, the underlying service that exchange carriers are in isn't any service at all, but rather provides a primitive functionality that everybody uses to build services on top of, including the BOCs and others. Therefore ONA, he predicted, in the very long term would affect not just enhanced services but basic services as well.

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#### SPEAKERS' COMMENTS AND ANSWERS TO QUESTIONS

Williams, commenting on AT&T, said that there is a point of view claiming that AT&T doesn't want BOCs programming their own switches, as this will not enable AT&T to capture and keep its customer. However, he pointed out, that within AT&T itself there is a divergence of opinion - one group feels that the move is inevitable and therefore if it is done right they could sell more switches.

A member of the audience referred to AT&T having a lot of problems with NET 1000 which was a similar concept to FN/SI. In the light of this experience he inquired whether anybody could implement something like FN/SI. Williams, responding, noted that implementing FN/SI, though difficult, is not impossible.

Responding to a question regarding the users concern about standards, Williams said that signalling interfaces will have to be consistent but that there are boundaries within which diversity will be useful and need not cause problems. As for users of primitives and information providers, he said that there has been concern in this area. No one knows right now as to how it will eventually work out, but at some point in time there will arise a need for standards though it is a long way off in the future.

Regarding development of ONA and ISDN, Williams stated that ONA and ISDN are different ideas. While it is possible to have ONA without ISDN it is most likely that ONA will be implemented in an ISDN environment. The moderator, Mr. Rutkowski, pointed out that if ONA works well it could even be exported. He referred to the FCC supplemental order to be released shortly and expressed hope that it would cover the area of Computer III implementation internationally.

Williams raised the question of whether ONA could be optional. i.e. can BOCs stay with Computer II ? Dujack said that he did not know whether this was practically possible though theoretically it appeared possible. Rutkowski added that AT&T had said that they would rather stay with Computer II than divulge proprietary information.

With reference to by-pass, Dujack emphasized that while ONA may affect by-pass the only real reason for ONA was to "level the playing field" in ES competition without allowing ES to have a deleterious effect on BOC's local service.

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# RELATIONSHIP OF FN/SI TO LOCAL SWITCHING

