

1 This network ultimately carried as much as 40% of America Online's dial-up traffic.

2 16. My experience as CTO at GTE Internetworking provides useful insights not only in
3 network design, but also into operational procedures in a large Internet backbone operator
4 associated with a large traditional telecommunications carrier. BBN's joint project with AT&T
5 required me to work closely with AT&T's engineers as they deployed the service. In addition,
6 much of BBN's Internet equipment was physically deployed into points of presence owned and
7 operated by WorldCom and by MCI, which required that I be able to coordinate with their staffs as
8 well. These insights into carrier operations enable me to assess the AT&T documents.

9 17. Many of my other duties at BBN, GTE Internetworking and Genuity are relevant to
10 this declaration.

11 18. I created a network design and capacity planning function within BBN, and ran the
12 function for several years. In the context of an ISP, capacity planning is the process whereby the
13 ISP measures and interprets current service demands on the network, projects future demands
14 (considering both current and projected future service offerings), and plans for necessary network
15 enhancements to meet those demands. Capacity planning required constant interaction with the
16 company's financial planners, as well as marketing and engineering. It also required an in-depth
17 understanding of traffic flows within and between Internet providers. After the merger with GTE, I
18 received a GTE Chairman's Leadership Award for that work.

19 19. I am the author of a textbook on data network design: *Designing Wide Area*
20 *Networks and Internetworks: A Practical Guide*, Addison Wesley, 1999. The book largely reflects
21 my experience with capacity planning and network design in the large at BBN, GTE
22 Internetworking and Genuity.

23 20. I held a number of sales and marketing positions at BBN, and in those roles (and
24 also subsequently as Genuity's CTO) frequently participated in the assessment of the costs and the
25 potential revenues associated with new services.

26 21. Many of my outside consulting assignments at BBN involved elements of data
27 security and network security. Later, as CTO, the company's senior security expert was a direct
28 report. I thus had a general oversight role with respect to the company's performance of lawful

1 intercept.

2 22. As CTO, I also had primary responsibility for the company's strategic approach to
3 peering⁷ with other Internet Service Providers (including AT&T). I personally chaired the firm's
4 peering policy council, where the company's various stakeholders (engineering, financial and
5 marketing) established strategic direction in regard to peering.

6 23. I supported GTE's General Counsel in raising concerns about the MCI-WorldCom
7 merger (1998) and the proposed MCI-Sprint merger (2000), arguing that the network externality
8 effects resulting from the mergers would make anticompetitive practices as regards Internet
9 backbone peering both feasible and profitable. These arguments hinged to a substantial degree on
10 my ability to estimate peering traffic flows between the major Internet backbones in both real and
11 hypothetical circumstances. This activity drew heavily on my experience with the measurement
12 and analysis of traffic.

13 24. From July 2001 to July 2005, I was the Senior Advisor for Internet Technology at
14 the Federal Communications Commission (FCC). In this role, I served as the FCC's leading
15 technical expert on the Internet, and provided advice to the Chairman's office and to other senior
16 managers as regards technology and policy issues.

17 25. I participated in numerous proceedings during my time at the FCC, including
18 several that dealt generally with broadband and with Voice over IP (VoIP).⁸

19 26. I was a member of the FCC's Homeland Security Policy Council, with significant
20 responsibilities as regards cybersecurity and infrastructure security. I held a top secret clearance. I
21 frequently spoke on the FCC's behalf on lawful intercept (CALEA)⁹ in connection with IP-based
22 services. I was an active and significant participant in the FCC's proceedings related to CALEA in
23

24 ⁷ *Peering* is the process whereby Internet providers interchange traffic destined for their
25 respective customers, and for customers of their customers. A more extensive definition appears
later in this Declaration, under "Traffic Captured."

26 ⁸ *IP* is the Internet Protocol. All Internet data is IP-based. *Voice over IP* refers to the
transmission of voice over IP-based networks – either private networks or the "public" Internet.

27 ⁹ Communications Assistance for Law Enforcement Act of 1994 (CALEA), Pub. L. No. 103-
28 414, 108 Stat. 4279. CALEA is the statute that requires carriers to proactively instrument their
networks in order to support law enforcement needs. The FCC has a role in its implementation.

1 connection with Voice over IP (VoIP) and with broadband.

2 27. From July 2005 to the present, I have been a Senior Consultant for the WIK, located
3 in Bad Honnef, Germany. The WIK is a leading German research institute specializing in the
4 economics of electronic communications, and the regulatory implications that flow from those
5 economics. Much of my current work applies economic reasoning to policy problems in electronic
6 communications.

7 28. I am a Senior Member of the Institute of Electrical and Electronics Engineers
8 (IEEE), and have held several senior volunteer positions within the IEEE. I am currently co-editor
9 for public policy and regulatory matters for *IEEE Communications Magazine*. I have also served as
10 a trustee of the American Registry of Internet Numbers (ARIN).

11 29. I do not consider myself an economist, but I have a good working knowledge of
12 economics as it applies to the aspects of telecommunications that I deal with. Several of my
13 professional papers over the past few years are economics papers, and a number of them have been
14 cited by recognized economists.¹⁰ Other recent papers apply economic reasoning to problems in the
15 regulation of electronic communications.¹¹

16 BACKGROUND –DOCUMENTS REVIEWED

17 30. In forming my expert opinions in this Declaration, I reviewed the following
18 documents: the Klein Declaration; [REDACTED]

19
20 ¹⁰ See, for instance, my paper with Jean-Jacques Laffont, Patrick Rey, and Jean Tirole, IDE-I,
21 Toulouse, "Internet interconnection and the off-net-cost pricing principle," *RAND Journal of*
22 *Economics*, Vol. 34, No. 2, Summer 2003, available at
23 <http://www.rje.org/abstracts/abstracts/2003/rje.sum03.Laffont.pdf> (Exhibit D). An earlier version
24 of the paper appeared as "Internet Peering," *American Economics Review*, Volume 91, Number 2,
25 May 2001. See also "Call Termination Fees: The U.S. in global perspective," presented at the 4th
26 ZEW Conference on the Economics of Information and Communication Technologies, Mannheim,
27 Germany, July 2004, available at: [ftp://ftp.zew.de/pub/zew-](ftp://ftp.zew.de/pub/zew-docs/div/IKT04/Paper_Marcus_Parallel_Session.pdf)
28 [docs/div/IKT04/Paper_Marcus_Parallel_Session.pdf](ftp://ftp.zew.de/pub/zew-docs/div/IKT04/Paper_Marcus_Parallel_Session.pdf) (Exhibit E). Another paper that deals
primarily with economics has been commissioned by the International Telecommunications Union
(ITU-T) for presentation at their ITU New Initiatives Workshop on "What Rules for IP-enabled
NGNs?," March 23-24, 2006: "Interconnection in an NGN environment," available at
<http://www.itu.int/osg/spu/ngn/documents/Papers/Marcus-060323-Fin-v2.1.pdf> (Exhibit F).

¹¹ See, for instance, "Evolving Core Capabilities of the Internet," *Journal on*
Telecommunications and High Technology Law, 2004 (Exhibit G).

1 (Klein Decl. Exh. A); [REDACTED]

2 [REDACTED] (Klein Decl. Exh. B); and [REDACTED]

3 [REDACTED] (Klein Decl. Exh. C).

4 31. I have also reviewed publicly available data on the Internet – wherever I have relied
5 on such data, I have so indicated in the text.

6 32. The Klein Exhibits use terms such as [REDACTED] equipment” and [REDACTED] room.” I believe
7 [REDACTED] to be an acronym for [REDACTED], which is used consistently to describe the project.
8 Consistent with this terminology, I will refer to the [REDACTED] Configuration throughout this declaration.

9 33. I interpret [REDACTED] as a reference to the [REDACTED]. These documents
10 represent directions to technicians who must “cut” the new facilities into the network, *i.e.* install
11 them with as little impact as possible on AT&T’s ongoing network operations.

12 34. Based on my experience in working with AT&T, I consider the documents to be
13 written with the meticulous attention to detail that is typical of AT&T operations. Highly skilled
14 central engineering staff provided unambiguous and highly detailed directions in order to enable
15 implementation by multiple on site field crews at a lower skill level. Any operations that could be
16 done in advance were dealt with prior to the cut. The cut was designed to be as fast and as painless
17 as possible, so as to minimize the risk of network disruption. The cut was to take place during the
18 maintenance window (presumably during the early morning hours, *e.g.* 2:00 AM) so as to further
19 minimize possible disruption.¹²

20 35. It is clear that these plans relate to real deployments, and not just to a theoretical or
21 hypothetical exercise. The last page of Klein Exhibit B makes clear that the [REDACTED]
22 deployment was already in full swing when the document was published on [REDACTED]. Of
23 [REDACTED] large [REDACTED] circuits that were to be diverted, (1) circuit engineering was complete for
24 [REDACTED], (2) actual change orders had already been issued for [REDACTED], and were scheduled to be issued
25 for [REDACTED] more within the subsequent week (*i.e.* by [REDACTED]), and (3) request dates had been
26 established for the completion of the remaining circuit engineering, for [REDACTED] pre-test and for
27

28 ¹² See Klein Exh. A, page 4.

1 putting the [REDACTED] into the circuits, all in [REDACTED] and [REDACTED].

2 36. Klein Exhibit B and Klein Exhibit C are specific to AT&T's [REDACTED] facility,
3 but Klein Exhibit A is generic – it is relevant to all sites where this cut was to take place.

4 OVERVIEW AND SUMMARY OF PRINCIPAL OPINIONS

5 37. My expert assessment is based on the Klein Declaration, the AT&T documents
6 collectively designated as the Klein Exhibits, my extensive and varied experience in the industry,
7 and various publicly available documents. Where I have relied on such documents, I have so
8 indicated in the text.

9 38. Based on these documents, other publicly available documents, and my general
10 knowledge of the industry, I conclude that AT&T has constructed an extensive – and expensive –
11 collection of infrastructure that collectively has all the capability necessary to conduct large scale
12 covert gathering of IP-based communications information, *not only for communications to*
13 *overseas locations, but for purely domestic communications as well.*¹³

14 39. In terms of the media claims I was asked to evaluate with respect to AT&T, I
15 conclude that: the infrastructure described by the Klein Declaration and Klein Exhibits provides
16 AT&T Corp. with the capacity to assist the government in carrying out the Program; that the
17 infrastructure deployed included a data network (the [REDACTED] that apparently provided third
18 party access to the [REDACTED] room or rooms; that, if the government is in fact in communication with
19 this infrastructure, AT&T Corp. has given the government direct access to telecommunications
20 facilities physically located on U.S. soil; that, by virtue of this access, the government would have
21 the capacity to monitor both domestic and international communications of persons in the United
22 States; and that surveillance under the Program is conducted in several stages, with the early stages
23 being computer-controlled collection and analysis of communications and the last stage being
24 actual human scrutiny.

25 40. A key question is whether the infrastructure that AT&T deployed – which I refer to
26 for purposes of this declaration as the [REDACTED] *Configurations* – is being used solely for legitimate or

27
28 ¹³ Later in this Declaration, I provide my assessment of the volume of domestic and international traffic captured.