

## 9. Quality of Service

### Introduction

This section summarizes various kinds of service quality data filed by the regional Bell companies, Sprint and other price-cap regulated incumbent local exchange carriers for calendar year 2004. The data track the quality of service provided to both retail customers (business and residential) and access customers (interexchange carriers).

The Commission does not impose service quality standards on communications common carriers. Rather, the Commission annually monitors quality of service data submitted by incumbent local exchange carriers that are regulated as price-cap carriers. The Commission summarizes these data and periodically publishes a report on quality of service trends.<sup>1</sup> The tables included in this section present comparative data on key company performance indicators. These include objective indicators of installation and maintenance performance, switch outages and trunk blocking performance. The tables also present data on customer perceptions of service, as well as the level of consumer complaints.

### Background

At the end of 1983, anticipating AT&T's imminent divestiture of its local operating companies, the Commission directed the Common Carrier Bureau<sup>2</sup> to establish a monitoring program that would provide a basis for detecting adverse trends in Bell operating company network service quality. Subsequently, the Bureau modified the service quality reporting requirements to reduce unnecessary paperwork and to ensure that needed information would be provided in a uniform format. Initially, the data were received twice yearly. The data collected for 1989 and 1990 formed the basis for FCC summary reports published in June 1990 and July 1991, respectively, highlighting five basic elements of quality of service data collected at that time.

With the implementation of price-cap regulation for certain local exchange carriers, the Commission made several major changes to the service quality monitoring program beginning with reports filed in 1991. First, the Commission expanded the class of companies filing reports to

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1 The latest report, which covers data for 2004, was released November 22, 2005. See Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission, *Quality of Service of Incumbent Local Exchange Carriers* (November 2005). This report includes data revisions that were received after the cutoff date for data in this Monitoring Report. It also includes an analysis of the quality of the data and the significance of changes over time. It can be found on the Commission's website at [www.fcc.gov/wcb/stats](http://www.fcc.gov/wcb/stats) under the file name QUAL04.ZIP.

2 As the result of a reorganization in March 2002, the Wireline Competition Bureau now performs Common Carrier Bureau functions described in this section. In this section, references to the Common Carrier Bureau apply to activities prior to the above date.

include non-Bell carriers that have elected to be subject to price-cap regulation.<sup>3</sup> These carriers are known as non-mandatory price-cap carriers and most of them are much smaller than the Bell operating companies. Second, it included service quality reports in the Automated Reporting Management Information System (ARMIS).<sup>4</sup> Finally, the Commission ordered significant changes to the kinds of data these carriers had to report.<sup>5</sup> Following these developments, the Commission released service quality summary reports in February 1993, March 1994, March 1996, September 1998, December 1999, December 2001, January 2003, February 2004, and December 2004 that focused on the largest reporting companies.<sup>6</sup> This section summarizes current year data from all reporting price-cap companies used in preparation of the summary reports.<sup>7</sup>

In 1996, pursuant to requirements in the Telecommunications Act of 1996,<sup>8</sup> the Commission reduced the frequency of data reporting for all reports to annual submissions.<sup>9</sup> In May 1997,

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3 Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313, Second Report and Order, 5 FCC Rcd 6786, 6827-31 (1990) (LEC Price-Cap Order) (establishing the current service quality monitoring program and incorporating the service quality reports into the ARMIS program), Erratum, 5 FCC Rcd 7664 (1990), modified on recon., 6 FCC Rcd 2637 (1991), aff'd sub nom., Nat'l Rural Telecom Ass'n v. FCC, 988 F.2d 174 (D.C. Cir. 1993). The incumbent local exchange carriers that are rate-of-return regulated are not subject to federal service quality reporting requirements.

4 LEC Price-Cap Order, 5 FCC Rcd at 6827-30. The ARMIS database includes a variety of mechanized company financial and infrastructure reports in addition to the quality-of-service reports. Most data are available disaggregated to a study area level which generally represents operations within a given state.

5 Id.; Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313, Memorandum Opinion and Order, 6 FCC Rcd 2974 (1991) (Service Quality Order), recon., 6 FCC Rcd 7482 (1991). Previously the Common Carrier Bureau had collected data on five basic service quality measurements from the Bell operating companies. These were customer satisfaction levels, dial tone delay, transmission quality, on time service orders, and percentage of call blocking due to equipment failure.

6 The reports have included data from the mandatory price-cap companies and the largest non-mandatory carriers, GTE and Sprint. GTE is now a part of Verizon, a mandatory price-cap carrier. Non-mandatory carriers are not required to file customer satisfaction data that appears in the ARMIS 43-06 report.

7 The following smaller non-mandatory price-cap companies that file ARMIS 43-05 data are included in this summary: Alltel Corp., Century Tel., Cincinnati Bell, Citizens, Citizens Frontier, Iowa Telecom, and Valor Telecommunications. Sprint, the largest of the non-mandatory price-cap companies, has been included in prior summaries.

8 Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56.

9 Orders implementing filing frequency and other reporting requirement changes

relevant definitions were clarified further. These changes have been reflected in filed data starting with the 1997 calendar year. The raw data are now filed annually in April of each year.

## The Data

The data presented in this section summarize the most recent ARMIS 43-05 and 43-06 carrier reports.<sup>10</sup> Tables in this year's summary include data from the regional Bell companies, Sprint and all other reporting incumbent local exchange carriers.<sup>11</sup> Tables 9.1(a), 9.2(a), 9.3(a), 9.4 and 9.5 cover data for the Bell operating companies, or mandatory price cap companies, and Tables 9.1(b), 9.2(b) and 9.3(b) cover data for smaller non-mandatory price-cap companies. These companies report quality of service data at a study area level which generally represents operations within a given state. Although the companies provide selected company aggregate data, the tables of this section contain summary data recalculated by FCC staff as the composite aggregate of all study areas for each listed entity. This section also includes a fairly extensive summary of data about individual switching outages, including outage durations and numbers of lines affected, for which no company calculated summaries are provided. Switch outage data have also been aggregated to the company level for inclusion in the tables.

The company-level quality of service data included in the tables of this section are derived

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associated with implementation of the Telecommunications Act of 1996 are as follows: Implementation of the Telecommunications Act of 1996: Reform of Filing Requirements and Carrier Classifications, CC Docket No. 96-193, Order and Notice of Proposed Rulemaking, 11 FCC Rcd 11716 (1996); Revision of ARMIS Quarterly Report (FCC Report 43-01) et al., CC Docket No. 96-193, Order, 11 FCC Rcd 22508 (1996); Policy and Rules Concerning Rates for Dominant Carriers, CC Docket No. 87-313, Memorandum Opinion and Order, 12 FCC Rcd 8115 (1997); Revision of ARMIS Annual Summary Report (FCC Report 43-01) et al., AAD No. 95-91, Order, 12 FCC Rcd 21831 (1997).

- 10 Source data used in preparing this section may be useful for further investigation and can be readily extracted from the ARMIS 43-05 and 43-06 tables on the online database maintained on the FCC website at [www.fcc.gov/wcb/eafs](http://www.fcc.gov/wcb/eafs). The data are also available from Best Copy and Printing, Inc at (202) 488-5300. A number of prior-year data summary reports are available through the FCC's Reference Information Center (Courtyard Level) at 445 12th Street, SW, Washington, D.C. 20554.
- 11 In February 1992, United Telecommunications Inc. became Sprint Corporation (Local Division); and in March 1993, Sprint Corporation acquired Centel Corporation. Bell Atlantic and NYNEX merged in August 1997, and then merged with GTE in 2000. Verizon Communications is shown separately for GTE, Verizon North (the former NYNEX companies), and Verizon South (the former Bell Atlantic Companies). SBC, Pacific Telesis, Ameritech, and SNET are shown separately despite the merger of SBC and Pacific Telesis in April 1997, SBC and SNET in October 1998, and SBC and Ameritech in October 1999.

by calculating sums or weighted averages of data reported at the study area level. In particular, where companies report study area information in terms of percentages or average time intervals, this section presents company composites that are calculated by weighting the percentage or time interval figures from all study areas within that company. For example, we weight the percent of commitments met by the corresponding number of orders provided in the filed data.<sup>12</sup>

In the case of outage data summarized in Tables 9.2, and 9.3, we calculate a number of useful statistics from raw data records for individual switches with outages lasting more than two minutes. These statistics include the total number of events lasting more than two minutes, the average outage duration, the average number of outages per hundred switches, the average number of outages per million access lines, and the average outage line-minutes per thousand access lines and per event. Outage line-minutes is a measure that combines both duration and number of lines affected in a single parameter. We derive this parameter from the raw data by multiplying the number of lines involved in each outage by the duration of the outage and summing the resulting values. We then divide the resulting sum by the total number of thousands of access lines or of events to obtain average outage line-minutes per access line and average outage line minutes per event respectively.

The tables contained in this section cover data for 2004. Table 9.1 provides installation, maintenance and customer complaint data. The installation and maintenance data are presented separately for local services provided to end users and access services provided to interexchange carriers. Table 9.2 shows switch downtime and trunk servicing data. Table 9.3 shows outage data by cause. Table 9.4 presents the percentages of residential, small business and large business customers indicating dissatisfaction with BOC installations, repairs and business offices, as determined by BOC customer perception surveys.<sup>13</sup> Table 9.5 shows the underlying survey sample sizes.

More detailed information on the raw data from which this section has been developed may be found on the Commission's ARMIS web page cited earlier. Tables 9.4 and 9.5 were prepared from data filed only by the Bell operating companies in the ARMIS 43-06 report. The statistics presented in Tables 9.4 and 9.5 are straightforward and reflect the data in the format filed. Complete

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12 Although companies have prepared their own company composites, we have recalculated a number of them from study area data for presentation in the tables to assure that company averages are calculated in a consistent manner. We weight data involving percentages or time intervals in order to arrive at consistent composite data shown in the tables. Parameters used for weighting in this section were appropriate for the composite being calculated and were based on the raw data filed by the carriers but are not necessarily shown in the tables. For example, we calculate composite installation interval data by multiplying the average installation interval at the individual study area level by the number of orders in that study area, summing the results for all study areas, and then dividing that sum by the total number of orders.

13 Customer satisfaction data, collected in the 43-06 report and summarized in Tables 9.4 and 9.5, are required to be reported only by the mandatory price-cap carriers.

data descriptions are available in several Commission orders.<sup>14</sup>

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14 See supra note 9.

**Table 9.1 (a)**  
**Installation, Maintenance, & Customer Complaints**  
**Bell Companies - 2004**

	BellSouth	Qwest	SBC Ameritech	SBC Pacific	SBC Southwestern	SBC SNET	Verizon North	Verizon South	Verizon GTE
<b>ACCESS SERVICES PROVIDED TO CARRIERS -- SWITCHED ACCESS</b>									
Percent Installation Commitments Met	100.0	99.8	94.4	95.1	84.9	74.4	99.9	99.8	92.4
Average Installation Interval (days)	19.2	15.0	31.8	20.3	27.6	28.1	28.5	20.1	26.6
Average Repair Interval (hours)	0.6	1.3	4.4	9.6	3.6	0.4	15.0	4.0	9.5
<b>ACCESS SERVICES PROVIDED TO CARRIERS -- SPECIAL ACCESS</b>									
Percent Installation Commitments Met	99.8	97.9	95.5	98.2	99.1	98.5	91.8	92.8	91.0
Average Installation Interval (days)	14.0	9.0	17.9	16.2	17.4	20.7	21.3	16.5	20.2
Average Repair Interval (hours)	3.3	2.8	4.7	4.3	3.7	3.7	5.4	3.8	17.3
<b>LOCAL SERVICES PROVIDED TO RESIDENTIAL AND BUSINESS CUSTOMERS</b>									
Percent Installation Commitments Met	97.7	99.6	98.6	99.4	98.9	99.5	98.8	98.7	98.1
Residence	98.7	99.7	98.6	99.4	98.9	99.6	98.8	98.8	98.4
Business	90.6	98.8	98.3	99.1	98.5	99.0	98.0	97.5	95.5
Average Installation Interval (days)	1.5	0.3	1.4	1.8	2.1	1.2	0.9	1.4	0.7
Residence	1.2	0.3	1.4	1.6	2.0	1.0	0.8	1.3	0.6
Business	1.9	1.2	1.4	3.0	2.4	2.9	1.5	2.0	2.3
Average Out of Service Repair Interval (hours)	31.3	16.0	16.7	26.9	27.7	26.7	25.7	29.0	26.4
Residence	33.5	16.3	17.2	28.8	28.9	27.2	27.1	31.7	28.9
Business	19.9	14.9	14.2	17.6	20.7	23.9	20.1	15.1	13.8
Initial Trouble Reports per Thousand Lines	298.2	117.6	146.2	116.1	190.5	165.8	181.6	139.2	167.2
Total MSA	289.7	133.8	145.9	115.5	182.7	164.3	175.6	133.4	157.8
Total Non MSA	348.9	39.3	148.9	136.2	228.6	181.4	245.3	219.3	205.4
Total Residence	344.8	137.1	206.8	162.6	247.2	211.0	221.9	184.7	192.1
Total Business	177.1	74.5	58.9	45.7	82.2	70.2	104.8	62.7	108.6
Troubles Found per Thousand Lines	197.3	89.2	107.8	98.0	147.6	91.8	137.8	102.3	140.0
Repeat Troubles as a Pct. of Trouble Reports	18.6%	20.3%	16.1%	10.2%	16.6%	16.7%	20.6%	21.0%	14.6%
Res. Complaints per Mill. Res. Access Lines	212.4	130.8	16.2	17.5	35.8	128.8	100.1	496.5	161.1
Bus. Complaints per Mill. Bus. Access Lines	50.3	47.4	6.2	3.3	8.0	48.2	38.2	60.3	49.9

NA: Not available

Please refer to text for notes and data qualifications

**Table 9.1 (b)**  
**Installation, Maintenance, & Customer Complaints**  
**Other Price-Cap Companies - 2004**

	Alltel	CenturyTel	Cincinnati Bell	Citizens	Citizens Frontier	Iowa Telecom	Sprint	Valor
<b>ACCESS SERVICES PROVIDED TO CARRIERS -- SWITCHED ACCESS</b>								
Percent Installation Commitments Met	98.6	80.0	100.0	92.7	99.2	64.2	92.6	89.1
Average Installation Interval (days)	13.5	18.9	22.2	12.8	25.6	20.5	11.9	31.7
Average Repair Interval (hours)	3.1	12.9	NA	11.8	2.6	26.1	2.6	2.8
<b>ACCESS SERVICES PROVIDED TO CARRIERS -- SPECIAL ACCESS</b>								
Percent Installation Commitments Met	90.6	83.0	100.0	89.2	93.5	63.7	94.0	94.7
Average Installation Interval (days)	11.8	20.7	17.0	12.0	21.1	9.6	10.0	23.0
Average Repair Interval (hours)	3.2	12.6	3.2	14.8	23.0	18.3	3.6	3.1
<b>LOCAL SERVICES PROVIDED TO RESIDENTIAL AND BUSINESS CUSTOMERS</b>								
Percent Installation Commitments Met	97.4	95.9	99.8	95.1	97.6	98.4	96.5	98.2
Residence	97.7	96.0	99.9	95.3	98.1	98.4	96.8	98.2
Business	94.3	95.5	99.5	94.3	95.2	97.4	94.5	98.1
Average Installation Interval (days)	1.8	1.9	2.2	4.0	5.3	2.1	1.8	1.6
Residence	1.6	1.6	1.7	4.1	5.2	2.0	1.7	1.6
Business	3.0	1.7	4.7	3.7	6.4	3.4	2.7	1.6
Average Out of Service Repair Interval (hours)	15.1	15.2	26.7	16.9	22.0	10.8	22.2	17.1
Residence	15.4	18.4	28.2	16.7	22.3	11.1	22.5	17.3
Business	13.6	13.8	16.2	17.8	19.8	8.6	20.1	15.4
Initial Trouble Reports per Thousand Lines	193.1	230.5	113.6	296.0	257.2	157.2	216.1	422.6
Total MSA	170.9	215.4	113.6	NA	260.7	155.3	195.5	328.2
Total Non MSA	214.8	244.6	NA	296.0	253.5	157.7	261.6	505.0
Total Residence	243.2	68.1	141.7	336.2	315.7	179.0	260.2	504.0
Total Business	76.6	729.0	48.7	170.1	127.3	82.1	101.2	198.3
Troubles Found per Thousand Lines	149.4	189.6	106.1	236.4	210.3	141.8	144.4	404.1
Repeat Troubles as a Pct. of Trouble Reports	20.3%	42.9%	12.2%	16.0%	11.6%	17.1%	21.9%	7.6%
Res. Complaints per Mill. Res. Access Lines	189.2	714.1	664.6	687.5	727.8	21.0	61.8	154.0
Bus. Complaints per Mill. Bus. Access Lines	70.3	408.8	83.5	137.4	109.7	0.0	24.8	36.6

NA: Not available

Please refer to text for notes and data qualifications

**Table 9.2 (a)**  
**Switch Downtime & Trunk Blocking**  
**Bell Companies - 2004**

	BellSouth	Qwest	SBC Ameritech	SBC Pacific	SBC Southwestern	SBC SNET	Verizon North	Verizon South	Verizon GTE
Total Access Lines in Thousands	20,938	13,425	17,287	16,156	13,912	2,069	15,829	20,276	15,785
Total Trunk Groups	3,230	1,523	962	1,227	734	88.0	736	900	1,564
Total Switches	1,625	1,323	1,436	778	1,654	161	1,290	1,349	3,180
Switches with Downtime									
Number of Switches	26	264	14	29	25	10	14	10	49
As a Percentage of Total Switches	1.6%	20.0%	1.0%	3.7%	1.5%	6.2%	1.1%	0.7%	1.5%
Average Switch Downtime in Seconds per Switch*									
For All Events	19.8	104.4	5.0	0.2	4.4	20.9	47.7	10.9	212.6
For Unscheduled Events Over 2 Minutes	19.8	90.4	2.1	NA	3.7	17.9	43.6	10.7	NA
For Unscheduled Downtime More Than 2 Minutes									
Number of Occurrences or Events	15	29	5	0	5	2	10	9	0
Events per Hundred Switches	0.9	2.2	0.3	0.0	0.3	1.2	0.8	0.7	0.0
Events per Million Access Lines	0.72	2.16	0.29	0.00	0.36	0.97	0.63	0.44	0.00
Average Outage Duration in Minutes	35.8	68.7	9.8	NA	20.2	24.1	93.8	26.7	NA
Average Lines Affected per Event in Thousands	15.6	6.5	37.1	NA	22.2	22.3	21.8	15.0	NA
Outage Line-Minutes per Event in Thousands	282.8	243.7	365.7	NA	430.0	78.4	516.7	1,024.6	NA
Outage Line-Minutes per 1,000 Access Lines	202.6	526.4	105.8	0.0	154.5	75.7	326.4	454.8	0.0
For Scheduled Downtime More Than 2 Minutes									
Number of Occurrences or Events	5	28	1	0	2	0	3	1	0
Events per Hundred Switches	0.3	2.1	0.1	0.0	0.1	0.0	0.2	0.1	0.0
Events per Million Access Lines	0.24	2.09	0.06	0.00	0.14	0.00	0.19	0.05	0.00
Average Outage Duration in Minutes	8.1	5.5	66.0	NA	5.5	NA	28.5	2.3	NA
Avg. Lines Affected per Event in Thousands	1.4	16.1	21.0	NA	19.3	NA	22.9	21.8	NA
Outage Line-Minutes per Event in Thousands	11.4	66.5	1,388.1	NA	77.5	NA	142.9	50.6	NA
Outage Line-Minutes per 1,000 Access Lines	2.7	138.8	80.3	0.0	11.1	0.0	27.1	2.5	0.0
% Common Trunk Grps. Exceeding Blocking Objectives	1.30%	9.72%	0.10%	0.49%	0.68%	0.0	3.80%	2.11%	0.19%

\* Aggregate downtime divided by total number of company switches.

NA: Not available

Please refer to text for notes and data qualifications



**Table 9.2 (b)**  
**Switch Downtime & Trunk Blocking**  
**Other Price-Cap Companies - 2004**

	Alltel	CenturyTel	Cincinnati Bell	Citizens	Citizens Frontier	Iowa Telecom	Sprint	Valor
Total Access Lines in Thousands	756	607	953	1,293	940	246	7,546	513
Total Trunk Groups	90	244	61	247	92	170	541	246
Total Switches	243	187	86	643	201	273	1,344	292
Switches with Downtime								
Number of Switches	57	0	17	55	12	20	101	31
As a Percentage of Total Switches	23.5%	0.0%	19.8%	8.6%	6.0%	7.3%	7.5%	10.6%
Average Switch Downtime in Seconds per Switch*								
For All Events	3,580.8	0.0	44.8	1,011.5	829.9	254.2	2,978.0	770.1
For Unscheduled Events Over 2 Minutes	3,233.7	NA	NA	946.3	857.0	197.5	2,797.6	770.1
For Unscheduled Downtime More Than 2 Minutes								
Number of Occurrences or Events	29	0	0	63	16	18	77	31
Events per Hundred Switches	11.9	0.0	0.0	9.8	8.0	6.6	5.7	10.6
Events per Million Access Lines	38.36	0.00	0.00	48.71	17.02	73.05	10.20	60.40
Average Outage Duration in Minutes	451.6	NA	NA	161.0	179.4	49.9	813.9	120.9
Average Lines Affected per Event in Thousands	2.2	NA	NA	0.8	1.5	0.7	3.2	1.7
Outage Line-Minutes per Event in Thousands	565.7	NA	NA	368.6	188.5	38.2	6,803.4	349.8
Outage Line-Minutes per 1,000 Access Lines	21,697.3	0.0	0.0	17,956.8	3,207.5	2,790.2	69,423.5	21,130.4
For Scheduled Downtime More Than 2 Minutes								
Number of Occurrences or Events	2	0	0	16	0	1	24	0
Events per Hundred Switches	0.8	0.0	0.0	2.5	0.0	0.4	1.8	0.0
Events per Million Access Lines	2.65	0.00	0.00	12.37	0.00	4.06	3.18	0.00
Average Outage Duration in Minutes	703.0	NA	NA	34.2	NA	258.4	168.3	NA
Avg. Lines Affected per Event in Thousands	1.4	NA	NA	1.2	NA	0.7	4.8	NA
Outage Line-Minutes per Event in Thousands	731.1	NA	NA	28.6	NA	187.3	831.2	NA
Outage Line-Minutes per 1,000 Access Lines	1,933.9	0.0	0.0	354.4	0.0	760.3	2,643.5	0.0
% Common Trunk Grps. Exceeding Blocking Objectives	1.11%	5.33%	24.59%	0.00%	0.00%	0.00%	2.96%	0.81%

\* Aggregate downtime divided by total number of company switches.

NA: Not available

Please refer to text for notes and data qualifications

**Table 9.3 (a)**  
**Switch Downtime Causes -- Outages More Than 2 Minutes in Duration**  
**Bell Companies - 2004**

	BellSouth	Qwest	SBC Ameritech	SBC Pacific	SBC Southwestern	SBC SNET	Verizon North	Verizon South	Verizon GTE
<b>Total Number of Outages</b>									
1. Scheduled	5	28	1	0	2	0	3	1	0
2. Procedural Errors -- Telco. (Inst./Maint.)	0	0	1	0	0	0.0	2	2	0
3. Procedural Errors -- Telco. (Other)	0	0	0	0	0	0	0	0	0
4. Procedural Errors -- System Vendors	2	10	0	0	0	0	0	0	0
5. Procedural Errors -- Other Vendors	0	2	0	0	1	0	0	0	0
6. Software Design	1	0	1	0	0	1	2	4	0
7. Hardware Design	0	0	0	0	0	0	1	1	0
8. Hardware Failure	5	9	3	0	4	1	3	1	0
9. Natural Causes	3	0	0	0	0	0	1	0	0
10. Traffic Overload	0	0	0	0	0	0	0	0	0
11. Environmental	0	0	0	0	0	0	0	1	0
12. External Power Failure	1	2	0	0	0	0	1	0	0
13. Massive Line Outage	0	0	0	0	0	0	0	0	0
14. Remote	5	28	1	0	2	0	3	1	0
15. Other/Unknown	1	0	0	0	0	0	0	0	0
<b>Total Outage Line-Minutes per Thousand Access Lines</b>									
1. Scheduled	2.7	138.8	80.3	0.0	11.1	0.0	27.1	2.5	0.0
2. Procedural Errors -- Telco. (Inst./Maint.)	0.0	0.0	10.4	0.0	0.0	0.0	44.2	24.0	0.0
3. Procedural Errors -- Telco. (Other)	7.9	56.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4. Procedural Errors -- System Vendors	2.0	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5. Procedural Errors -- Other Vendors	0.0	73.1	0.0	0.0	128.3	0.0	0.0	0.0	0.0
6. Software Design	48.9	0.0	10.4	0.0	0.0	66.1	4.3	8.1	0.0
7. Hardware Design	0.0	0.0	0.0	0.0	0.0	0.0	5.2	3.7	0.0
8. Hardware Failure	115.1	295.5	85.0	0.0	26.2	9.6	226.2	20.1	0.0
9. Natural Causes	19.4	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0
10. Traffic Overload	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11. Environmental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	398.9	0.0
12. External Power Failure	4.6	69.2	0.0	0.0	0.0	0.0	37.6	0.0	0.0
13. Massive Line Outage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14. Remote	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15. Other/Unknown	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Please refer to text for notes and data qualifications

**Table 9.3 (b)**  
**Switch Downtime Causes -- Outages More Than 2 Minutes in Duration**  
**Other Price-Cap Companies - 2004**

	Alltel	CenturyTel	Cincinnati Bell	Citizens	Citizens Frontier	Iowa Telecom	Sprint	Valor
<b>Total Number of Outages</b>								
1. Scheduled	2	0	0	16	0	1	24	0
2. Procedural Errors -- Telco. (Inst./Maint.)	3	0	0	0	0	2	16	15
3. Procedural Errors -- Telco. (Other)	0	0	0	0	0	0	0	0
4. Procedural Errors -- System Vendors	1	0	0	0	0	0	0	0
5. Procedural Errors -- Other Vendors	0	0	0	0	0	0	1	3
6. Software Design	4	0	0	16	2	2	2	0
7. Hardware Design	0	0	0	0	0	2	0	1
8. Hardware Failure	6	0	0	21	2	9	9	3
9. Natural Causes	3	0	0	4	2	0	8	1
10. Traffic Overload	0	0	0	0	0	0	0	0
11. Environmental	0	0	0	0	0	0	0	0
12. External Power Failure	2	0	0	12	5	2	19	0
13. Massive Line Outage	7	0	0	0	0	1	1	0
14. Remote	2	0	0	16	0	1	24	0
15. Other/Unknown	2	0	0	0	0	0	2	0
<b>Total Outage Line-Minutes per Thousand Access Lines</b>								
1. Scheduled	1,933.9	0.0	0.0	354.4	0.0	760.3	2,643.5	0.0
2. Procedural Errors -- Telco. (Inst./Maint.)	278.1	0.0	0.0	0.0	0.0	361.1	257.4	5,829.5
3. Procedural Errors -- Telco. (Other)	53.8	0.0	0.0	0.0	0.0	0.0	0.0	620.0
4. Procedural Errors -- System Vendors	56.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5. Procedural Errors -- Other Vendors	0.0	0.0	0.0	0.0	0.0	0.0	4.5	1,168.1
6. Software Design	1,327.5	0.0	0.0	1,089.2	257.9	1,317.5	9.6	0.0
7. Hardware Design	0.0	0.0	0.0	0.0	0.0	112.6	0.0	6.4
8. Hardware Failure	1,665.3	0.0	0.0	1,148.2	58.7	810.4	373.6	10,750.3
9. Natural Causes	3,167.7	0.0	0.0	13,379.7	951.6	0.0	65,706.0	2,756.1
10. Traffic Overload	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11. Environmental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12. External Power Failure	216.1	0.0	0.0	1,276.6	1,313.3	120.8	2,783.1	0.0
13. Massive Line Outage	14,903.1	0.0	0.0	0.0	0.0	67.8	168.5	0.0
14. Remote	0.0	0.0	0.0	1,063.2	626.1	0.0	113.1	0.0
15. Other/Unknown	29.3	0.0	0.0	0.0	0.0	0.0	7.6	0.0

Please refer to text for notes and data qualifications

**Table 9.4  
Customer Perception Surveys - Percent of Customers Dissatisfied  
Bell Companies - 2004**

	BellSouth	Qwest	SBC Ameritech	SBC Pacific	SBC Southwestern	SBC SNET	Verizon North	Verizon South	Verizon GTE
<b>Installations:</b>									
Residential	6.38%	3.90%	7.57%	6.06%	8.38%	8.62%	6.04%	6.86%	5.33%
Small Business	9.23%	9.18%	11.75%	7.99%	9.48%	6.94%	10.25%	12.92%	10.22%
Large Business	6.38%	NA	10.28%	5.74%	8.76%	NA	5.68%	5.87%	7.34%
<b>Repairs:</b>									
Residential	9.95%	5.91%	11.01%	7.44%	10.40%	11.61%	17.73%	20.74%	14.01%
Small Business	7.26%	7.47%	10.71%	4.92%	7.64%	9.56%	12.73%	10.95%	10.22%
Large Business	5.50%	NA	9.30%	4.68%	7.45%	NA	9.98%	5.53%	7.39%
<b>Business Office:</b>									
Residential	8.12%	1.62%	8.15%	5.10%	8.83%	6.88%	6.21%	6.58%	6.61%
Small Business	10.94%	3.30%	9.10%	6.52%	6.96%	8.64%	7.08%	8.44%	7.76%
Large Business	6.13%	NA	10.72%	3.01%	4.97%	NA	10.14%	13.51%	8.50%

NA: Not available

Please refer to text for notes and data qualifications

**Table 9.5  
Customer Perception Surveys - Sample Sizes  
Bell Companies - 2004**

	BellSouth	Qwest	SBC Ameritech	SBC Pacific	SBC Southwestern	SBC SNET	Verizon North	Verizon South	Verizon GTE
<b>Installations:</b>									
Residential	45,000	49,832	10,708	10,841	10,311	4,558	20,301	15,346	19,762
Small Business	45,310	31,801	10,484	11,256	10,227	2,148	19,446	15,246	19,891
Large Business	9,801	0	2,287	3,480	2,272	0	599	733	436
<b>Repairs:</b>									
Residential	30,680	35,055	10,505	12,348	10,537	2,368	20,255	15,224	20,023
Small Business	46,100	24,993	10,724	11,071	10,665	1,193	20,151	15,052	20,176
Large Business	7,340	0	2,376	3,689	2,390	0	551	651	433
<b>Business Office:</b>									
Residential	42,609	46,008	21,038	22,934	20,887	2,876	11,057	9,783	12,966
Small Business	10,900	31,757	20,346	22,954	21,281	1,111	3,418	3,625	3,402
Large Business	457	0	2,883	2,853	2,534	0	503	592	341

Please refer to text for notes and data qualifications