Network Reliability Steering Committee

Annual Report 2004

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Network Reliability
Steering Committee

Sponsored by the Alliance
for Telecommunications
Industry Solutions

TO: Stakeholders of the Telecommunications Industry in the United States

This Annual Report reviews the health of the wireline telecommunications networks for the year 2004, as determined by statistical analysis of major outages reported by service providers to the FCC. This analysis is intended to advise the various stakeholders of the telecommunications industry on the network reliability results that were observed during the previous year from a very special perspective. While any individual company can analyze their own major outage events, only the NRSC brings the industry together in a non-competitive setting to *objectively analyze* the macro outage data for the United States wireline telecommunications industry, and when necessary, *cooperatively bring to bear the industry's resources* when problems are identified. The statistical analysis techniques employed by the NRSC are objective methodologies that were developed and approved by the ANSI accredited ATIS Standards Group on Network Reliability and Performance. These techniques provide many benefits. Some examples include:

1. **Decision Support:** IF IT WERE POSSIBLE, INDUSTRY WOULD PREVENT ALL OUTAGES. Failing that, if it were possible, industry would devote infinite resources to stopping every identified class of failure. Unfortunately, it is impossible to prevent all outages and obviously there are finite resources available to be devoted to correcting the causes of outages. The answer is to devote the finite resources to preventing/reducing those outages that have the most severe impact, thus gaining the most "bang for the buck". The NRSC assists in this process by analyzing major outages and alerting the stakeholders to ongoing and emerging problems on the basis of statistical analysis. Not conjecture. Not opinion. Not guesses. The reports written by the NRSC are intended to identify areas which merit special attention, based on objective statistical analysis.
2. **Appropriate Response:** The Statistical Process Control (SPC) methodologies employed by the NRSC are longstanding and proven methods of statistical analysis that are able to identify major shifts in network reliability due to systemic causes from the normal variation in the frequency and impact of outage events. This allows the NRSC to focus its efforts on significant reliability issues that are due to systemic causes rather than overreacting to normal random fluctuation in outage frequency or impact.
3. **Density of Information:** Failure events (outages) that are due to systemic causes will occur over and over again, forming a trend over time. The length of time that it takes to recognize a trend depends on how often the events occur. Some event types occur very infrequently and it can be extremely difficult to recognize a trend. By aggregating all of the outage data for the United States as a whole, these rare event types can be identified more quickly by the NRSC than by a telecommunications service provider working alone.
4. **Control Limits and Trends:** The NRSC is committed to identifying network reliability problems as quickly as possible. To that end, it uses control limits based on historical performance to establish an alarm threshold and identify any sudden, undesirable changes in outage frequency or impact. In this way, the NRSC can sound the alarm or suggest a response to a quickly emerging problem. However; reliability problems are not always so extreme as to be immediately detectable. It may take time and the accumulation of data over time to identify a problem. For this reason, the NRSC also examines outage frequency, impact, duration, and extent over the long term to identify troubling trends over time, even those that may not exceed the control limits. This diversity in analysis provides dual protection in the identification of network reliability problems both immediately and over the long term.

Some particularly notable measurements and trends for 2004 were:

- The lowest number of outages ever observed.
- Facility outages at a record low in terms of both number of events and impact (i.e., outage index).
- Lowest number of local switch outages ever observed.
- Second lowest frequency ever for tandem switch outages.
- A five-year trend of 19% annual reduction in total outage frequency.
- An eight-year trend of 13% annual reduction for facility outage frequency.

Based on the 12-year outage reporting history, 2004 was definitely a great year for network reliability as measured by outage frequency. Consistent with its practice for over a decade, the NRSC reports this and other factual observations, but stops short of offering interpretation as to why this happened. For those inclined to ponder why things have improved, an outline of possible influencing factors is provided in the Summary and Conclusion section of this report. As to the question of what impact NRSC activities have had on the positive performance observed in 2004, there is certainly ample evidence to suggest that the many years of study and numerous process improvements have been positive ones. Additional insights to this question can be gleaned from the NRSC studies at http://www.atis.org/nrsc (particularly the documents: "Timing Outages Task Group Report", "Fixing Facilities Damages", and "Procedural Outage Reduction") and the Network Reliability and Interoperability Council (NRIC) website at http://www.nric.org where the NRIC Best Practices can be found.

2004 was a milestone year. Several key personnel in the area of network reliability chose to retire. P. J. Aduskevicz, Chair of the NRSC from 2000-2003 and Jim Lankford, Chair of the NRSC for 2004 both decided to retire last year. P.J. and Jim are giants in the field of network reliability who had enviable records of achievement and leadership. They will be missed.

Beginning in 2005, major changes to the outage reporting process were implemented by the FCC. New rules went into effect that fundamentally changed what outages would be reported, and how the data would be handled. The new rules expand outage reporting beyond the wireline segment to include the wireless, cable, paging, and satellite segments of the industry. Unfortunately, the language in the new rules that was intended to protect outage data from potential abuse by enemies of the United States has been interpreted by the FCC as prohibiting access by the NRSC. The work of the NRSC over the past 12 years has been a repeated cycle of analyzing data, identifying areas for focused study, and making recommendations to industry on how to improve network reliability. The work of the NRSC takes place in an environment where competition and marketplace rivalries are put aside. The focus is on improving the reliability of the national telecom infrastructure for the benefit of all users of communications services in the United States and communicating network reliability information to the public. This process is a proven model that has increased the reliability of communications for all consumers in the United States. Unfortunately, at this time, the NRSC's network reliability improvement cycle has halted because insufficient access to outage data has restricted its capability to provide this service to the nation. The NRSC stands ready to work side by side with the FCC to resolve the data access issue, and continue the efforts to improve the reliability of telecommunications services for everyone in the United States.

Archie McCain
Chair NRSC

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INTRODUCTION

This report provides an analysis of U.S. telecommunications network performance based on outage reports made by service providers to the FCC from January 1, 1993 through December 31, 2004. While service providers were required to make such reports for outages meeting various criteria, the vast majority of reports were made for outages that potentially affect 30,000 or more customers for 30 minutes or more.

The report is divided into four sections. The analysis results presented in the first two sections were limited to those outages reported on the basis of the 30,000 customer/30 minute thresholds. The first section describes network performance overall and within failure categories. The second section provides further breakdown analyses of failure subcategories and root cause categories within each failure category. In both sections, the major metrics examined are number of outages and aggregated outage index. The first section also examines the number of customers potentially affected and outage duration per outage.

The "Special" Outages section addresses reports below the 30,000 customer threshold that affect major airports, major military installations, key government facilities, nuclear power plants, and 911 service, as well as fire-related incidents that impact 1,000 or more lines, but less than 30,000 lines, for 30 minutes or longer.

The Summary and Conclusion section provides a summary of 2004 and reviews the accomplishments of the NRSC prior to the revision of the FCC outage reporting requirements in 2005.

During 2004, members and participants in the NRSC included:

AT&T
AT&T Wireless
BellSouth
Cingular Wireless
Cellular Telecommunications & Internet Association (CTIA)
Cox Communications
Department of Homeland Security (DHS)
e-Commerce & Telecommunications User Group (eTUG)
Federal Communications Commission (FCC)
Institute for Law and Public Safety
Juniper Networks
Lucent Technologies
Marconi Communications
MCI
National Emergency Number Association (NENA)
Nortel Networks
NYC DOITT
Puerto Rico Telephone
Qwest
SBC
Spectrasite
Sprint
Telcordia Technologies
Union Pacific Railroad
Verizon