



NRSC Bulletin No. 2009-008 E-911 Outages November 2009

Background

The Network Reliability Steering Committee (NRSC) created the E-911 Subteam in August 2008 in order to investigate the Federal Communications Commission's (FCC's) concern that the number of outage reports that were submitted with E-911 as the reason reportable were increasing at a statistically significant rate.

Methodology of the E-911 Subteam

Seven service providers participated in this study. As part of their efforts, the service providers categorized events that referenced E-911 as the reason reportable and completed a comprehensive data analysis. The analysis included studying the direct and root cause categories referenced in the FCC Network Outage Reporting System (NORS). The Subteam excluded "sympathy"¹ reports in the study because the reporting entity often does not know the cause of the outage and focused on E-911 events from January 2008 through March 2009.

E-911 Subteam Findings and Guidance

The Subteam's analysis of the leading cause categories² demonstrated a marked correlation to the division between E-911 Phase II and non-Phase II outages. The leading cause categories of non-Phase II outages aligned with the older technology. The leading cause categories associated with Phase II outages indicated failures aligned with the newer, more complex technology and the increased number of players supporting that functionality. The overall number of both Phase II and non-Phase II outages was trending downward. However, the downward trend in Phase II outages was not statistically significant due to the increase in implementations of Phase II functionality.

The Subteam's analysis showed the total number of outages reported was trending downward; individual major cause categories were also trending downward, with one exception. That exception was a statistically significant increase in the number of "Procedural-Service Provider" outages reported.

Further, analysis of the Best Practices (BPs) cited in the NORS data indicated a notable number of outage reports that correlated with "Procedural" errors.

- The Subteam examined the BPs cited in the outage reports and analyzed the particular BPs cited in relation to the reported outage causes.
 - **BP 7-7-0588** Network Operators, Service Providers and Equipment Suppliers should provide awareness training that stresses the services impact of network failure, the risks of various levels of threatening conditions and the roles components play in the overall architecture. Training should be provided for personnel involved in the direct operation, maintenance, provisioning, security and support of network elements.
 - This BP was cited in all cause categories and in 24% of all outage reports. It was the most cited BP in Hardware Failure, Other /Unknown, and Cable Damage cause categories. It ranked second in the Procedural-Service Provider category and third in the Design Software category.

¹ Failure occurred in another company's network

² Hardware failure (26.6%), Other/Unknown (17.5%), Design Software (14.9%), Procedural Service Provider (11.1%), Cable Damage (10.7%)



- **BP 7-7-0697** Network Operators, Service Providers and Equipment Suppliers should employ an Ask Yourself program as part of core training and daily operations. This initiative is intended to reinforce the responsibility every employee has to ensure flawless network service.
 - This BP was the most cited in the Procedural-Service Provider category.
- The Subteam concluded that the BPs cited in the outage reports studied were generally consistent with the outages reported.
 - Hardware failure cause category: Five BPs cited in 74% of all reports. Those BPs (7-7-0588, 7-7-0483, 7-7-5107, 7-7-0434, 7-7-0454) cited training, critical spares and management issues.
 - Other/unknown cause category: Two BPs cited in 63% of all reports. Those BPs (7-7-0588, 7-7-0434) cited training.
 - Design software cause category: Five BPs cited in 39% of all reports. Those BPs (7-7-0567, 7-7-0404, 7-7-0588, 7-7-8004, 7-7-0421) cited hardware diversity, management issues, training, improved failover mechanisms and improved default configurations.
 - Cable damage cause category: Two BPs cited in 62% of all reports. Those BPs (7-7-0588, 7-7-0736) cited training and management issues.
 - Procedural service provider cause category: Six BPs cited in 60% of all reports. Those BPs (7-7-0697, 7-7-0567, 7-7-0588, 7-7-0434, 6-5-0758, 7-7-0418) cited training, hardware diversity, public education and MOPs.
 - Other BPs were cited in reports associated with these cause categories, but were cited in 1% or less of all reports.

Based on the underlying problem descriptions available, the Subteam was unable to correlate the FCC's perceived E-911 problems to any pervasive issues or practices. The Subteam found:

- Service providers should continue referencing the most up-to-date Network Reliability and Interoperability Council (NRIC) Best Practices found at:
 - <http://www.bell-labs.com/USA/NRICbestpractices/> or
 - <https://www.fcc.gov/nors/outage/bestpractice/BestPractice.cfm>

Recommendation

The NRSC recommends that the industry review the NRIC Best Practices cited above and consider implementation as appropriate.

Conclusion

There are existing Best Practices that address the issues identified by the E-911 Outage Subteam's study. The NRSC believes that the review of and adherence to these Best Practices should continue to reduce the number of E-911 outages over time.



For more information:

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