



NRSC Special Study

Report on DS3 Simplex Events Issue 1

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Network Reliability Steering Committee



Team Members

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Study Objective

Address the FCC's concern over the number of DS3 Simplex Events that meet the FCC reporting threshold

Study Approach

- **NDA Signatures**
- **Data Collection**
- **Review DS3 Event Incident Response and Escalation Process**
- **Recommendations**

Data Collection

- **Number of DS3 Simplex Events that meet the FCC reporting threshold**
 - **Threshold = 7200 minutes**
 - **customers not affected**
- **Number of DS3 Simplex Events escalating to Duplex Outages**
- **Data from Jan-Sept 2005 DS3 Simplex Events only**
- **6 Participating Service Providers**

DS3 Simplex Event Details

- **DS3 Simplex Events (Jan-Sept 2005)**
 - 824 DS3 Simplex Events
 - 91.6 DS3 Simplex Events/month

- **DS3 Simplex Events escalating to Duplex Outages**
 - 26 DS3 Simplex Events
 - 18 Events were non-hurricane related
 - 8 Events were hurricane related
 - 2 Simplex Events/month become Duplex Failures
 - 2.2% of DS3 Simplex Events become Customer Impacting
 - 3.2% with Hurricane Katrina related events

Incident Response and Escalation Process

- **Participating Service Providers have Incident Response Processes that include DS3 Simplex events**
- **Participating Service Providers have Escalation Processes that include DS3 Simplex events**
 - Includes field, management & technical support
- **Used the processes of the participating Service Providers to make study recommendations**

Recommendations

- **Service Providers should review their current practices against highlighted Best Practices**

- **New Best Practice Recommendation**

Highlight Best Practices

- **Track & Report Outages**
 - BPs: 0548 & 0583
- **Human Procedures/Training/MOPs**
 - BPs: 0588 & 0589
- **Cable Damage/Cuts**
 - BPs: 0710, 0719 & 0741
- **Equipment Spares**
 - BPs: 5080, 5083
- **Maintaining Redundancy**
 - BPs: 0731, 5079 & New BP
- **Disaster Recovery**
 - BPs: 5237, 5249, 5252

New BP Proposal

Network Operators and Service Providers should detect DS3 simplex events and restore the duplex protective path in a timely manner by executing appropriate incident response and escalation processes. Restoration of simplex events should be coordinated with the restoration of customer affecting outages. Incident response and escalation processes should prioritize and assign higher priority to those events with the greatest risk of customer impact.

Reference/Comments: DS3 Simplex events should be resolved within 7200 minutes (i.e. 5 days). DS3 Simplex events exceeding this time limit become FCC's reportable events.



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DS3 Simplex Events

Supporting Material

Track & Report Outages Best Practices

7-7-0548 Post Mortem Review: Network Operators and Service Providers should have an internal post mortem process to complete root cause analysis of major network events with follow-up implementation of corrective and preventive actions to minimize the probability of recurrence. Network Operators and Service Providers should engage Equipment Suppliers and other involved parties, as appropriate, to assist in the analysis and implementation of corrective measures.

7-7-0583 Network Operators, Service Providers and Equipment Suppliers should adopt an industry uniform method of reporting and tracking significant service outages (e.g., TL-9000 standard outage template).

Human Procedures/Training/MOPs BPs

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.

7-7-0589 Network Operators, Service Providers, and Equipment Suppliers should establish a minimum set of work experience and training courses which must be completed before personnel may be assigned to perform maintenance activities on production network elements, especially when new technology is introduced in the network.

Cable Damage/Cuts Best Practices

7-7-0710 Network Operators should use 'dig carefully' concepts and utilize guidance from industry sources for the protection of underground facilities when excavation is to take place within the specified tolerance zone.

7-7-0719 Network Operators should use 'dig carefully' concepts and utilize guidance from industry sources when installing underground facilities.

7-7-0741 Network Operators and Service Providers should review, and adopt as appropriate, best practices aimed at reducing damage to underground facilities that are maintained by the Common Ground Alliance (www.commongroundalliance.com).

Equipment Spares Best Practices

7-7-5080 Network Operators should identify and track critical network equipment, location of spares, and sources of spares to ensure the long term continuity and availability of communication service.

7-7-5083 Network Operators, Service Providers and Equipment Suppliers should maintain the availability of spares for critical network systems.

Maintaining Redundancy Best Practices

7-7-0731 Network Operators should provide physical diversity on critical inter-office routes when justified by a risk or value analysis.

7-7-5079 Network Operators and Service Providers should, where feasible, provide both physical and logical diversity of critical facilities links (e.g., nodal, network element). Particular attention should be paid to telecom hotels and other concentration points.

New BP - Network Operators and Service Providers should detect DS3 simplex events and restore the duplex protective path in a timely manner by executing appropriate incident response and escalation processes. Restoration of simplex events should be coordinated with the restoration of customer affecting outages. Incident response and escalation processes should prioritize and assign higher priority to those events with the greatest risk of customer impact.

Disaster Recovery Best Practices

7-7-5237 Network Operators, Service Providers and Equipment Suppliers should verify the integrity of system spares and replenish utilized spares, as appropriate, as part of a disaster response at a facility.

7-6-5249 Network Operators should consider geographic separation of network redundancy during restoration, and address losses of redundancy and geographic separation following restoration.

7-7-5252 Network Operators should evaluate the priority on re-establishing diversity of facility entry points (e.g., copper or fiber conduit, network interfaces for entrance facilities) during the restoration process.