Quality Excellence for Suppliers of Telecommunications Forum (QuEST Forum)

TL 9000 Quality Management System

Measurements Handbook

SONE Examples

Version 1.2

6.2 SONE Examples

6.2.1 – Host End-Office System-Outage Reporting

As of June, 2006, Consider a population of four host end-office systems, product category 1.1h, consisting of 4 systems (**N**).

For this example the following outages occurred in June, 2006:

1) Site A experienced a 10-minute, Product Attributable, affecting all terminations
2) Site D experienced a 30-minute, Product Attributable, affecting all terminations
3) Site A experienced a 5-minute, Product Attributable, CCS outage (default weight 50%)
4) Site C experienced a 15-minute, Product Attributable, CCS outage (default weight 50%)
5) Site B experiences a 20-minute, Product Attributable, outages affecting 500 terminations out of 2000 terminations

(Based on these outages measurement variables **T** = 2 and **P** = 3)

Table 6.2.1-1 summarizes the outage data for the current reporting month.

Table 6.2.1-1 Total Outage Measurement Summary for Host End-Office Systems

Outage Number	Fraction of NE Affected (f)	Outage Duration in minutes (td)	Weighted Time (f * td)
1	1	10	10.00
2	1	30	30.00
Totals			40.00

Table 6.2.1-2 Partial Outage Measurement Summary for Host End-Office Systems

Outage Number	Fraction of NE Affected (f)	Outage Duration in minutes (pd)	Weighted Time (f * pd)
3	0.50	5	2.50
4	0.50	15	7.50
5	0.25	20	5.00
Totals			15.00

Network Element Impact Calculations

The “Product Attributable” downtime calculation for the host systems is

$$\mathbf{TD} = \sum_{\mathbf{i=1}}^{\mathbf{T_m}} \mathbf{td_{m,i}}$$

$$\mathbf{TD} = 4\mathbf{0}$$

$$\mathbf{PD} = \sum_{\mathbf{i=1}}^{\mathbf{P_m}} \mathbf{pd_{m,i}} \mathbf{f_{m,i}}$$

$$\mathbf{PD} = 1\mathbf{5}$$

$$\mathbf{NEO4} = \mathbf{12\ x}\ \frac{\mathbf{TD_m} + \mathbf{PD_m}}{\mathbf{N}_m}$$

$$\mathbf{NEO4} = \mathbf{12\ x}\ \frac{\mathbf{55.00}}{\mathbf{4}}$$

$$\mathbf{NE04} = \mathbf{165.00\ minutes/NE/year}$$

The “Product Attributable” outage frequency calculation for the host systems is

$$\mathbf{NEO3} = \mathbf{12\ x}\ \frac{\mathbf{T_m} + \mathbf{P_m}}{\mathbf{N}_m}$$

$$\mathbf{NEO3} = \mathbf{12\ x}\ \frac{\mathbf{2} + \mathbf{3}}{\mathbf{4}}$$

$$\mathbf{NE03} = \mathbf{15\ events/NE/\ year}$$

These measurements translate to the performance of the network element in the system population. A network element will experience 15.00 outages totaling 165.00 minutes in a year based on performance in the current month.

The host system population consists of four systems, which is reported as NEOs in the SONE measurement. Since all the outages were product attributable, the customer attributable measurements (NEOec and NEOdc) are zero. The organization reports NEOdp as 55.00 and NEOep as 5 in the measurement submission.

Table 6.2.1-3 Example SONE Data Table Report for June, 2006

Identifier	Value
MeasurementID	SONE
NEOa	12
NEOs	4
NEOec	0
NEOdc	0
NEOep	5
NEOdp	55.00

6.2.2 – Normalization Unit of NE - Base Station Controller

Consider a population of Base Station Controllers, product category 3.3.1, consisting of 4 systems – sites A, B, C, and D. Table 6.2.2-1 summarizes the BSC distribution across the sites.

Table 6.2.2-1 Site Information Summary for BSC Systems

Site	Network Element Count (S)
A	1
B	1
C	1
D	1
Population (**NEOs**)	4

For this example the following outages occurred in the reporting month:

1) Site A experienced a 10-minute, Customer Attributable, affecting entire BSC
2) Site D experienced a 30-minute, Product Attributable, affecting entire BSC
3) Site A experienced a 5-minute, Product Attributable, (weight 50%)
4) Site C experienced a 15-minute, Product Attributable, (weight 50%)
5) Site B experiences a 20-minute, Product Attributable, (weight 25%)

For the SONE measurements, when the NU is a NE, duration is weighted by the percentage of the NE affected in the outage. However frequency is not weighted.

Table 6.2.2-2 summarizes the Customer Attributable outage data for the current reporting month.

Table 6.2.2-2 Customer Attributable Outage Measurement Summary for BSC Systems

Outage Number	Fraction of NE Affected	Event Count	Outage Duration in minutes	Weighted Time	Attributed To
1	100%	1	10	10	Customer
2	100%	0	30	0	Product
3	50%	0	5	0	Product
4	50%	0	15	0	Product
5	25%	0	20	0	Product
Total Outages (TD)		1		10	
Partial Outages (PD)		0		0	

Customer Attributable Outage Calculations (from Table 6.2.2-2)

The Customer Attributable outage downtime is:

$$TD = \sum_{i=1}^{T_m} td_{m,i}$$

$$TD = 10$$

$$PD = \sum_{i=1}^{P_m} pd_{m,i} f_{m,i}$$

$$PD = 0$$

$$NEO2 = 12 \text{ x } \frac{TD_m + PD_m}{N_m}$$

$$NEO2 = 12 \text{ x } \frac{10}{4}$$

$$NEO2 = 30.00 \text{ minutes/NE/year}$$

The Customer Attributable outage frequency calculation is:

$$NEO1 = 12 \text{ x } \frac{T_m + P_m}{N_m}$$

$$NEO1 = 12 \text{ x } \frac{1+0}{4}$$

$$NEO1 = 3 \text{ events/NE/year}$$

Table 6.2.3-2 summarizes the Product-Attributable outage data for the current reporting month.

Table 6.2.3-2 Product Attributable Outage Measurement Summary for BSC

Outage Number	Fraction of NE Affected	Event Count	Outage Duration in minutes	Weighted Time	Attributed To
1	100%	0	10	0	Customer
2	100%	1	30	30	Product
3	50%	1	5	2.5	Product
4	50%	1	15	7.5	Product
5	25%	1	20	5	Product
Total Outages (TD)		1		30	
Partial Outages (PD)		3		15	

Product Attributable Outage Calculations (from Table 6.2.3-2)

The Product Attributable downtime is:

$$TD = \sum_{i=1}^{T_m} td_{m,i}$$

$$TD = 30$$

$$PD = \sum_{i=1}^{P_m} pd_{m,i} f_{m,i}$$

$$PD = 15$$

$$NEO4 = 12 \times \frac{TD_m + PD_m}{N_m}$$

$$NEO4 = 12 \times \frac{45}{4}$$

$$NEO4 = 135.00 \text{ minutes/NE/year}$$

The Product Attributable outage frequency calculation is:

$$NEO3 = 12 \times \frac{T_m + P_m}{N_m}$$

$$NEO3 = 12 \times \frac{1+3}{4}$$

$$NEO3 = 12 \text{ events/NE/year}$$

Table 6.2.2-4 shows the data that would be reported for SONE for the corresponding reporting month.

Table 6.2.2-4 Example SONE Data Table Report for the Reporting Month

Identifier	Value
MeasurementID	SONE
NEOa	12

NEOs	4
NEOec	1
NEOdc	10
NEOep	4
NEOdp	45.00