Weighted Frequency for Critical Service Points in Service Level Agreements

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Abstract

This paper describes a two-dimensional weighting of frequencies for critical service points [CSP] in service level agreements [SLA].   The dimensions are rank order of CSP by the customer coupled with rank order of groups of CSP by the contractor. The results are scaled to 1000.

Introduction

In the literature, service level agreements [SLA] and critical service points [CSP] are of interest to document, respectively, quality assurance and quality control. Metrics derived from SLA and CSP are valuable to monitor performance so as to earn service credits and to predict performance so as to avoid invocation of service debits. The most basic input to the SLA model on which everything turns is the frequency or baseline score assigned to each CSP.

Method of Weighting

For the frequency of CSP, the customer supplied the rank order [RO] by CSP in Table 1. (CSP 10 and 12 were combined, and then later deleted by the customer.)

CSP	1	2	3	4	5	6	7	8	9	[*10&12*]	11	13	14	15	16	17	18	19	20	21	22	23
RO	8	9	21	10	11	12	13	15	16	[*14*]	20	5	3	7	1	4	17	19	18	2	22	6

Table 1: RO by CSP

However, that RO alone is not sufficient to assign meaningful probability.

Required also is another dimension or RO. That dimension was derived by the contractor and based on view of the RO by CSP in Table 1 as the CSP by RO in Table 2.

RO	1	2	3	4	5	6	7	8	9	10	11	12	13	[*14*]	15	16	17	18	19	20	21	22
CSP	16	21	14	17	13	23	15	1	2	4	5	6	7	[*10&12*]	8	9	18	20	19	11	3	22

Table 2: CSP by RO

The next step was to abstract the CSP by RO of Table 2 into types of CSP. The experts determined four types of CSP and assigned RO to each. When applied to the CSP in Table 2, the pattern of types became apparent in Table 3 as billing [BI], file delivery [FD], process [PR], and report [RE].

RO	1	2	3	4	5	6	7	8	9	10	11	12	13	[14]	15	16	17	18	19	20	21	22
CSP	16	21	14	17	13	23	15	1	2	4	5	6	7	[10&12]	8	9	18	20	19	11	3	22
Type	BI	BI	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	[FD]	PR	PR	RE	RE	RE	RE	RE	RE

Table 3: RO of CSP type

Based on Table 3, the RO of the type of CSP became sequential. Further summary statistics were derived in Table 4 to include number of CSP per RO, RO of CSP type, and RO of CSP type x number of CSP with totals.

RO of CSP	Type of CSP (RO)	CSP	Number of CSP	RO of CSP type x Num of CSP
1, 2	BI (**4**)	16, 21	2	8
3 – 9, 11, 13, 14	FD (**3**)	14, 17, 13, 23, 15, 1, 2, 4, 5 , 6, 7, [10/12]	11	33
15, 16	PR (**2**)	8, 9	2	4
17 – 22	RE (**1**)	18, 20, 19, 11, 3, 22	6	6
			Totals: 21	**51**

Table 4: RO summary statistics by CSP and type

Formula 1 became obvious to calculate frequency as rounded and scaled to a total of 1000 so as to avoid decimals.

Formula 1: (RO of CSP type x 1000) / (Total of all (RO of CSP type x Number of CSP))

Formula 1 produced the tabulated frequency in Table 5 where the frequency value is the numerator of a fraction with base-1000.

RO	1	2	3	4	5	6	7	8	9	10	11	12	13	[14]	15	16	17	18	19	20	21	22
CSP	16	21	14	17	13	23	15	1	2	4	5	6	7	[10&12]	8	9	18	20	19	11	3	22
Type	BI	BI	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	[FD]	PR	PR	RE	RE	RE	RE	RE	RE
Type freq =1003	78	78	59	59	59	59	59	59	59	59	59	59	59	[--]	39	39	20	20	20	20	20	20

Table 5: Frequency of CSP and type scaled to 1000

The experts also determined that a third dimension or rank ordering existed for *immediate* business impact [IBI] as a further abstraction of the types of CSP. The types of immediate business impact are cash flow [CF], external delivery [ED] for outside customer consumption, and internal delivery [ID] for inside corporate consumption, as listed in Table 6.

RO	1	2	3	4	5	6	7	8	9	10	11	12	13	[*14*]	15	16	17	18	19	20	21	22
CSP	16	21	14	17	13	23	15	1	2	4	5	6	7	[*10&12*]	8	9	18	20	19	11	3	22
Type	BI	BI	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	[*FD*]	PR	PR	RE	RE	RE	RE	RE	RE
Type freq =1003	78	78	59	59	59	59	59	59	59	59	59	59	59	[--]	39	39	20	20	20	20	20	20
IBI	CF	CF	ED	ED	ED	ED	ED	ED	ED	ED	ED	ED	ED	[*ED*]	ID	ID	ID	ID	ID	ID	ID	ID

Table 6: RO of business impact of CSP type

Based on Table 6, the RO of the type of business impact of CSP also became sequential. Further summary statistics were derived in Table 7 to include number of CSP per RO, RO of IBI type, and RO of IBI type x number of CSP with totals.

RO of CSP	Type of IBI (RO)	CSP	Number of CSP	RO of IBI type x Num of CSP
1, 2	CF (**3**)	16, 21	2	6
3 – 9, 11, 13, 14	ED (**2**)	14, 17, 13, 23, 15, 1, 2, 4, 5 , 6, 7, [*10/12*]	11	22
15 – 22	ID (**1**)	8, 9, 18, 20, 19, 11, 3, 22	8	8
			Totals: 21	**36**

Table 7: RO summary statistics by CSP, type, and IBI

Formula 2, as an instance of Formula 1, became obvious to calculate frequency as rounded and scaled to a total of 1000 so as to avoid decimals.

Formula 2:   (RO of IBI type x 1000) / (Total of all (RO of IBI type x Number of CSP))

Formula 2 produced the tabulated frequency in Table 8 where the frequency value is the numerator of a fraction with base-1000.

RO	1	2	3	4	5	6	7	8	9	10	11	12	13	[*14*]	15	16	17	18	19	20	21	22
CSP	16	21	14	17	13	23	15	1	2	4	5	6	7	[*10&12*]	8	9	18	20	19	11	3	22
Type	BI	BI	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	[*FD*]	PR	PR	RE	RE	RE	RE	RE	RE
Type freq =1003	78	78	59	59	59	59	59	59	59	59	59	59	59	[--]	39	39	20	20	20	20	20	20
IBI	CF	CF	ED	ED	ED	ED	ED	ED	ED	ED	ED	ED	ED	[*ED*]	ID	ID	ID	ID	ID	ID	ID	ID
IBI freq =1006	83	83	56	56	56	56	56	56	56	56	56	56	56	[--]	28	28	28	28	28	28	28	28

Table 8: Frequency of CSP and respective type and IBI scaled to 1000

Combining the frequency of CSP, type, and IBI is equivalent to averaging the two frequencies in Table 9 or using Formula 3 to calculate frequency as rounded and scaled to a total of 1000 so as to avoid decimals.

Formula 3:   1000 x
          ((RO of CSP type / Total of all (RO of CSP type x Number of CSP))
          + (RO of IBI type / Total of all (RO of IBI type   x Number of CSP))) / 2

Formula 3 produced the tabulated frequency in Table 9 where the frequency value is the numerator of a fraction with base-1000.

RO	1	2	3	4	5	6	7	8	9	10	11	12	13	[14]	15	16	17	18	19	20	21	22
CSP	16	21	14	17	13	23	15	1	2	4	5	6	7	[10&12]	8	9	18	20	19	11	3	22
Type	BI	BI	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	FD	[FD]	PR	PR	RE	RE	RE	RE	RE	RE
Type freq =1003	78	78	59	59	59	59	59	59	59	59	59	59	59	[--]	39	39	20	20	20	20	20	20
IBI	CF	CF	ED	ED	ED	ED	ED	ED	ED	ED	ED	ED	ED	[ED]	ID	ID	ID	ID	ID	ID	ID	ID
IBI freq =1006	83	83	56	56	56	56	56	56	56	56	56	56	56	[--]	28	28	28	28	28	28	28	28
Type + IBI freq =999	81	81	57	57	57	57	57	57	57	57	57	57	57	[--]	33	33	24	24	24	24	24	24

Table 9: Frequency of CSP, type, and IBI scaled to 1000

Formula 3 may be generalized into Formula 4.

Formula 4:　(Scale factor / N) x
((RO of type 1 / Total of all (RO of type 1 x Number of CSP)
+(RO of type 2 / Total of all (RO of type 2 x Number of CSP)
…
+(RO of type N / Total of all (RO of type N x Number of CSP))

where: the scale factor avoids decimals with a base-10 value such as 10^3 or 1000; and
the average factor N is the number of dimensions or rank orderings

Conclusion

Frequency of CSP requires two dimensions of rank ordering. If the customer supplies one dimension, then the contractor may derive the second dimension by grouping the CSP into types and rank ordering those types. Extending the scope of dimensions to order N is generalized in formula.

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