## HP Service Quality Management Solution V3.2



### Service Management Foundation Business Rule Reference Guide

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for Windows 64bit & Linux 64bit Operating System

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## Preface

It is assumed that the reader is familiar with the functionality of HP BSM 9 product and has previous experience of the following:

- System administration and operations
- Service level management.

#### **Intended Audience**

This document is intended for the following users:

SQM Solution architect

SQM Solution administrators and integrators

#### **Abbreviations and Acronyms**

The following table describes the abbreviations and acronyms used in this document.

Abbreviation	Description
BSM	Business Service Management
CI	Configuration Item
CIT	Configuration Item Type
HI	Health Indicator
KPI	Key Performance Indicator
SMF	Service Management Foundation
SQM	Service Quality Management

#### **Associated documents**

The HP Business Service Management documents are available at: http://support.openview.hp.com/selfsolve/manuals Additional SQM Solution materials (like the SQM Solution product briefs) and information about SQM Solution updates are available at: http://www.hp.com/cms

#### **Typographic Conventions**

This document uses the following conventions to identify special information:

Convention	Information Type/Example
[] (square brackets)	Interface components requiring user actions e.g. Buttons. Ex: Click [Finish] to complete the Import wizard.

Convention	Information Type/Example	
() [round brackets]	Supplementary information Ex: Configuration Item (CI).	
Bold type	Fields names, menus, window pane names	
	Ex of menus: Admin $\rightarrow$ Service Level Management $\rightarrow$ Repository.	
<i>Italic</i> type	Important information and/or concepts.	
	Ex: The output is an . <i>XMI</i> file.	
Underline type	Rule Parameters or Tooltip Parameters	

#### Symbols Used in this Guide

Symbols	Information
	Note Draws your attention to additional information about a software function/feature.
	Important Draws your attention to important information regarding the proper usage of a software function/feature.
V	Caution Draws your attention to an important warning.

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## **Chapter 1**

### **SQM Business Rules definition**

The following provide the complete description of the SQM Business Rules used within SQM predefined value packs. They are sorted per simplicity, aggregation.

### 3.1. Simple assignment rules

These rules are simple assignment rules (no computation) from HI mainly.

Business Rule	Description	Additional comments
SQM Assign KPI value from HI value	Assign the value of corresponding HI into the KPI value. Rule Parameters— Category = category represents a metric category set on KPI (optional). <u>HI Name</u> = Id of the HI used to calculate the KPI value. <u>LinearityCoefficient</u> and <u>LinearityOffset</u> = indicate how upper level calculation will use them for normalization. <u>Reverse</u> = (false/true) Reverse is KPI indicator that represents positive or negative value. If true then upper level will use the KPI value reversely as follows 100- val. <u>Weight</u> = KPI weight used for upper level calculation. The range is between 0~1.	HI Name: Browse to Admin->Service Health->Repositories->Indicators page, Edit selected indicator, and copy the Id in the dialog. Refer figure "Id of Health Indicator". Normalization formula is: ([LinearityCoefficient*HI value] + LinearityOffset) = new value for this KPI used at upper level. This capacity is used to normalize a KPI for instance to transform a MOS (0~4) to a rate (0~100) or for the fault to transform alarm severity (0~5) to a rate (0~100). It is the coefficient to multiply your value to get

		range 0~100.
SQM Assign KPI value from HI Status	Assign the KPI value according to the status of the HI Rule Parameters— <u>HI Name</u> = Id of the HI used to calculate the KPI value. <u>Category</u> = category to set for this KPI used for upper level calculation. <u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level calculation. If true then upper level will use the KPI value reversely as follows 100-val. <u>Weight</u> = KPI weight used for upper level calculation. <u>LinearityOffset</u> and <u>LinearityCoefficient</u> =indicate how upper level calculation will use them for normalization	Normalization formula is: ([LinearityCoefficient*HI value] + LinearityOffset) = new value for this KPI used at upper level. This capacity is used to normalize a KPI for instance to transform a MOS ( $0$ ~4) to a rate ( $0$ ~100) or for the fault to transform alarm severity ( $0$ ~5) to a rate ( $0$ ~100). It is the coefficient to multiply your value to get range $0$ ~100.
SQM Assign KPI value from HI reverse value	Assign the KPI value as follows: Value = 100 – HI value <b>Rule Parameters</b> — <u>HI Name</u> = uuid of the HI <u>Category</u> = category to set for this KPI used for upper level calculation (possibly). <u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level calculation (possibly). If true then upper level will use the KPI value reversely as follows 100-val. <u>Weight</u> = KPI weight used for upper level calculation (possibly). <u>LinearityOffset</u> and <u>LinearityCoefficient</u> =indicate how upper level calculation will use them for normalization	Normalization formula is: ([LinearityCoefficient*HI value] + LinearityOffset) = new value for this KPI used at upper level. This capacity is used to normalize a KPI for instance to transform a MOS ( $0$ ~4) to a rate ( $0$ ~100) or for the fault to transform alarm severity ( $0$ ~5) to a rate ( $0$ ~100). It is the coefficient to multiply your value to get range $0$ ~100.
SQM Set KPI value from HI Value	Set the value of corresponding HI into the KPI value. Rule Parameters— <u>Category</u> = category represents a metric category set on KPI (possibly). <u>HI Name</u> = the HI name used to calculate the KPI value copy the name from BSM Admin->Service Health->Repositories->Indicators page; <u>LinearityCoefficient</u> and <u>LinearityOffset</u> = indicate how upper level calculation will use them for normalization; <u>Reverse</u> = (false/true) Reverse is KPI indicator that represents positive or negative value. If true then upper level will use the KPI value reversely as follows 100-val. <u>Weight</u> = KPI weight used for upper level calculation between 0~1.	Normalization formula is: ([LinearityCoefficient*HI value] + LinearityOffset) = new value for this KPI used at upper level. This capacity is used to normalize a KPI for instance to transform a MOS (0~4) to a rate (0~100) or for the fault to transform alarm severity (0~5) to a rate (0~100). It is the coefficient to multiply your value to get range 0~100.
SQM Set KPI from One	Set KPI based on selected Child KPI and minimum degradation. -Rule Parameters-	

Child KPI       = The display ID of chosen Child KPI on BSM uuid (by default the ID column is hidden)         Minimum Degradation       = Minimum Degradation to calcu degraded child	GUI, not KPI late % of
cator - Environmental Status	
ne: Environmental Status Environmental_Status Health Indicator with associated Event Type Based on Environmental Alarm severity	
Save Cancel Help	
	Child KPI = The display ID of chosen Child KPI on BSM uuid (by default the ID column is hidden)         Minimum Degradation = Minimum Degradation to calcudegraded child         icator - Environmental Status         Iecf2e15-2dee-441e-956d-fd1a4789eb93         me:       Environmental Status         Environmental Status         Health Indicator with associated Event Type         N:       Based on Environmental Alarm severity

Figure 1: Id of Health Indicator

### 3.2. Simple 'computation' rules

These rules are simple computation rules such as compute the average value or find the max, the min among a list of KPI associated to children CIs:

Business Rule	Description	Additional comments
SQM % of Degraded Subordinates	Assign the KPI value as the percentage of all degraded (with status CRITICAL, MAJOR, MINOR or WARNING) subordinate HIs and/or children KPIs	For instance, this rule can be used to calculate Failure Ratio: how many children KPIs

Business Rule	Description	Additional comments
	Rule Parameters—	
	<u>calc_method</u> =the method used to calculate the KPI, includes 3 options:	
	"HIs and child KPIs", "HIs" and "HIs; if none, use child KPIs";	
	<u>hi list</u> = the HIs used to calculate the KPI.	
	Assign the KPI value as the percentage of all degraded (with status	
	INFORMATIONAL) subordinate HIs and/or children KPIs	
SQM % of Normal	Rule Parameters—	
Subordinates	<u>calc method</u> =the method used to calculate the KPI, includes 3 options:	
	"HIs and child KPIs", "HIs" and "HIs; if none, use child KPIs";	
	<u>h1 list</u> = the HIs used to calculate the KPI.	
	Assign the KPI value as the percentage of all violated (with status	
	CRITICAL) subordinate HIs and/or children KPIs	
SQM % of Violated	Kule Parameters—	
Subordinates	<u>calc method</u> =the method used to calculate the KPI, includes 3 options:	
	"His and child KPIs", "His" and "His; if none, use child KPIs";	
	<u>ni list</u> = the HIs used to calculate the KPI.	
	Calculate status based a configured field's value of the event type sample	
	and set custom tooltip	
	Information from the event.	
	Kule Parameters— Field Name – The name of the comple field with a numeric value which is	
SOM Conoria Event	<u>Field Name</u> – The name of the sample field with a numeric value which is $\frac{1}{100}$	
Somple Pule	No data timoout - indicata the interval this KDI status will be set as No	
Sample Rule	$\frac{100 \text{ uata timeout}}{100 \text{ uata timeout}}$ – indicate the interval time Ki i status will be set as No	
	unit is second	
	RCA Field Name = the name of field which contains the RCA value	
	Time Stamp Field = The name of the time stamp field in the external	
	source sample, if its name is not time stamp.	
	Calculate HIs from samples, using a set of calculation methods	For example, if a CI has duration
	(sum. count. average. and so on)	as 5 minutes, the HI status is
	Rule Parameters—	calculated based on the samples
SQM Generic Formula	duration = Service Health calculates CI status based on the samples	received during the past 5 minutes.
Rule	received during the duration period (defined in seconds).	
	Default: 900 (15 minutes)	
	<u>Formula</u> = The formula to be used to calculate the value or the status of	

Business Rule	Description	Additional comments
	the KPI to which the Generic Formula rule is attached, for the time period	
	specified in the duration parameter.	
	<u>No data timeout</u> = indicate the interval this KPI status will be set as No	
	Data if no new calculation happened. The default value is 900, and the	
	unit is second.	
	<u>Time Stamp Field</u> = The name of the time stamp field in the external	
	source sample, if its name is not time_stamp.	
	Calculate HI values, using the value of a selected field from a sample	
	Rule Parameters—	
	<u>Field Name</u> = The name of the sample field with a numeric value which is	
SOM Conorio Somulo	used to calculate the rule result.	
Bulo	<u>No data timeout</u> = indicate the interval this KPI status will be set as No	
Kule	Data if no new calculation happened.	
	The default value is 900, and the unit is second.	
	<u>Time Stamp Field</u> = The name of the time stamp field in the external	
	source sample, if its name is not time_stamp.	
	Assign the value of corresponding sample onto the HI value	
	Rule Parameters—	
	<u>Field Name</u> = The name of the sample field with a numeric value which is	
SOM Aggion III value	used to calculate the rule result.	
from Somple value	<u>No data timeout</u> = indicate the interval this KPI status will be set as No	
from Sample value	Data if no new calculation happened.	
	The default value is 900, and the unit is second.	
	<u>Time Stamp Field</u> = The name of the time stamp field in the external	
	source sample, if its name is not time_stamp.	
	Calculates the average values of the HIs and KPIs which are used to	
	calculate the KPI.	
SQM Average of	Rule Parameters—	
Values	<u>calc</u> method=the method used to calculate the KPI, includes 3 options:	
	"HIs and child KPIs", "HIs" and "HIs; if none, use child KPIs";	
	<u>hi list</u> = the HIs used to calculate the KPI.	
	Calculates the average of the values of the HIs and KPIs which	
SQM Average of	are used to calculate the KPI, the unit is %.	
Efficiency %	-Rule Parameters-	
	<u>calc</u> method=the method used to calculate the KPI, includes 3 options:	

Business Rule	Description	Additional comments
	"HIs and child KPIs", "HIs" and "HIs; if none, use child KPIs";	
	<u>hi list</u> = the HIs used to calculate the KPI.	
	Calculates the SQM Worst of siblings	
	-Rule Parameters-	
SQM Worst of Siblings	<u>calc_method</u> =the method used to calculate the KPI, includes 3 options:	
	"HIs and child KPIs", "HIs" and "HIs; if none, use child KPIs";	
	<u>hi list</u> = the HIs used to calculate the KPI.	
	Calculates the Number of degraded (not normal status) subordinate CIs.	For instance, if <u>Minimum</u>
	-Rule Parameters-	<u>Degradation</u> ="minor", then all
SQM Number of	<u>calc</u> method=the method used to calculate the KPI, includes 3 options:	subordinated ones with status
Degraded	"HIs and child KPIs", "HIs" and "HIs; if none, use child KPIs";	"Major" or "Minor" are Degraded
Subordinates	<u>hi list</u> = the HIs used to calculate the KPI.	ones.
	<u>Minimum Degradation</u> = Minimum Degradation to calculate % of	
	degraded child, this field is case insensitive	
	Assign the KPI value with the maximum value of 2 specific HIs.	
	-Rule Parameters-	
	$\frac{\text{HI1}}{\text{HI1}}$ = uuid of HI1;	
SQM Compute	$\underline{H12}$ = uuid of H12, copy the ids from BSM Admin->Service Health-	
MAX( H1, H12)	>Repositories->Indicators page;	
	<u>No data timeout</u> =indicate the interval this KPI status will be set as No	
	Data if no new calculation happened. The default value is 900, and the	
	unit is second.	
	Assign the KPI value with the minimum value of 2 specific HIs.	
	-Kule Parameters-	
SOM Commute	$\frac{\Pi \Pi}{\Pi \Omega} = \text{uuld of } \Pi \Pi;$	
MIN(HI HI9)	<u>Sensitarias</u> Sudicators page:	
	No data timoout -indicate the interval this KPI status will be set as No.	
	Data if no new calculation hannened. The default value is 900, and the	
	unit is second	
	Assign the KPI value with the calculation result of formula: (HI1 / HI2) *	BATE function (A/B)*100
SQM Compute	-Rule Parameters-	For instance, used to compute a
RATE( HI, HI2)	HI1 = uuid of HI1:	success rate when you have the
	$\frac{1}{\text{HI2}}$ = uuid of HI2, copy the ids from BSM Admin->Service Health-	success and the all:

Business Rule	Description	Additional comments
	>Repositories->Indicators page;	Success rate = (success / all)*100
	<u>No data timeout</u> =indicate the interval this KPI status will be set as No	
	Data if no new calculation happened. The default value is 900, and the	
	unit is second.	
	<b>Note</b> : if value of HI1 is larger than value of HI2, the result is 100.	
	Assign the KPI value with the sum of the 2 specific HI's value.	Sum function for 2 configurable
	-Rule Parameters-	HIs.
	HI1 = uuid of HI1;	
SQM Compute	<u>HI2</u> = uuid of HI2, copy the ids from BSM <b>Admin-&gt;Service Health</b> -	For instance, used to compute
SUM( HI, HI2)	>Repositories->Indicators page;	frame numbers when you have
	<u>No data timeout</u> =indicate the interval this KPI status will be set as No	BframeCnt and IframeCnt:
	Data if no new calculation happened. The default value is 900, and the	FrameCnt = BframeCnt +
	unit is second.	IframeCnt.
	From a list of KPIs associated to a list of children CIs, the max value is	
	retrieved and set to the KPI value.	
	Rule Parameters—	
	<u>ChildCITId</u> = it's the name of the CIT like defined in the CIT manager	
COM Mar Xalaa	(sqm_sgsn for instance for SGSN CIT). Use "all" to specify all CI Type.	
SQM Max value	<u>ChildKPIId</u> = The KPI display id retrieved from the KPI repository	
	(remember tip to visualize it (by default ID attribute is hidden).	
	No data timeout=indicate the interval this KPI status will be set as No	
	Data if no new calculation happened. The default value is 900, and the	
	unit is second.	
	From a list of KPIs associated to a list of children CIs, the min value is	
	retrieved and set to the KPI value.	
	Rule Parameters—	
	<u>ChildCITId</u> = it's the name of the CIT like defined in the CIT manager	
SOM Min Value	(sqm_sgsn for instance for SGSN CIT). Use "all" to specify all CI Type.	
Sem min value	<u>ChildKPIId</u> = The KPI display id retrieved from the KPI repository	
	(remember tip to visualize it (by default ID attribute is hidden).	
	<u>No data timeout</u> =indicate the interval this KPI status will be set as No	
	Data if no new calculation happened. The default value is 900, and the	
	unit is second.	
SQM Ratio Above	SQM API customized rule to iterate on child KPIs and estimate the % of	
Average	children with one KPI Above the average of values	

Business Rule	Description	Additional comments
	Rule Parameters—	
	<u>ChildCITId</u> = it's the name of the CIT like defined in the CIT manager	
	(sqm_sgsn for instance for SGSN CIT). Use "all" to specify all CI Type.	
	<u>ChildKPIId</u> = The KPI display id retrieved from the KPI repository	
	(remember tip to visualize it (by default ID attribute is hidden).	
	SQM API customized rule to iterate on child KPIs and estimate the % of	
	children with one KPI below the average of values	
SOM Dette Dele	Rule Parameters—	
SQM Ratio Below	<u>ChildCITId</u> = it is the name of the CIT like defined in the CIT manager	
Average	(sqm_sgsn for instance for SGSN CIT). Use "all" to specify all CI Type.	
	<u>ChildKPIId</u> = The KPI display id retrieved from the KPI repository	
	(remember tip to visualize it (by default ID attribute is hidden).	
	This rule is used to calculate HI's status based the	
	events collected from TeMIP. In the meanwhile,	
	it sets more tooltip information from event.	
	-Rule Parameters-	
TeMIP Event Sample	<u>No data timeout</u> = indicate the interval this KPI status will be set as No	
Rule	Data if no new calculation happened. The default value is 900, and the	
	unit is second.	
	<u>RCA Field Name</u> = the name of field, which contains the RCA value	
	<u>Time Stamp Field</u> = The name of the time stamp field in the external	
	source sample, if its name is not time_stamp.	
	Calculates the status based on the lowest status held by any of	
	the child CIs. And join and save the ROC string	
TeMIP Worst Child	-Rule Parameters-	
Rule	<u>calc</u> method=the method used to calculate the KPI, includes 3 options:	
	"HIs and child KPIs", "HIs" and "HIs; if none, use child KPIs";	
	<u>hi list</u> = the HIs used to calculate the KPI.	
	The TeMIP Self-Management rule assigns to a KPI the contents of the	A specified number of samples
	events sent by the TeMIP Fault Manager about the health of the TeMIP	(specified in the Total Number of
ToMID FMS Simple	to SQM communication channel.	Samples parameter) are
Pulo	-Rule Parameters-	accumulated. The status of the rule
Kule	<u>No data timeout</u> =indicate the interval this KPI status will be set as No	changes to a new status only when,
	Data if no new calculation happened.	among the accumulated samples,
	The default value is 900, and the unit is second.	the specified number of samples

Business Rule	Description	Additional comments
	<u>Number of problematic samples</u> = The number of samples that have the	(specified in the Number of
	required status.	Problematic Samples parameter)
	<u>Save Last Sample</u> = (true/false) if true save last Sample values, if false do	has the new status. For example,
	not save.	Total Number of Samples=5,
	<u>Total number of samples</u> = The total number of samples. See Number of	Number of Problematic Samples=3;
	Problematic Samples parameter for more details.	if three samples in the
		accumulated samples have a red
		status, the rule status changes to
		red.
	Calculate the outage duration, the outage duration is the sum duration of	
(SLM)TeMIP	the alarm whose severity is worse than the specified severity outage	
cumulated outage	parameter, the unit is second.	
duration	-Rule Parameters-	
uurution	<u>Severity outage value</u> = the value scope for the parameter: UNKNOWN,	
	INFORMATIONAL, WARNING, MINOR, MAJOR, CRITICAL	
	This rule is a HI rule to calculate the HI's availability based on the	
	availability duration / calculation cycle. The availability duration	
	is the sum of sample duration whose severity is better than the	
(SI M)TOMIP HI	parameter outage severity value. It is a percent value.	
availability	-Rule Parameters-	
	<u>Severity outage value</u> = the value scope for the parameter: NO_TRIM,	
	UNKNOWN, INFORMATIONAL, WARNING, MINOR, MAJOR,	
	CRITICAL	
	<u>Severity trim</u> = Severity value that is considered failure	
	The Number of the alarm whose severity value is worse that the	
	specified severity threshold parameter.	
(SI M)ToMID number	-Rule Parameters-	
	<u>Severity threshold</u> = the value scope for the parameter: NO_TRIM,	
of alarms	UNKNOWN, INFORMATIONAL, WARNING, MINOR, MAJOR,	
	CRITICAL	
	<u>calc method</u> = the method used to calculate the KPI, includes 3 options:	
	"HIs and child KPIs", "HIs" and "HIs; if none, use child KPIs";	
	<u>hi list</u> = the HIs used to calculate the KPI.	

### 3.3. Matching category rules

These rules are based on the research of a common tag set on the KPI called 'category'. All KPIs of children CIs that have this 'category' are used in the computation of the value that can be the average, find the max/min, etc.

Business Rule	Description	Additional comments
	From the children CIs (within the model), research all KPIs tagged with	AVERAGE function for one
	a certain category and computed the average value to set to the KPI.	specified category.
	Rule Parameters—	Normalization formula is:
	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	([LinearityCoefficient*HI value]
	calculation	+ LinearityOffset) = new value
	<u>ChildKPICategory</u> = category to research, you can use a set of strings	for this KPI used at upper level.
SQM Matching Category	separated by comma ',' (ex: "Core Access Accuracy, RAN Access	This capacity is used to
Average Value	Accuracy").	normalize a KPI for instance to
	<u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level	transform a MOS (0~4) to a rate
	calculation (possibly). If true then upper level will use the KPI value	$(0\sim100)$ or for the fault to
	reversely as follows 100-val.	transform alarm severity $(0\sim5)$ to
	<u>Weight</u> = KPI weight used for upper level calculation (possibly).	a rate (0~100). It is the
	<u>LinearityOffset</u> and <u>LinearityCoefficient</u> =indicate how upper level	coefficient to multiply your value
	calculation will use them for normalization	to get range 0~100.
	From the children CIs (within the model), research all KPIs tagged with	
	a certain category and computed the best status to set to the KPI.	
	Rule Parameters—	
SOM Matching Catagory	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	
Bost Status	calculation	
Dest Status	<u>ChildKPICategory</u> = category to research, you can use a set of strings	
	separated by comma ',' (ex: "Core Access Accuracy, RAN Access	
	Accuracy").	
	From the children CIs (within the model), research all KPIs tagged with	
SQM Matching Category	a certain category and computed the worst status to set to the KPI.	
Worst Status	Rule Parameters—	
	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	

Business Rule	Description	Additional comments
	calculation ChildKPICategory= category to research, you can use a set of strings	
	separated by comma '.' (ex: "Core Access Accuracy, RAN Access	
	Accuracy").	
	From the children CIs (within the model), research all KPIs tagged with	DIFF function for 2 categories
	2 certain categories and computed the difference KPICategoryA -	For instance, used to compute a
	KPICategoryB	fail when you have the attempt
	Rule Parameters—	and the success:
	<u>KPICategoryA</u> = base category	Fail = attempt - success
	<u>KPICategoryB</u> = category to subtract	
SQM Matching Category	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	
Difference A-B	calculation	
	<u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level	Refer the Normalization formula
	calculation (possibly). If true then upper level will use the KPI value	described in BR "SQM Matching
	reversely as follows 100-val.	Category Average Value".
	<u>Weight</u> = KPI weight used for upper level calculation (possibly).	
	<u>LinearityOffset</u> and <u>LinearityCoefficient</u> =indicate how upper level	
	calculation will use them for normalization	
	From the children CIs (within the model), research all KPIs tagged with	MAX function for one specified
	a certain category and get the max value to set to the KPI.	category.
	Rule Parameters—	
	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	
	Calculation	
SOM Mataking Category	<u>ChildKPICategory</u> = category to research, you can use a set of strings	
New Volue	Accuracy, rAN Access	Pofer the Normalization formula
Max value	Reverse= (false/true) indicate how this KPI value is used for upper level	described in BR "SOM Matching
	<u>neverse</u> (laise/fide) indicate now this Ki i value is used for upper level	Category Average Value"
	reversely as follows 100-val	Caregory Interage Variae .
	Weight= KPI weight used for upper level calculation (nossibly)	
	LinearityOffset and LinearityCoefficient = indicate how upper level	
	calculation will use them for normalization	
	From the children CIs (within the model), research all KPIs tagged with	MIN function for one specified
SQM Matching Categorv	a certain category and get the min value to set to the KPI.	category or one set of specified
Min Value	Rule Parameters—	categories.
	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	

Business Rule	Description	Additional comments
	calculation <u>ChildKPICategory</u> = category to research, you can use a set of strings separated by comma ',' (ex: "Core Access Accuracy, RAN Access Accuracy"). <u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level calculation (possibly). If true then upper level will use the KPI value reversely as follows 100-val. <u>Weight</u> = KPI weight used for upper level calculation (possibly). <u>LinearityOffset</u> and <u>LinearityCoefficient</u> = indicate how upper level calculation will use them for normalization	Refer the Normalization formula described in BR "SQM Matching Category Average Value".
SQM Matching Category Sum Value	From the children CIs (within the model), research all KPIs tagged with a certain category and computed the sum value to set to the KPI. Rule Parameters— <u>ParentKPICategory</u> = category to set for this KPI used for upper level calculation <u>ChildKPICategory</u> = category to research, you can use a set of strings separated by comma ',' (ex: "Core Access Accuracy, RAN Access Accuracy"). <u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level calculation (possibly). If true then upper level will use the KPI value reversely as follows 100-val. <u>Weight</u> = KPI weight used for upper level calculation (possibly). <u>LinearityOffset</u> and <u>LinearityCoefficient</u> =indicate how upper level calculation will use them for normalization	SUM function for one specified category or one set of specified categories. Refer the Normalization formula described in BR "SQM Matching Category Average Value".
SQM Sibling Matching Category Max Value	From the sibling CIs (within the model), research all KPIs tagged with a certain category and computed the max value to set to the KPI.        Rule Parameters—         ParentKPICategory= category to set for this KPI used for upper level calculation         SiblingKPICategory= category to research, you can use a set of strings separated by comma ',' (ex: "Core Access Accuracy, RAN Access Accuracy").         Reverse= (false/true) indicate how this KPI value is used for upper level calculation. If true then upper level will use the KPI value reversely as follows 100-val.         Weight= KPI weight used for upper level calculation.	Refer the Normalization formula described in BR "SQM Matching Category Average Value".

Business Rule	Description	Additional comments
	LinearityOffset and LinearityCoefficient=indicate how upper level	
	calculation will use them for normalization.	
	From the children CIs (within the model), research all KPIs tagged with	RATE function (A/B)*100
	2 certain categories and computed the rate as follows: [KPICategoryA /	For instance, used to compute a
	KPICategoryB]*100	rate when you have the success
	Rule Parameters—	and the attempt:
	<u>KPICategoryA</u> = category to rate	Success rate = [success
SQM Compute Rate	<u>KPICategoryB</u> = reference category	/attempt]*100
Category A vs Category B	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	
	calculation	In case of 0 success, rate is 100%
	<u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level	
	calculation. If true then upper level will use the KPI value reversely as	
	follows 100-val.	
	<u>Weight</u> = KPI weight used for upper level calculation	
	From the children CIs (within the model), research all KPIs tagged with	RATE function (A/A+B)*100
	2 certain categories and computed the rate as follows: [KPICategoryA /	For instance, used to compute a
	(KPICategoryA + KPICategoryB)]*100	rate when you have the success
	Rule Parameters—	and the fail:
SOM Commenter De ta	<u>KPICategoryA</u> = category to rate	Success rate = [success / (success
SQM Compute Rate	<u>KPICategoryB</u> = category to add	+ fail)]*100
Category A vs Category	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	
A+B	calculation.	In case of 0 success, rate is 100%
	<u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level	
	calculation. If true then upper level will use the KPI value reversely as	
	follows 100-val.	
	<u>Weight</u> = KPI weight used for upper level calculation (possibly).	
	From the children CIs (within the model), research all KPIs tagged with	RATE function (A/constant)*100
	a certain category and computed the rate as follows: [KPICategoryA /	For instance, used to compute a
	Constant]*100	rate when you have the
	Rule Parameters—	value/counter and the max
SQM Compute Rate	<u>KPICategoryA</u> = category to rate	authorized:
Category A vs Constant	<u>Constant</u> = constant reference	Disk full rate = [disk full
	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	/2G]*100
	calculation	
	<u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level	If Category=0 then rate is 0;
	calculation (possibly). If true then upper level will use the KPI value	For tuning aspect, the rate is not

Business Rule	Description	Additional comments
	reversely as follows 100-val.	'limited' to 100% but corresponds
	<u>Weight</u> = KPI weight used for upper level calculation (possibly).	to the computation with the
		constant value.
SQM Match Cat. Computed Rate From Threshold	From the children CIs (within the model), research all KPIs tagged with a certain category and computed the rate as follows: 0- Get the max value from children matching the ChildKPICategory 1- If the max retrieved value is lower than the specified threshold value, returned value is 100 (because we do consider that there is absolutely no impact) 2- If the max retrieved value is between the specified threshold value and 100, the below formula is applied: a. compute the forwarding interval: (100 - threshold) / nbLevel b. iterate from the threshold to figure out on which interval the max value belongs to (and therefore to figure out the weight to apply) c. compute the rate: 100 - (weight * (100 / nbLevel)) Rule Parameters— ParentKPICategory= category to set for this KPI used for upper level calculation ChildKPICategory= category to research, you can set of strings separated by comma ',' (ex: "Core Access Accuracy, RAN Access Accuracy"). threshold= threshold value from which computation starts level= number of 'levels' identified in term of impact between the 'threshold' and 100% <u>Reverse=</u> (false/true) indicate how this KPI value is used for upper level calculation. If true then upper level will use the KPI value reversely as follows 100-val.	RATE function from a threshold
	<u>Weight</u> = KPI weight used for upper level calculation.	
SQM Matching Category Rate With Utilization	<ul> <li>From the children CIs (within the model), research all KPIs tagged with a certain category and computed the rate as follows:</li> <li>0- Get the max value from children matching the ChildKPICategory Get the sum of Utilization value from children matching the UtilizationKPICategory</li> <li>1- If the sum of Utilization value is lower than the specified threshold value, returned value is the max retrieved value.</li> <li>2. If the sum of Utilization value is hotman the specified threshold</li> </ul>	

Business Rule	Description	Additional comments
	value and 100, the below formula is applied:	
	a. compute the forwarding interval: (100 - threshold) / nbLevel	
	b. iterate from the threshold to figure out on which interval the sum of	
	Utilization value belongs to (and therefore to figure out the weight to	
	apply)	
	c. compute the rate: max value - (weight * (100 / nbLevel))	
	Rule Parameters—	
	<u>ParentKPICategory</u> = category to set for this KPI used for upper level	
	calculation	
	<u>ChildKPICategory</u> = category to research, you can set of strings	
	separated by comma ',' (ex: "Core Access Accuracy, RAN Access	
	Accuracy").	
	<u>UtilizationKPICategory</u> = category to research	
	<u>threshold</u> = threshold value from which computation starts	
	<u>level</u> = number of 'levels' identified in term of impact between the	
	'threshold' and 100%	
	<u>Reverse</u> = (false/true) indicate how this KPI value is used for upper level	
	calculation. If true then upper level will use the KPI value reversely as	
	follows 100-val.	
	<u>Weight</u> = KPI weight used for upper level calculation.	

## Chapter2

## **SQM Business Rule Tooltip**

The attached table provide the complete definition of tooltip parameters defined in the SQM Business Rules.



HP\_SQM\_Solution\_S MF\_Business\_Rules

### **Chapter3**

### **SQM Business Rule Example**

# 3.1. Example of the SQM Assign KPI value from HI value Rule

This rule assigns the value of corresponding HI into the KPI value.

 Under Admin→Service Health→Repositories→KPI, we use KPI 'Communication Status' to use our Business Rules 'SQM Assign KPI value from HI value', we must make sure the rule is under the right list panel of 'Selected Rules', So when we create the KPI assignment, you can get the Business Rule 'SQM Assign KPI value from HI value' for the KPI 'Communication Status'.

* Name:	Communicatio	n Status			
Domain:					
Domain.	Selection:	Telecon	n		
	🔘 Other:				
Default group rule:	TeMIP Worst	Child Rule	;	<b>•</b>	
Applicable rules:					
Unselected Rules				Selected Rules	
Number of Tasks in Erro	r Rule	-		SQM Assign KPI value from HI Status	
Percentage Rule				SQM Assign KPI value from HI reverse value	
Real Time Impact				SQM Assign KPI value from HI value	
SQM % of Degraded Sul	oordinates			SQM Average of Efficiency %	
SQM % of Normal Subor	dinates		_	SQM Average of Values	
SQM % of Violated Subo	ordinates		\$	SQM Compute MAX( HI, HI2)	
Service Health PNR Rule				SQM Compute MIN( HI, HI2)	
Sum of Open Incidents				SQM Compute RATE( HI, HI2)	
Sum of Values Rule				SQM Compute Rate Category A vs Category /	
Sum of Volume		=		SQM Compute Rate Category A vs Category E	
Summary of values				SQM Compute Rate Category A vs Constant	
Transactions Grouped P	arent Rule		3	SQM Compute SUM( HI, HI2)	
Transactions Grouped R	ule	-	=	SQM Match Cat. Computed Rate From Thresh	
▲ III					
				·	
dvanced Settings					*
					×

2. Under Admin→Service Health→Assignments→KPI Assignments, we create a KPI Assignment for our CIT and define KPI 'Communication Status' and it's' Business Rule 'SQM Assign KPI value from HI value'. And input the Business Rule Parameters if needed, 'HI Name' is the id of the HI 'Communication Status'.

If you just want to test some Business Rules, You can simply use the Admin $\rightarrow$ Service Health $\rightarrow$ CI Indicators; choose the View which you create for your test, and select the CI, double click the KPI name and you can choose the Business rule which you want to use.

ne a KPI Configuration.			
9			CI Type Properties
			General Properties
KPI:	Communication Status	<b>T</b>	Binary
Business Rule:	SQM Assign KPI value from HI value	<b>~</b>	Calculated ID
Calculated Based Op:	His and child KPIs	<b>T</b>	Allow CLUpdate
Related Health Indicators:			Change Is New
Neiateu Health Indicators.	0		Enable Aging
	Communication Status		Is Candidate For Deletion
			Operation Is New
			Store KPI History For Ove
			Test Is New
	L		Pate
ning an Duda Daugunataua			Actual Delete Time
isiness Rule Parameters			Candidate For Deletion Ti
			Create Time
Category:	Telecom (St	tring)	Last Access Time
HI Name:	-e9d5-447a-adc7-0f1b63576560 (St	tring)	LastModifiedTime
1		ouble)	Integer
LinearityCoefficient:	1.0	ouble)	Actual Deletion Period
LinearityOffset:	0.0 (De	ouble)	List of Strings
Reverse:	False		Consumer Tenants
Weight:	10	ouble)	Context Menu
weight.	1.0		Monitored By
You can drag properties fr	om Cl Type Properties list or press Ctrl + i	while editing a field to set the value to the selected	Long
property.			Acknowledgement updat
			String
resholds			
reanolua			
[breehold Settings: 🔊 D. 4			Class Name
niniesholu Settiligs. 😈 Deta	auit O Custom		Container
♥ OK <=	10		Country or Province
🕼 Warning <=	20		Created By
Mi⊓or <=	30		Description
	10		Digest Display Lobal
וע Major <=	40		Documents
You can drag properties from the selected property.	om CLType Properties list or press Ctrl + i	while editing thresholds or the operator to set the value	Domain Name

CI Indicators				
View Builder Cl Indicators Cus	stom Image CI Status Alerts A	ssignments Repositories		
	5 🐻 🗠 🗠 🔤 Hide KPIs 🔗	G		
		V		
	CI Name		СІ Туре	
				<b>•</b>
무 🚇 demo_box1		TeMIP Managed Object		
emo_box1_card1		TeMIP Managed Object		
- 💷 demo_box1_card2				
- 💷 demo_box1_card3	Edit KPI for CI: demo_box1_0	card1		X
erro_box1_card4				A
📙 🛄 demo_box1_card5	KPI			<u> </u>
🕂 🖳 demo_box10				
emo_box10_card1	KPI:	Communication Status	-	
- 💷 demo_box10_card2	During a Dula	COM An aire KBLuchus Aren Ulluchus		
- 🖳 demo_box10_card3	Business Rule:	SQM Assign KPI value from HI value		
🗕 🗕 💷 demo_box10_card4	Calculated Based On:	HIs and child KPIs	<b>•</b>	
📙 🖳 demo_box10_card5	Related Health Indicators:	1		
다. 🖳 demo_box2				
- 🖾 demo_box2_card1		Communication Status		
- 🖾 demo_box2_card2				
CI Data: demo_box1_card1				
🔸 🤌 💓 i 🔁 🖓				
	KPI Properties			
KPI Name	Arriopenies			
Equipment Status	Business Rule Parameters			<u>*</u>
QualityOfService Status				
ProcessingError Status	Category:	Telecom (S	String)	
Environmental Status	HI Nama:		 Nuimat)	
Communication Status	HI Name:	-esa5-447a-adc7-ut1b6357656U (S	string)	
	LinearityCoefficient:	1.0 (0	)ouble)	
	LinearityOffset:	0.0	)ouble)	
11				

3.

We send HI 'Communication

Status' value '4' to the CI 'demo\_box1\_card1'. Under Applications $\rightarrow$ Service Health $\rightarrow$ 360° View; You can see the KPI 'Communication Status' and its status changed to green. Put your mouse on that KPI, you can see the detail Tooltip information and its value is also '4'.

360° View X Top View X Topology Map X Custom Inage X Geographic Map X Watch List X	Sel	Select Page		1 🕄 🕹 📀					
Hierarchy								D ≁ D ≈	
TeMIP Managed Objects 🔻 📴 🍸 Select a Filter] 💌 🐻 📳 📰									
Name	Status	Acknowledge	Last Status	Telecom					
			Change	Communication Status	Environmental Status	Equipment Status	ProcessingErro r Status	QualityOfService Status	
E TeMIP Managed Objects	-	-	-	-	-	-	-	-	
_ ⊖ 🗃 demo_box1	Ø	•	5/28/2014 12:12 PM	Ø	0	0	0	0	
demo_box1_card1	Ø	8	5/28/2014 12:12 PM	<b>⊘</b> ∘1↓	Details - Cor	nmunication Status	2 1	0 1	
		Business	s Impact   Indic	ators: 5 Accur Basel	acy: ine:	100 0.0-2.0-4.0-0.	ges: 0	Incidents: 0	
iee demo_box1_card2	0	8	5/27/2014 7:49 PM	🕜 Busin	ess Rule:	SOM Assign KPI value from HI value Telecom t t t 0 false OK 4 1		0	
🔐 demo_box1_card3	0	•	5/27/2014 7:49 PM	() Held S	status Since: rityCoefficient:			0	
🖳 demo_box1_card4	0	8	5/27/2014 7:49 PM	Linea     Rever     Statu	rityOffset: :se: 			0	
demo_box1_card5	0	•	5/27/2014 7:49 PM	Value Weigl	e. nt:			0	
🔤 demo_box10	0		5/27/2014 7:49 PM	0	0	0	0	0	
m mill demo hov?	0	-	507/0014 7-49 DM	0	0	0	0	0	

### 3.2. Example of the SQM Matching Category Max Value Rule

This Rule will get the max value from the children CIs, research all KPIs tagged with a certain child KPI category and set to the max value to the current KPI.

1.

2.

Under Admin→Service Health→Repositories→KPI, we use another KPI 'Equipment Status' to use our Business Rules 'SQM Matching Category Max Value'; we must make sure the rule is under the right list panel of 'Selected Rules'.

* Name:	* Name: Equipment Status				
Domain:	Selection:	Telec	om		
	O Other:			Imme	
	O Otner.				
Default group rule:	TeMIP Worst	Child Ru	ule	•	
Applicable rules:					
Linselected Rules			1	Selected Rules	
API Group And Sibling F	API Group And Sibling Rule			SQM Compute Rate Category A vs Constant	
Average Availability of	Vveighted Volume			SQM Match Cat. Computed Rate From Thresho	
Average Network of W	eighted Volume			SQM Matching Category Average Value	
Average Performance	of Weighted Volume	. E	->	SQM Matching Category Best Status	
Average Performance	or weighted volume	A	<	SQM Matching Category Difference A-B	
BDI Business Health St	atus Rule			SQM Matching Category Max Value	
BPI Operational Status	Rule			SQM Matching Category Min Value	
Best Status Rule	1.010			SQM Matching Category Rate With Utilization	
EUM Sum of Volumes				SQM Matching Category Sum Value	
Event KPI Group And S	ibling Rule (OMi)			SQM Matching Category Worst Status	
Impact Over Time Rule			1	SQM Max Value	
Locations Grouped Par	ent Rule	-	1	SQM Min Value 🔍	
A duran and Oatting					
Advanced Settings					×

Under Admin→Service Health→Assignments→KPI Assignments, we create a KPI Assignment for our CIT and define KPI 'Equipment Status' and its rule 'SQM Matching Category Max Value'. Input the rule parameter, here ChildKPICategory is 'Telecom'. Or your can simply use the Admin→Service Health→CI Indicators to test your rules.

PI				Cl Type Properties			
KDI-	Equipment Status		-	General Properties			
NPI.	Equipment Status		×	Calculated ID			
Business Rule:	SQM Matching Category Max Value	le	<b>•</b>	Boolean			
Calculated Based On:	HIs and child KPIs		T	Allow Cl Update			
Related Health Indicators:	11			Change Is New			
	<i>V</i>		-	Enable Aging			
	Equipment Status			Is Candidate For Deletion			
				Operation Is New			
				Store KPI History For Ove			
				Track Configuration Chan			
				Date			
unione - Dule Deventeur				Actual Delete Time			
usiness Rule Parameters				Candidate For Deletion Ti			
				Create Time			
ChildKPICategory:	Telecom	(String)		Last Access Time			
LinearityCoefficient:	1.0	(Double)		LastModifiedTime			
				Integer			
LinearityOffset:	0.0	(Double)		Actual Deletion Period			
ParentKPICategory:	Telecom	(String)		Deletion Candidate Period			
Reverse:	False			List of Strings			
		(D-141-)		Context Menu			
Weight:	1.0	(Double)		Monitored By			
• • • • • • • • • • • • • • • • • • • •	01 T			Long			
* You can drag properties fro	im CLType Properties list or press Cti	rl + i while edit	ing a field to set the value to the selected	Acknowledgement updat			
property.				String			
				Alias			
hresholds				💉 Сі Туре			
				City			
Threshold Settings: 💿 Defa	ult 🔘 Custom			Class Name			
🖉 ОК 🕞=	▼ 95			Container			
				Country or Province			
\land Warning >=	90			Created By			
🚵 Minor >=	85			Description			
W Major >-	80			Display Label			
* Vou oop drag proporties for	um Cl Tune Bronartica list or avecas Or	rl + i while off	ing threeholds or the operator to get the using	Documents			
to the selected properties fro	im of Type Properties list or press Cti	ri + i vvnile edit	ing unresholds or the operator to set the Value	Domain Name			
to the colocida property.				External ID			

3.

Add another 3 KPIs for test

here; use the same 'Telecom' category and 'SQM Assign KPI value from HI value' rule. So here HI value is our KPI value. And the max value is 5. Under our 'SQM Matching Category Max Value' rule, you can see that the value is also 5.

demo_box1_card1 (TeMIP Managed Object)          Health Indicators Contributing to KPIs         8=								
крі	Value	Last status change						
🧿 Equipment Status		Ø Equipment Sta	tus	2.0	5/28/2014 8:36 PM			
Health Indicators Not Contributing to KPIs								
Health Indicators 🔺		Value	Last status change					
🛕 Communication Status	•	2.0	5/28/2014 8:37 PM					
😻 Environmental Status	•	4.0	5/28/2014 8:37 PM					
ProcessingError Status	+	5.0	5/28/2014 8:45 PM					

Status	Acknowledge	Last Status Change	🖂 Telecom					
			Communication Status	Environmental Status	Equipment Status	ProcessingErro r Status	QualityOfService Status	
-	-	-	-	-	-	-	-	
8	8	5/28/2014 8:37 PM	CA	CA tatus	8	0	0	
0	8	5/2 Business Rule: Status:	SQM Matching	g Category Max Valu Critical	e 🕜 ۵ 🏨	<b>⊘</b> ∘1↓	<b>⊘</b> ∘1.	
		Busine: Accuracy:		5 100	s:0   Pla	anned Changes: 0	Incidents: 0	
0	•	5/2 Last value since Baseline:	e: 5/28/ : 5/28 m.2.0   a.3.8	2014 8:37 PM #14 8:45 PM M 5.0   d 41.7   s 91.1	, 📀	0	0	
0		5/2 Category:	m 5/28/14 8:34	PM   M 5/28/14 8:45   Telecom	PM 🕜	0	0	
0		5/2 Weight: LinearityCoeffici	ent:	Taise 1 1	0	0	0	
0		5/2 LinearityOffset: 5/2 Max Value:		0 5	0	0	0	
0		5/2 Count: Mean Value:		4 3.75	0	0	0	
0	•	5/2 Deviation: 5/2 Stability:		41.667 91.667	0	0	0	
-			_	-	-	-	-	