Performance Measurement
Business Message Standard (BMS)

Release 3.1

1-May-2013, Issue 1

Document Summary

Document Item	Current Value
Document Title	Performance Measurement - Business Message Standard (BMS)
BMS Release	3.1
Document Version	Issue 1, 1-May-2013
Work Group Name	eCom SMG
BMS Template Version	2.3

Change Request Reference

Date of CR Submission to GSMP:	CR Submitter(s):	Refer to Change Request (CR) Number(s):
13 - Jul – 2007	John Ryu, GS1	07-000283
	John Ryu, GS1	10-000201
	John Ryu, GS1	10-000258

Business Requirements Document (BRAD) Reference

BRAD Title:	BRAD Date:	BRAD Version
BRAD Trading Partner Performance Management	Nov 2008	Issue 1.0.0
eCom Domain Common Library	Mar 2011	BMS Release Version 3.0.0
Shared Common Library	Jan 2011	BMS Release Version 3.0.0
BRAD for Current Requirements Queue (Major Release 3)	Nov 2010	Issue 0.2.0

Document Change History

Date of Change	Version	Changed By	Reason for Change	Summary of Change
6 Jan 2012	BMS 3.0 issue 1.0.0	John Ryu	BMS release 3.0	Noted in summary of change section
1-May-2013	BMS 3.1 issue 1	Coen Janssen	Update to 3.1	Noted in Summary of Changes

Disclaimer

Table of Contents

1. Business Domain View

1.1. Problem Statement / Business Need

Buyers and sellers in long-term trading relationships often share business measures to evaluate their performance or identify business issues and opportunities. Trading partner performance measures may be shared as part of a larger structured business process framework such as Collaborative Planning Forecasting and Replenishment (CPFR[®]), or an industry initiative such as New Ways of Working Together (NWWT).

The Performance Measurement message allows trading partners to identify goals for the measures that that they wish to share, as well as exchange the values for those measures. The scope of the message includes key measures of Sales, Operations, Supply Chain, and Data Accuracy performance, including any of the following specific measures:

Sales

1. Sales Growth (%)
2. Share (%)
3. Retail Item Gross Margin (%)
4. Retail Gross Profit Margin (%)
5. Forecast Accuracy (%)
6. Markdown (%)

Supply Chain

7. Out of Stock (%)
8. Service Level / Fill Rate (%)
9. Order to Delivery Cycle Time (Hours)
10. On Time Delivery (%)
11. Finished Goods Inventory Cover (Days)

Operations

12. Order Item /Quantity Change (%)
13. Invoice Accuracy (%)
14. On Time Payment (%)
15. Unsaleables (%)

Data Accuracy

16. Item Master Data Accuracy (%)
17. Item Data Synchronisation (%)

[®] CPFR is a registered trademark of the Voluntary Interindustry Commerce Solutions (VICS) Association.

1.2.   Objective

This standard defines the transaction model and data model for the following business message:

■   Performance Measurement

1.3.   Audience

The audience for this document is anyone involved in measuring the effectiveness of trading partner relationships.

1.4.   References

Reference Name	Description
Trading Partner Performance Management – BRAD Issue 1.0.0	Provide the definitions, formulas, and examples for the 17 core measures.
New Ways of Working Together Initiative (NWWT)	*NWWT* is a joint project of Procter & Gamble, J.M. Smucker Co., Coca-Cola, Wegmans Food Markets, Safeway, Kroger, Oracle and a number of industry associations. One of the group's initiatives has been to use common goals and common measures to drive opportunities for growth and avoid issues that could lead to disruptions. Several of the TPPM core measures were based on the Common Goals and Common Measures identified in the NWWT initiative.
VICS Collaborative Planning Forecasting and Replenishment (CPFR®), Global Commerce Initiative Recommendation, June 30, 2001	A not-for-profit association with a mission to take a global leadership role in the development of business guidelines and specifications; facilitating implementation through education and measurement, resulting in the improvement of the retail supply chain efficiency and effectiveness, which meet or exceed customer and consumer expectations. GS1 US is the secretariat to the Voluntary Interindustry Commerce Solutions Association.
BMS eCom Common Library 3.1	The documented design of components that are used in multiple messages. In the eCom Domain.
BMS Shared Common Library 3.1	The documented design of components that are used in both the eCom Domain and GDSN

1.5.   Acknowledgements

1.5.1.   TPPM Work Group

Function	Name	Company / Organisation
Work Group Chair	Matt Johnson	Oracle
Work Group Process Manager	John Ryu	GS1 Global Office
Work Group Participant	Kraig Adams	The Coca-Cola Company
Work Group Participant	Joe Andraski	VICS
Work Group Participant	Michael Bammer	CVS
Work Group Participant	Mike Beer	General Mills
Work Group Participant	Mark Bieler	Daymon Worldwide
Work Group Participant	Lori Bigler	J M Smucker

Function	Name	Company / Organisation
Work Group Participant	Jeff Bornino	Kroger
Work Group Participant	Mauricio Brena	GS1 Mexico
Work Group Participant	Stacy Cashman	Johnson & Johnson
Work Group Participant	Brian Estabrook	Safeway
Work Group Participant	Pam Fisher	Wegmans Food Markets
Work Group Participant	Wayne Garzancich	Daymon Worldwide
Work Group Participant	Paula Giovannetti	Industrial Supply Association
Work Group Participant	Mike Gross	Wegmans Food Markets
Work Group Participant	Bruce Hawkins	Wal-Mart
Work Group Participant	Ivano Harris	Brown - Forman
Work Group Participant	Mike Kantor	Trade Promotion Management Association
Work Group Participant	Paul Koch	Wegmans Food Markets
Work Group Participant	Mary Lou McCleese	Johnson & Johnson
Work Group Participant	Don Mowery	Nestle Purina PetCare
Work Group Participant	Olivier Mouton	Carrefour
Work Group Participant	Wayne Munn	Axway
Work Group Participant	Marie Perry	Coca-Cola Enterprises
Work Group Participant	Jason Rexroat	Georgia Pacific
Work Group Participant	Giselle Rosario	GS1 Mexico
Work Group Participant	Beth Scheid	Procter & Gamble
Work Group Participant	Ayako Shimazaki	GS1 Japan
Work Group Participant	Olivier Siard	1SYNC
Work Group Participant	Kaori Watanabe	Ajinomoto
Work Group Participant	Richard Webb	Cadbury
Work Group Participant	Cate Zottola	General Mills

1.5.2.   Development Team Members

Function	Name	Organisation
GSMP Process Lead	Jean-Luc Champion	GS1 Global Office
Standards Content Lead	Coen Janssen	GS1 Global Office
Technical Development Lead	Ewa Iwicka	GS1 Global Office
Peer Review	Eric Kauz	GS1 Global Office

2. Business Context

Context Category	Value(s)
Industry	All
Geopolitical	All
Product	All
Process	eCom Plan
System Capabilities	GS1 Standard
Official Constraints	None

3. Business Transaction View

The Buyer and Seller utilize standardised calculation methods and nomenclature to describe the performance of their trading relationship, and explicitly identify the levels of detail, time period and other parameters used. Performance may be evaluated relative to goals that the Buyer and Seller have shared, utilizing the same level of detail, time period, and parameters as the results data. Further root cause analysis is done where needed.

Figure 3-1 TPPM Measures

Sales
- Sales Growth (%)
- Share (%)
- Sales Forecast Accuracy (%)
- Retail Item Gross Margin (%)
- Retail Gross Profit Margin (%)
- Markdown (%)

Supply Chain
- Out of Stock (%)
- Finished Goods Inventory Cover (Days)
- Service Level / Fill Rate (%)
- Order to Delivery Cycle Time (Hours)
- On-time Delivery (%)

TPPM Measures

Operations
- Order Item/ Quantity Change (%)
- Unsaleables (%)
- Invoice Accuracy (%)
- On Time Payment (%)

Data Accuracy
- Item Data Synchronisation (%)
- Item Master Data Accuracy (%)

3.1. Business Process - Processing Performance Measurement

Use Case Diagram

Use Case Definition

| Use Case ID	UC-1
Use Case Name	Processing Performance Measurement
Use Case Description	The objective is for a pair of trading partners to elaborate upon operational conditions and key metrics that would identify business issues or achievements.
Actors (Goal)	Performance Measurement is a two-actor system involving a collaborative effort between a buyer and a seller across one or more locations. The lead actor in the collaboration depends upon the scenario most appropriate to the trading partner's business situation.
Performance Goals	The ability to exchange performance goals and results.
Preconditions	A collaboration agreement and joint business plan must be in place. If goals are to be exchanged, they must be prepared and received by the trading partners.
Post conditions	**Successful Condition:** Trading partners review their performance and take corrective action when necessary. **Unsuccessful Condition:** Operational activities and key metrics are not exchanged, preventing trading partners from reviewing their performance.
Scenario	Begins with the receipt of data by one of the Actors Continues with...

Step #	Actor	Activity Step
1	Buyer, Seller	Calculates performance results.
2	Buyer, Seller	Transmits Performance Measurement message
3	Buyer, Seller	Reviews performance relative to goals (if provided).

Ends with corrective action to improve performance, if required.

Alternative Scenario	Not Applicable
Related Requirements	Not Applicable
Related Rules	Not Applicable

3.2. Business Process - Agreement on Measure

Use Case Definition

Use Case ID	UC-1.1
Use Case Name	Agreement on Measure
Use Case Description	The objective is for a pair of trading partners to agree on which measure to track.
Actors (Goal)	Performance Measurement is a two-actor system involving a collaborative effort between a buyer and a seller across one or more locations. The lead actor in the collaboration depends upon the scenario most appropriate to the trading partner's business situation.
Performance Goals	The ability to agree on the measure selection.
Preconditions	A collaboration agreement and joint business plan must be in place. There must be an agreement from buyer and seller to process Performance Measurement.
Post conditions	**<u>Successful Condition:</u>** Trading partners agree to the measure and plan to exchange the information. **<u>Unsuccessful Condition:</u>** Trading partners cannot agree to the measure.
Scenario	Begins with the precondition with an agreement from and seller to process performance measurement. Continues with...

Step #	Actor	Activity Step
1	Joint	Agree on measure with item and location
2	Decision	Determine who is the owner of the data?
3	Buyer, Seller	Determine on level of detail to track
4	Buyer, Seller	Determine parameters for each measure
5	Buyer, Seller	Determine frequency of updates.

Ends with plans to exchange this information.

Alternative Scenario	Receive Performance Measurement Message without measure results data.
Related Requirement	Not Applicable
Related Rule	Not Applicable

Activity Diagram


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Agreement on Measure
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3.3.   Business Process - Exchange Measure

Use Case Definition

Use Case ID	UC-1.2
Use Case Name	Exchange Measure
Use Case Description	The objective is for a pair of trading partners to exchange measure information.
Actors (Goal)	Performance Measurement is a two-actor system involving a collaborative effort between a buyer and a seller across one or more locations. The lead actor in the collaboration depends upon the scenario most appropriate to the trading partner's business situation.
Performance Goals	The ability to exchange performance goals and results.

Use Case ID	UC-1.2
Preconditions	There must be an agreement on which measure is to be exchanged.
Post conditions	**Successful Condition:** Trading partners can exchange measure information. **Unsuccessful Condition:** Trading partners can not exchange measure information.
Scenario	Begins with the agreement on measure to be exchanged In the example below the Buyer is the data source. Continues with...

Step #	Actor	Activity Step
1	Buyer	Reference definition/ formulas/ parameter
2	Buyer	Determine what raw data is needed
3	Buyer, Seller	Gather raw data and calculate measure result
4	Buyer	Transmit measure result via Performance Measurement

	Ends with Seller receiving the Performance Measurement Message which contains the measures.
Alternative Scenario	Not Applicable
Related Requirement	Not Applicable
Related Rule	Not Applicable

Activity Diagram

4. Business Information View

✓ Note: Reference Shared Common Library Business Message (BMS) Release 3.0.0 and eCom Domain Common Library Business Message (BMS) Release 3.0.0 for all common information.

4.1. Performance Measurement

Class Diagram
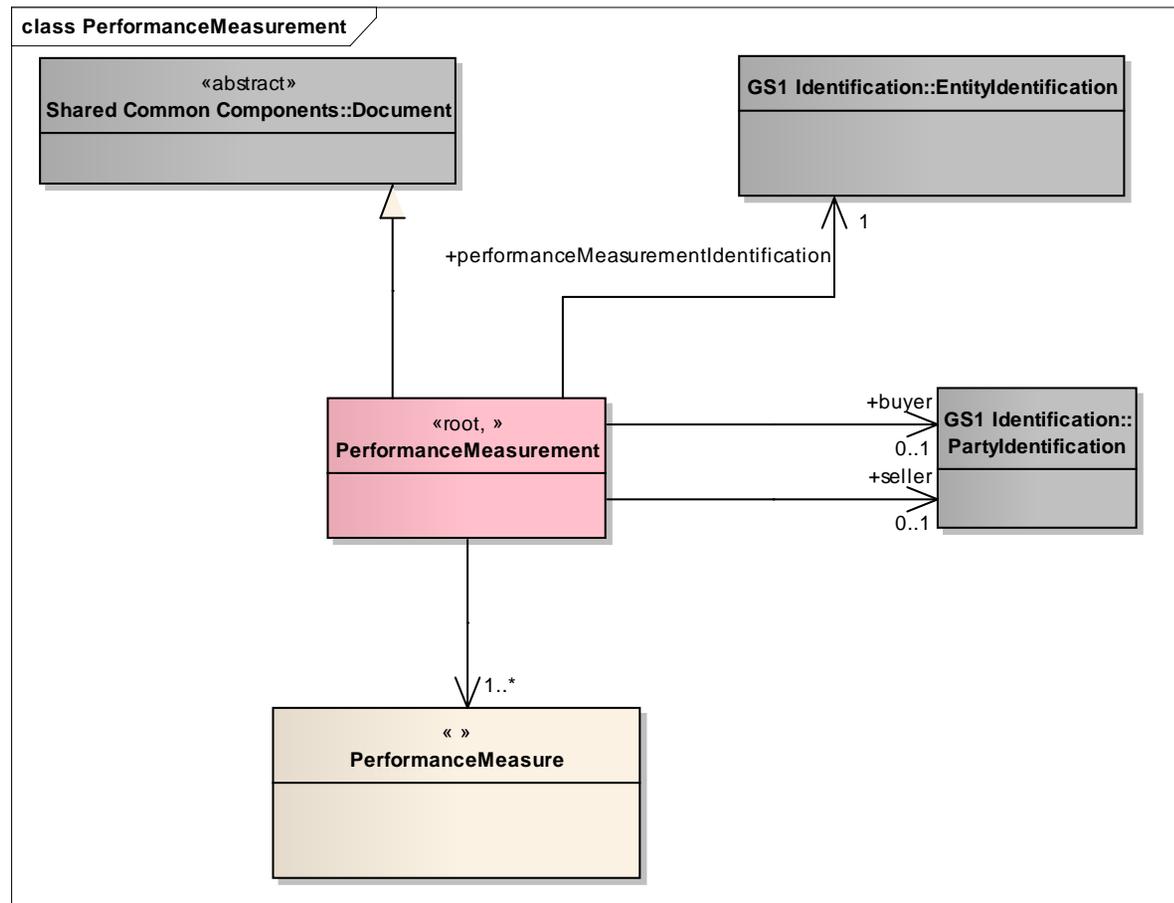
GDD Report

Content	Attribute / Role	Datatype /Secondary class	Multiplicity	Definition	Requirements
PerformanceMeasurement				Provides the performance measurement details with the performance measure and related parameters.	
Association	performanceMeasurementIdentification	EntityIdentification	1..1	The unique identification of the Performance Measurement.	
Association	seller	PartyIdentification	0..1	Party, which sells products or services to a buyer.	
Association	buyer	PartyIdentification	0..1	Party, which buys products or services from a seller.	
Generalization		Document		Used to specify basic information about the content of the message including version number, creation date and time.	
Association		PerformanceMeasure	1..*	Provides the performance measures.	

4.2. Performance Measure

Class Diagram
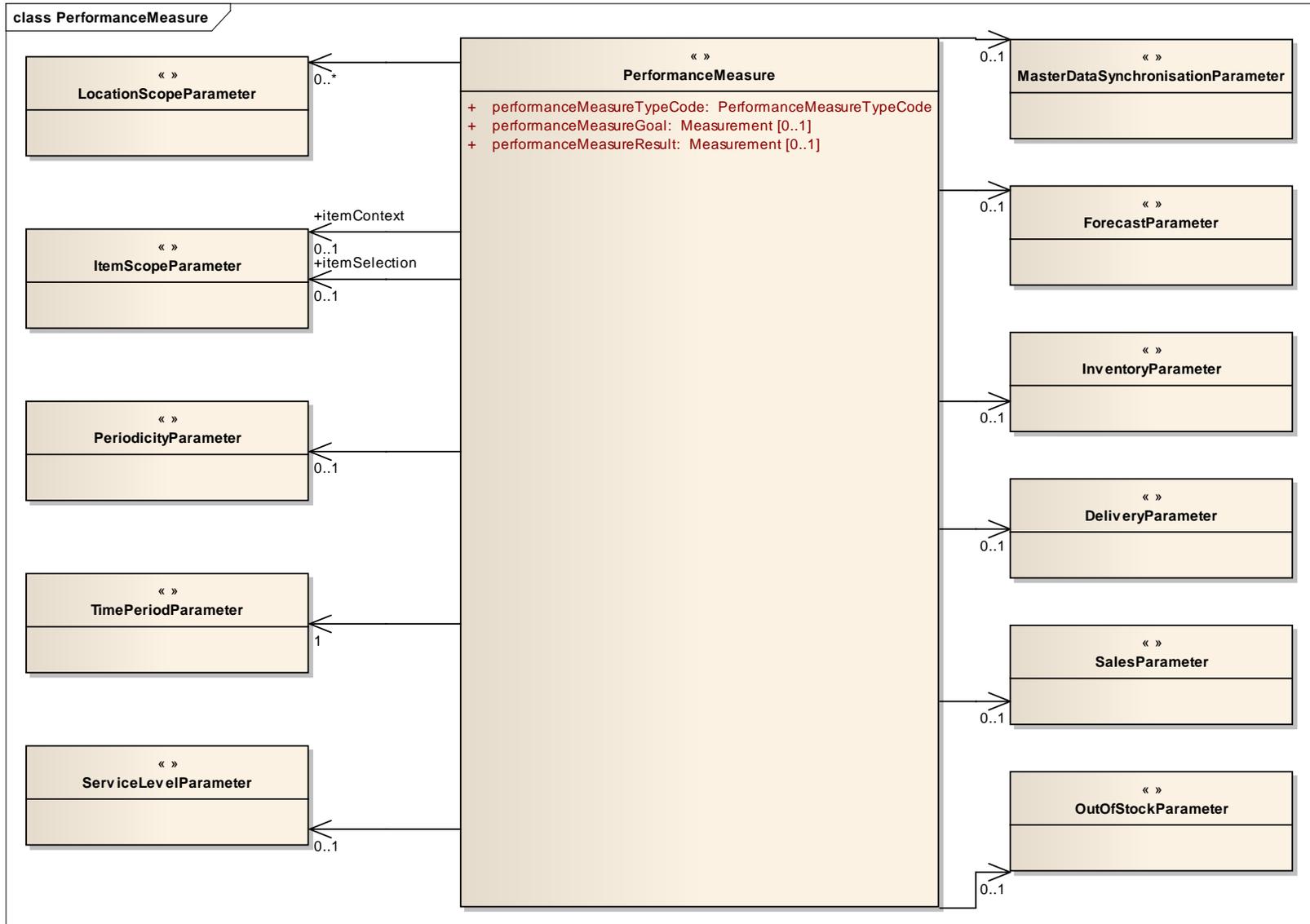
GDD Report

Content	Attribute / Role	Datatype /Secondary class	Multiplicity	Definition	Requirements
PerformanceMeasure				Provides the performance measure and related parameters.	
Association		ServiceLevelParameter	0..1	Provides the parameters related to service level.	
Association		PeriodicityParameter	0..1	Provides the periodicity parameter information.	
Association		TimePeriodParameter	1..1	Provides the time period associated with the specified performance measure.	
Association		SalesParameter	0..1	Provides the parameter related to sales.	
Association		OutOfStockParameter	0..1	Provides the parameter related to out of stock measurements.	
Association		MasterDataSynchronisationParameter	0..1	Provides the parameter related to master data synchronisation.	
Association		LocationScopeParameter	0..*	Provides the parameter related to location scope.	
Association		InventoryParameter	0..1	Provides the related inventory parameter information.	
Association	itemSelection	ItemScopeParameter	0..1	Identifier that indicates the scope of the data being communicated in terms of the item (product) dimension	
Association		ForecastParameter	0..1	Provides the parameter related to forecast.	
Association		DeliveryParameter	0..1	Provides the delivery parameter associated to the performance measure.	
Association	itemContext	ItemScopeParameter	0..1	Identifier of the range of items over which the share is being measured.	
Attribute	performanceMeasureTypeCode	PerformanceMeasureTypeCode	1..1	Specifies the type of performance measure.	
Attribute	performanceMeasureGoal	Measurement	0..1	Provides the ability for trading partners to identify goals for the measures that that they wish to share.	

Content	Attribute / Role	Datatype /Secondary class	Multi plicit y	Definition	Requirements
Attribute	performanceMeasure Result	Measurement	0..1	Provides the ability for trading partners to identify results for the measures that that they wish to share.	

4.3. Performance Measurement Parameters

Class Diagram
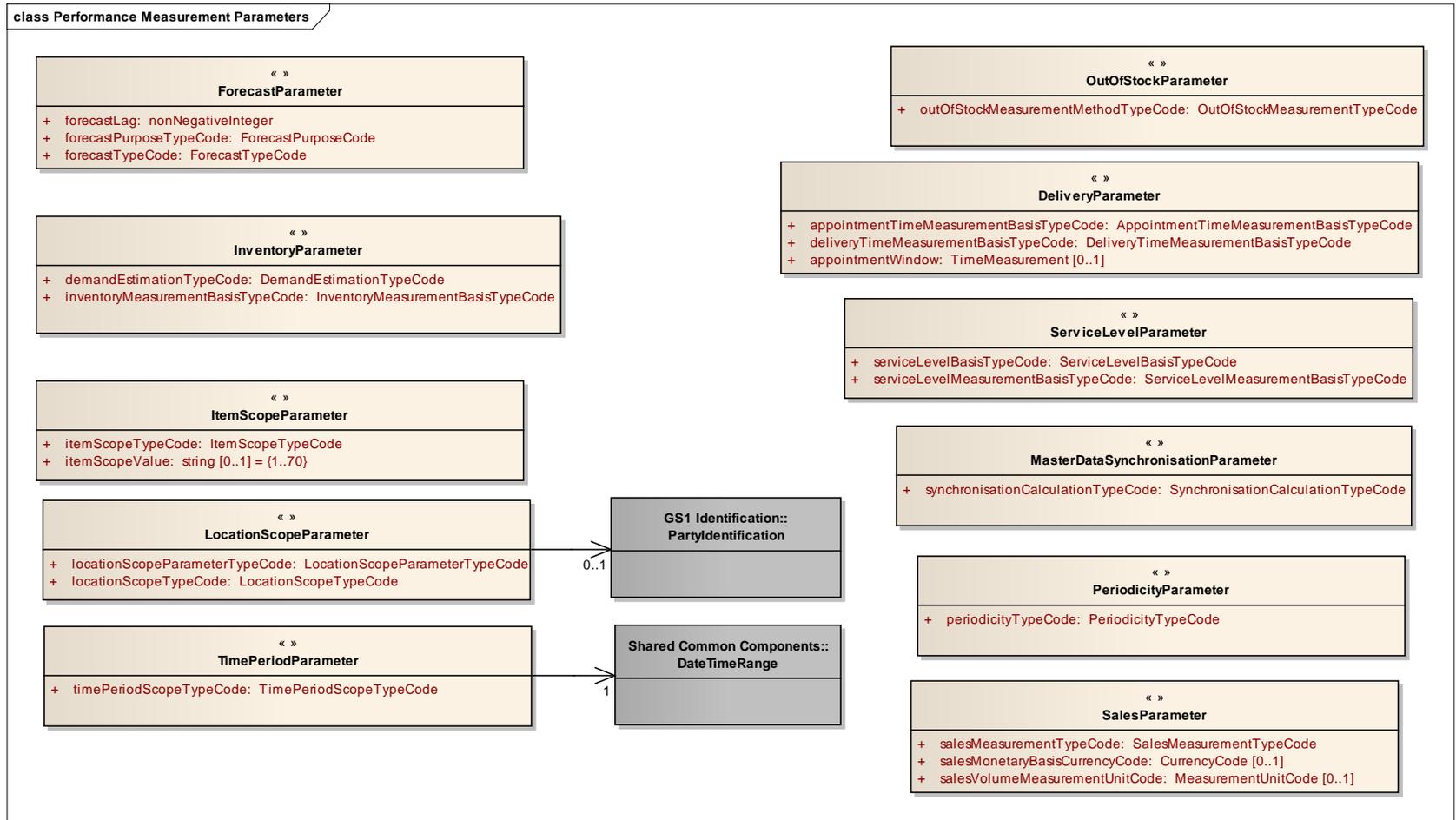
GDD Report

Content	Attribute / Role	Datatype /Secondary class	Multiplicity	Definition	Requirements
DeliveryParameter				Provides the delivery parameter information.	

Content	Attribute / Role	Datatype /Secondary class	Multiplicity	Definition	Requirements
Attribute	appointmentTimeMeasurementBasisTypeCode	AppointmentTimeMeasurementBasisTypeCode	1..1	Specifies whether an on-time delivery calculation considers the appointment date time to be the latest time that the delivery can arrive (the default option), or the center of a delivery window that allows delivers before or after the appointment time by an amount indicated by the Appointment Window parameter	
Attribute	deliveryTimeMeasurementBasisTypeCode	DeliveryTimeMeasurementBasisTypeCode	1..1	Indicates the source of the date to be used to determine whether a delivery was on-time (the original P.O. need-by date, the first scheduled appointment date or the last scheduled appointment date).	
Attribute	appointmentWindow	TimeMeasurement	0..1	The number of minutes before or after the appointment time that a delivery can arrive and still be considered on time, if the Appointment Time Measurement Basis is set to "Appointment Window."	
ForecastParameter				Provides the parameter related to forecast.	
Attribute	forecastLag	nonNegativeInteger	1..1	Specifies the minimum age of a forecast that is to be compared with actual sales for accuracy measurement.	
Attribute	forecastPurposeTypeCode	ForecastPurposeCode	1..1	Specifies whether the forecast is for the amount sold, received or shipped.	
Attribute	forecastTypeCode	ForecastTypeCode	1..1	Specifies whether the forecast pertains to all items in the period, only item/location combinations on promotion during the period, or non-promoted items.	
InventoryParameter				Provides the inventory parameter information.	

Content	Attribute / Role	Datatype /Secondary class	Multiplicity	Definition	Requirements
Attribute	demandEstimationTypeCode	DemandEstimationTypeCode	1..1	Specifies the technique used to estimate demand when measuring inventory cover.	
Attribute	inventoryMeasurementBasisTypeCode	InventoryMeasurementBasisTypeCode	1..1	Indicator of whether the inventory included in an inventory cover calculation includes inbound (pipeline) inventory.	
ItemScopeParameter				Provides the item scope parameter information.	
Attribute	itemScopeTypeCode	ItemScopeTypeCode	1..1	Specifies the type of item scope (brand, category, etc.) of a goal or measure value.	
Attribute	itemScopeValue	String70	0..1	Identifier that indicates the scope of the data being communicated in terms of the item (product) dimension.	
LocationScopeParameter				Provides the parameter related to location scope.	
Association		PartyIdentification	0..1	Identifier that indicates the scope of the data being communicated in terms of the location (organization/geography) dimension.	
Attribute	locationScopeParameterTypeCode	LocationScopeParameterTypeCode	1..1	Determines the role of a facility or group of facilities specified in the performance measurement. Depending on the measure selected, multiple location scope selections may be required to fully identify the range of facilities that should be included.	
Attribute	locationScopeTypeCode	LocationScopeTypeCode	1..1	Specifies the type of location scope (store, region, chain) of a goal or measure value.	
MasterDataSynchronisationParameter				Provides the parameter related to master data synchronisation.	

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Content	Attribute / Role	Datatype /Secondary class	Multiplicity	Definition	Requirements
Attribute	synchronisationCalculationTypeCode	SynchronisationCalculationTypeCode	1..1	Indicates whether the item data synchronization percentage calculation was based on the total number of items, or the incremental number of items synchronised.	
OutOfStockParameter				Provides the parameter related to out of stock measurements.	
Attribute	outOfStockMeasurementMethodTypeCode	OutOfStockMeasurementTypeCode	1..1	Specifies the technique used to measure the out of stock percentage being reported.	
PeriodicityParameter				Provides the parameter related to periodicity.	
Attribute	periodicityTypeCode	PeriodicityTypeCode	1..1	Specifies the time unit of measure of a result.	
SalesParameter				Provides the parameter related to sales.	
Attribute	salesMeasurementTypeCode	SalesMeasurementTypeCode	1..1	Indicates whether the values used in the calculation are on a volume (unit) basis, or value (monetary) basis.	
Attribute	salesMonetaryBasisCurrencyCode	CurrencyCode	0..1	Indicates the sales measurement currency.	
Attribute	salesVolumeMeasurementUnitCode	Measurement	0..1	Indicates the sales volume unit of measure.	
ServiceLevelParameter				Provides the parameters related to service level.	
Attribute	serviceLevelBasisTypeCode	ServiceLevelBasisTypeCode	1..1	Indicator of the basis for which a Service Level is to be calculated – in terms of the percentage of orders filled 100%, the percentage of order lines filled 100%, or the percentage volume of product filled vs. ordered	

Content	Attribute / Role	Datatype /Secondary class	Multiplicity	Definition	Requirements
Attribute	serviceLevelMeasurementBasisTypeCode	ServiceLevelMeasurementBasisTypeCode	1..1	Indicates whether a fill rate / service level calculation is based upon the quantity shipped or quantity received.	
TimePeriodParameter				Provides the time period parameter for the performance measure type.	
Association		DateTimeRange	1	Provides the time period format.	
Attribute	timePeriodScopeTypeCode	TimePeriodScopeTypeCode	1..1	Specifies the type of time period of a goal or measure value.	

4.4. Code Lists

Note: Reference Shared Common Library Business Message (BMS) Release 3.0.0 and eCom Domain Common Library Business Message (BMS) Release 3.0.0 for all Code Lists

Class	Codelist	Referenced in
PerformanceMeasure	PerformanceMeasure TypeCode	eCom domain Common Library Business Message (BMS) Release 3.0.0
DeliveryParameter	AppointmentTimeMe asurementBasisType Code	eCom Domain Common Library Business Message (BMS) Release 3.0.0
DeliveryParameter	DeliveryTimeMeasure mentBasisTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
ForecastParameter	ForecastPurposeCod e	eCom Domain Common Library Business Message (BMS) Release 3.0.0
ForecastParameter	ForecastTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
InventoryParameter	DemandEstimationTy peCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
InventoryParameter	InventoryMeasureme ntBasisTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
ItemScopeParameter	ItemScopeTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
LocationScopeParamete r	LocationScopeParam eterTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
LocationScopeParamete r	LocationScopeTypeC ode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
MasterDataSynchronisat ionParameter	SynchronisationCalcu lationTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
OutOfStockParameter	OutOfStockMeasure mentTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
PeriodicityParameter	PeriodicityTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
SalesParameter	SalesMeasurementTy peCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
SalesParameter	CurrencyCode	Shared Common Library Business Message (BMS) Release 3.0.0
ServiceLevelParameter	ServiceLevelBasisTy peCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
ServiceLevelParameter	ServiceLevelMeasure mentBasisTypeCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0
TimePeriodParameter	TimePeriodScopeTyp eCode	eCom Domain Common Library Business Message (BMS) Release 3.0.0

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5. Business Message Example

Provides illustration for each of the 17 Performance Measures.

✅ **Note:** Test Data is NOT in strict XML formats

5.1. Test Data 1

Performance Measure Type	Sales Growth (%)	Share (%)	Retail Item Gross Margin (%)	Retail Gross Profit Margin (%)	Invoice Accuracy (%)	Item Master Data Accuracy (%)	Item Data Synchronisation (%)
Example Description	Sales by unit volume of the 500gr size box of SmartBite Low-Fat Snack Crackers (GTIN 01067202197133) grew by 13% in the week ending 23 March 2009 at Value Mart store #32 (GLN 0988234988313) as compared with the same period last year.	The goal for LaundryCorp's share of Value Mart's Fabric Softener subclass for Fiscal Q3 of 2009 (ending in July) in its French stores is 43% in monetary sales terms.	Value Mart's gross margin for items in the carbonated soft drink category in January 2009 was 26.7%, compared to the goal of 25%.	Value Mart's Gross Profit Margin for GPC category Drinks (verify) was 31% in 2008.	The accuracy of LaundryCorp's invoices to Value Mart in July 2009 were 86%.	The accuracy of master data elements synchronized with ValueMart across all grocery department items and suppliers was 92% in December 2008.	The percentage of LaundryCorp's items that were synchronized to Value Mart in the week ending 14-Mar-2009 was 91%, vs. a goal of 99%.
Item Selection Scope Value	01067202197133	<Not Specified>	06-20	Drinks		04	<Not Specified>
Item Selection Scope Type	GTIN	TRADING_RELATIONSHIP	CLASS	GPC		DEPARTMENT	TRADING_RELATIONSHIP
Item Context Scope Value		07-33-77					
Item Context Scope Type		SUBCLASS					TRADING_RELATIONSHIP
Location Selection Scope Value	0988234988313 (Store #32's GLN)	FR	"Value Mart Stores"	"Value Mart Stores"	0988234980003 (Value Mart's GLN)	0988234980003 (Value Mart's GLN)	7003443100003 (LaundryCorp's GLN)

Performance Measure Type	Sales Growth (%)	Share (%)	Retail Item Gross Margin (%)	Retail Gross Profit Margin (%)	Invoice Accuracy (%)	Item Master Data Accuracy (%)	Item Data Synchronisation (%)
Location Selection Scope Type	GLN	COUNTRY	CHAIN	CHAIN	Supplier	GLN	Supplier
Location Scope Parameter Type	LOCATION_SELECTION	LOCATION_SELECTION	LOCATION_SELECTION	LOCATION_SELECTION	LOCATION_SELECTION	LOCATION_SELECTION	LOCATION_CONTEXT
Time Period Value Start	17-Mar-2009	01-May-09	1-Jan-2009	01-Jan-08	1-Jul-2009	01-Dec-08	08-Mar-09
Time Period Value End	23-Mar-2009	31-Jul-09	31-Jan-2009	31-Dec-08	31-Jul-2009	31-Dec-08	14-Mar-09
Time Period Scope Type	WEEK	FISCAL_QUARTER	CALENDAR_MONTH	CALENDAR_YEAR	CALENDAR_MONTH	CALENDAR_MONTH	WEEK
Periodicity Type							
Sales Measurement Type	VOLUME_BASIS	MONETARY_BASIS					
Sales Volume Unit of Measure Value	EA						
Sales Monetary Basis Currency Code		EUR					
Inventory Measurement Basis Type							
Demand Estimation Type							
Synchronisation Calculation Type							TOTAL_ITEMS
Delivery Time Measurement BasisType							

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Performance Measure Type	Sales Growth (%)	Share (%)	Retail Item Gross Margin (%)	Retail Gross Profit Margin (%)	Invoice Accuracy (%)	Item Master Data Accuracy (%)	Item Data Synchronisation (%)
Appointment Time Measurement Basis Type							
OOS Measurement Method Type							
Forecast Type Code							
Forecast Purpose Code							
Forecast Lag							
Service Level Measurement Basis Type							
Service Level Basis Type							
Performance Goal	<Not Specified>	43 %	25 %	<Not Specified>	<Not Specified>	<Not Specified>	99 %
Performance Result	13 %	<Not Specified>	26.7 %	31 %	86 %	92 %	91 %

5.2. Test Data 2

Performance Measure Type	Order Item/ QuantityChange (%)	Service Level / Fill Rate (%)	Order to Delivery Cycle Time (Hours)	On-time Delivery (%)	Finished Goods Inventory Cover (Days)
Example Description	The percentage of Value Mart orders that LaundryCorp had to be change before shipment month-to-date was 20%, vs a goal of 10%.	The supplier's service level to the retail DC identified by GLN 0377076379213 was 98.3% in the week ending 07 March, compared to the goal of 97%.	The average order-to-delivery cycle time for direct-to-store shipments from LaundryCorp's Detergent Plant to Value Mart was 96 hours in February 2009.	The goal for on-time delivery performance of LaundryCorp's shipments to Value Mart's Northeastern DC is 95% for Fiscal Year 2009, based upon the first appointment time and a 2 hour delivery window.	For the week ending 14-Mar-2009, Value Mart had 12 days of forecasted inventory cover of the 500gr size box of SmartBite Low-Fat Snack Crackers (GTIN 00379982745325) at its Northeastern DC.
Item Selection Scope Value		<Not Specified>	<Not Specified>		00379982745325
Item Selection Scope Type		TRADING_RELATIONSHIP	TRADING_RELATIONSHIP		GTIN
Item Context Scope Value					
Item Context Scope Type					
Location Selection Scope Value	1. "Value Mart Stores" 2. "Laundry Corp"	1. 0377076379213 2. 0377076379223 (Vendor Location GLN) 3. 0377076379223 (Customer Destination GLN) 4. 0377076379233 (Shipping Location GLN)	1. <not Specified> 2. 7003443100323 (LaundryCorp Detergent Plant's GLN)	1. 0988234982093 (Value Mart Northeastern DC's GLN) 2. 7003443100003 (LaundryCorp's GLN)	0988234982093 (Value Mart Northeastern DC's GLN)
Location Selection Scope Type	1. CHAIN 2. SUPPLIER	1. GLN 2. GLN 3. GLN 4. GLN	1. STORE 2. GLN	1. GLN 2. GLN	GLN
Location Scope Parameter Type	1. LOCATION_SELECTION 2. LOCATION_CONTEXT	1. LOCATION_SELECTION 2. VENDOR_LOCATION 3. CUSTOMER_DESTINATION_LOCATION 4. SHIPPING_LOCATION	1. LOCATION_SELECTION 2. LOCATION_CONTEXT	1. LOCATION_SELECTION 2. LOCATION_CONTEXT	LOCATION_SELECTION
Time Period Value Start	01-Apr-09	01-Mar-09	01-Feb-09	01-Aug-08	08-Mar-09

Performance Measure Type	Order Item/ QuantityChange (%)	Service Level / Fill Rate (%)	Order to Delivery Cycle Time (Hours)	On-time Delivery (%)	Finished Goods Inventory Cover (Days)
Time Period Value End	06-Apr-09	07-Mar-09	28-Feb-09	31-Jul-09	14-Mar-09
Time Period Scope Type	MONTH_TO_DATE	WEEK	CALENDAR_MONTH	FISCAL_YEAR	WEEK
Periodicity Type			HOUR		
Sales Measurement Type					
Sales Volume Unit of Measure Value					
Sales Monetary Basis Currency Code					
Inventory Measurement Basis Type					ON_HAND_ONLY
Demand Estimation Type					FORECAST_BASIS
Synchronisation Calculation Type					
Delivery Time Measurement BasisType				FIRST_APPOINTMENT_DATE_TIME	
Appointment Time Measurement Basis Type				APPOINTMENT_WINDOW	
OOS Measurement Method Type					
Forecast Type Code					

Performance Measure Type	Order Item/ QuantityChange (%)	Service Level / Fill Rate (%)	Order to Delivery Cycle Time (Hours)	On-time Delivery (%)	Finished Goods Inventory Cover (Days)
Forecast Purpose Code					
Forecast Lag					
Service Level Measurement Basis Type		RECEIVED_QUANTITY			
Service Level Basis Type		VOLUME			
Performance Goal	10 %	97 %	<Not Specified>	95 %	<Not Specified>
Performance Result	20 %	98.3 %	96 Hours	<Not Specified>	12 Days

5.3. Test Data 3

Performance Measure Type	Forecast Accuracy (%)	Out-of-stock (%)	Unsaleables (%)	On Time Payment (%)	Markdown (%)
Example Description	The four-week lagged unit POS forecast accuracy for the 500gr size box of SmartBite Low-Fat Snack Crackers (GTIN 00379982745325) across all stores was 78% in the week ending 14-Mar-2009.	The estimated average out-of-stock rate for grocery items at Value Mart Store #32 in Fiscal Month 12 (based on sales data analysis) was 8%.	The percentage of unsaleable items that Value Mart has received year-to-date from LaundryCorp is 0.9%, vs a goal of 1.0%.	The percentage of LaundryCorp invoices that Value Mart paid on time in the first calendar quarter of 2009 was 100%.	The Markdown percentage of LaundryCorp's items at Value Mart in the week ending 14-Mar-2009 was 2%.
Item Selection Scope Value	00379982745325	04	<Not Specified>		<Not Specified>
Item Selection Scope Type	GTIN	DEPARTMENT	TRADING_RELATIONSHIP		TRADING_RELATIONSHIP
Item Context Scope Value					

Performance Measure Type	Forecast Accuracy (%)	Out-of-stock (%)	Unsaleables (%)	On Time Payment (%)	Markdown (%)
Item Context Scope Type					
Location Selection Scope Value	0988234980003 (Value Mart's GLN)	0988234988313 (Store #32's GLN)	0988234980003 (Value Mart's GLN)	1. 0988234980003 (Value Mart's GLN) 2.700344310000 (LaundryCorp's GLN)	<Not Specified>
Location Selection Scope Type	GLN	GLN	GLN	1. GLN 2. GLN	Supplier
Location Scope Parameter Type	LOCATION_SELECTION	LOCATION_SELECTION	LOCATION_SELECTION	1. LOCATION_SELECTION 2. LOCATION_CONTEXT	LOCATION_SELECTION
Time Period Value Start	08-Mar-09	27-Jun-09	01-Jan-09	01-Jan-09	08-Mar-09
Time Period Value End	14-Mar-09	31-Jul-09	06-Apr-09	31-Mar-09	14-Mar-09
Time Period Scope Type	WEEK	FISCAL_MONTH	YEAR_TO_DATE	CALENDAR_QUARTER	WEEK
Periodicity Type					
Sales Measurement Type	VOLUME_BASIS				
Sales Volume Unit of Measure Value	EA				
Sales Monetary Basis Currency Code					
Inventory Measurement Basis Type					
Demand Estimation Type					

Performance Measure Type	Forecast Accuracy (%)	Out-of-stock (%)	Unsaleables (%)	On Time Payment (%)	Markdown (%)
Synchronisation Calculation Type					
Delivery Time Measurement BasisType					
Appointment Time Measurement Basis Type					
OOS Measurement Method Type		SALES_DATA_ANALYSIS			
Forecast Type Code	TOTAL				
Forecast Purpose Code	SALES_FORECAST				
Forecast Lag	4				
Service Level Measurement Basis Type					
Service Level Basis Type					
Performance Goal	<Not Specified>	<Not Specified>	1 %	<Not Specified>	<Not Specified>
Performance Result	78 %	8 %	0.9 %	100 %	2 %

5.4. Business Message

This example is based on parts of the three sets of test data provided in paragraphs 6.1 - 6.3.

PerformanceMeasurement	
purchaseConditionsCurrencyCode	**EUR**
Document	
creationDateTime	**2010-01-09T11:00:00**
documentStatus	**ORIGINAL**
EntityIdentification (+performanceMeasurementIdentification)	
entityIdentification	**2011001**
PartyIdentification (+contentOwner)	
gln	**8712345678913**
PartyIdentification (+seller)	
gln	**8812345678903**
PartyIdentification (+buyer)	
gln	**8712345678913**
PerformanceMeasure	
performanceMeasureTypeCode	**SALES_GROWTH**
performanceMeasureGoal	
performanceMeasureResult	**13 (measurementUnitCode = P1)**
ItemScopeParameter (+itemContext)	
itemScopeTypeCode	
itemScopeValue	
ItemScopeParameter (+itemSelection)	
itemScopeTypeCode	**GTIN**
itemScopeValue	**01067202197133**
LocationScopeParameter	
locationScopeParameterTypeCode	**LOCATION_SELECTION**
locationScopeTypeCode	**GLN**
PartyIdentification	
gln	**098823498813**
TimePeriodParameter	
timePeriodScopeTypeCode	**WEEK**
DateTimeRange	
beginDate	**2009-03-17**
endDate	**2009-03-23**
SalesParameter	

salesMeasurementTypeCode	**VOLUME_BASIS**
salesMonetaryBasisCurrencyCode	
salesVolumeMeasurementUnitCode	**EA**
PerformanceMeasure	
performanceMeasureTypeCode	**SHARE**
performanceMeasureGoal	**43 (measurementUnitCode = P1)**
performanceMeasureResult	
ItemScopeParameter (+itemContext)	
itemScopeTypeCode	**SUBCLASS**
itemScopeValue	**07-33-77**
ItemScopeParameter (+itemSelection)	
itemScopeTypeCode	**TRADING_RELATIONSHIP**
itemScopeValue	
LocationScopeParameter	
locationScopeParameterTypeCode	**LOCATION_SELECTION**
locationScopeTypeCode	**COUNTRY**
PartyIdentification	
gln	**0000000000000**
additionalPartyIdentification	**ValueMart France (BUYER_ASSIGNED_IDENTIFIER_FOR_A_PARTY)**
TimePeriodParameter	
timePeriodScopeTypeCode	**FISCAL_QUARTER**
DateTimeRange	
beginDate	**2009-05-01**
endDate	**2009-07-31**
SalesParameter	
salesMeasurementTypeCode	**MONETARY_BASIS**
salesMonetaryBasisCurrencyCode	**EUR**
salesVolumeMeasurementUnitCode	
PerformanceMeasure	
performanceMeasureTypeCode	**RETAIL_ITEM_GROSS_MARGIN**
performanceMeasureGoal	**25 (measurementUnitCode = P1)**
performanceMeasureResult	**26.7 (measurementUnitCode = P1)**
ItemScopeParameter (+itemContext)	
itemScopeTypeCode	
itemScopeValue	
ItemScopeParameter (+itemSelection)	
itemScopeTypeCode	**CLASS**

	itemScopeValue	`06-20`
LocationScopeParameter		
	locationScopeParameterTypeCode	`LOCATION_SELECTION`
	locationScopeTypeCode	`CHAIN`
PartyIdentification		
	gln	`0000000000000`
	additionalPartyIdentification	`Value Mart Stores (BUYER_ASSIGNED_IDENTIFIER_FOR_A_PARTY)`
TimePeriodParameter		
	timePeriodScopeTypeCode	`CALENDER_MONTH`
DateTimeRange		
	beginDate	`2009-01-01`
	endDate	`2009-01-31`
PerformanceMeasure		
	performanceMeasureTypeCode	`ITEM_DATA_SYNCHRONISATION`
	performanceMeasureGoal	`99 (measurementUnitCode = P1)`
	performanceMeasureResult	`91 (measurementUnitCode = P1)`
ItemScopeParameter (+itemContext)		
	itemScopeTypeCode	`TRADING_RELATIONSHIP`
	itemScopeValue	
ItemScopeParameter (+itemSelection)		
	itemScopeTypeCode	`TRADING_RELATIONSHIP`
	itemScopeValue	
LocationScopeParameter		
	locationScopeParameterTypeCode	`LOCATION_CONTEXT`
	locationScopeTypeCode	`SUPPLIER`
PartyIdentification		
	gln	`7003443100003`
TimePeriodParameter		
	timePeriodScopeTypeCode	`WEEK`
DateTimeRange		
	beginDate	`2009-03-08`
	endDate	`2009-03-14`
MasterDataSynchronisationParameter		
	synchronisationCalculationTypeCode	`TOTAL_ITEMS`
PerformanceMeasure		
	performanceMeasureTypeCode	`FILL_RATE`
	performanceMeasureGoal	`97 (measurementUnitCode = P1)`

|	
performanceMeasureResult	**98.3 (measurementUnitCode = P1)**
ItemScopeParameter (+itemContext)	
itemScopeTypeCode	
itemScopeValue	
ItemScopeParameter (+itemSelection)	
itemScopeTypeCode	**TRADING_RELATIONSHIP**
itemScopeValue	
LocationScopeParameter	
locationScopeParameterTypeCode	**LOCATION_SELECTION**
locationScopeTypeCode	**GLN**
PartyIdentification	
gln	**0377076379213**
LocationScopeParameter	
locationScopeParameterTypeCode	**VENDOR_LOCATION**
locationScopeTypeCode	**GLN**
PartyIdentification	
gln	**0377076379223**
LocationScopeParameter	
locationScopeParameterTypeCode	**CUSTOMER_DESTINATION_LOCATION**
locationScopeTypeCode	**GLN**
PartyIdentification	
gln	**0377076379223**
LocationScopeParameter	
locationScopeParameterTypeCode	**SHIPPING_LOCATION**
locationScopeTypeCode	**GLN**
PartyIdentification	
gln	**0377076379233**
TimePeriodParameter	
timePeriodScopeTypeCode	**WEEK**
DateTimeRange	
beginDate	**2009-03-01**
endDate	**2009-03-07**
ServiceLevelParameter	
serviceLevelBasisTypeCode	**VOLUME**
serviceLevelMeasurementBasisTypeCode	**RECEIVED_QUANTITY**

6. Implementation Considerations

6.1. Information Systems Deployment

There are multiple deployment options for trading partner performance management. Before starting an initiative, a buyer and seller need to select that approach that efficiently meets their mutual business requirements, enhances their ability to collaborate, leverages their existing technology capabilities while remaining agile enough to meet evolving demands, and allows all this to happen in a secure environment.

6.1.1. Supplier Extranet

A retailer can set up a supplier extranet, and allow manufacturer users to log in, review information and perform tasks on the retailer's site. The extranet model has the advantage of offering access to manufacturers of any size - they do not need any in-house IT or planning applications to participate. However, a manufacturer has to work with each retailer that has an extranet separately, and often must cope with widely varying capabilities, navigation paradigms and user expectations. Manufacturers that depend on retailers' extranets cannot easily aggregate data across all of their customers to understand demand patterns and anomalies. Special attention to security is called for to address access to the extranet, encryption of data in transit and restricted access within the extranet application such that supplier information is not accessible by competitors.
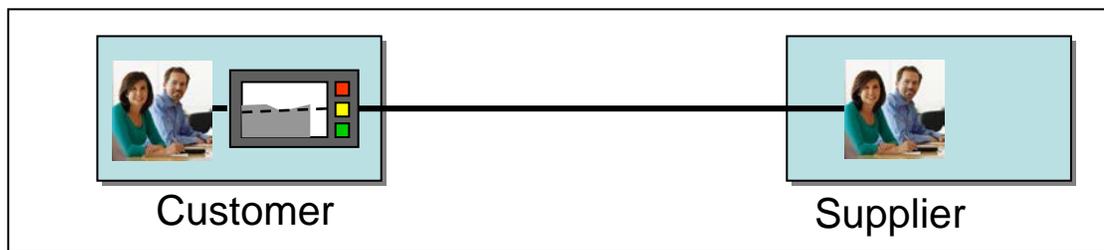

6.1.2. Message Interchange

Some companies exchange data through business-to-business transactions sets, using EDI, XML or flat file formats. The company-to-company model offers the advantage of standards based messages, and uses each company's own enterprise applications to analyze and act on the data. Companies can also combine this data across trading partners to get market-level insights. However, this approach also demands that a company invest in a B2B communications infrastructure, and have applications that can deal with large volumes of consumer demand data. The company-to-company approach also must overcome batch data synchronization delays, and subtle differences in each company's user views. With the public Internet as the transport mechanism for B2B messages, it is important that the data be transported in a manner that is both secure and provides confirmation of delivery. The AS2 specification is a widely adopted solution.
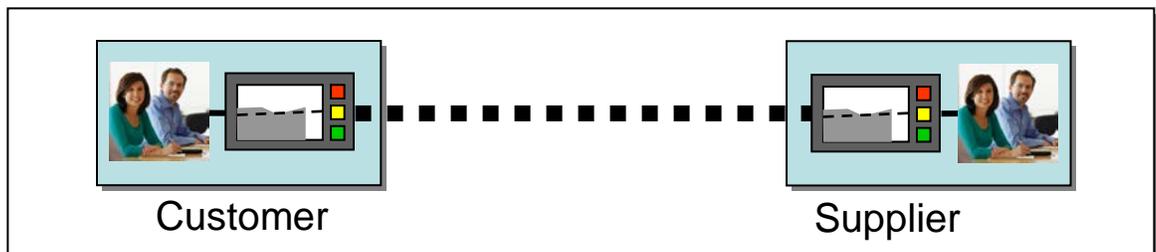
6.1.3. Hosted/On-Demand

The hosted/on-demand model collects data from multiple retailers and makes it available to multiple manufacturers through a public exchange or private service. The hosted model combines the benefits of ease of access of the extranet model with the data aggregation and single point of access of the company-to-company model. However, the hosted model raises issues of data ownership and payment, security and competitive positioning. Some retailers also do not allow their data to be hosted by a third party, limiting the potential for the hosted model to become universal.
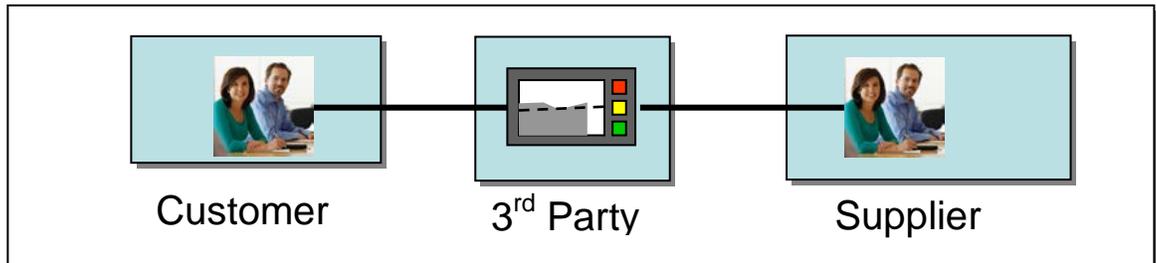

6.1.4. Distributed

An emerging alternative is to leave the measure data at its source (whether manufacturer, retailer or distributor) rather than forwarding it to a partner or a shared service. Users access the data in place when they review their scorecard or other performance management application. Technology is responsible for requesting the values from their distributed sources, and assembling any views that combine them.

The advantage of the distributed approach is that the data can remain wherever it was originally produced. If a combination of customer, supplier and third-party sources own this data, the services fetch the only the results requested, rather than transferring the large volumes of transaction data needed to calculate the measures. The distributed approach also always presents the user with the latest results, based on the original source for the data.

To be effective, distributed measures would most likely utilize Service Oriented Architecture (SOA) technology that can hide the complexity of sending off multiple requests to diverse data sources from the user consuming the information.

The potential disadvantages of the distributed approach are 1) the potential delay in assembling the results in near real time from disparate sources spread across a wide-area network, and 2) the likelihood that users will want to review the underlying data that caused specific results to be reported, necessitating ad hoc transfers of voluminous transaction data.
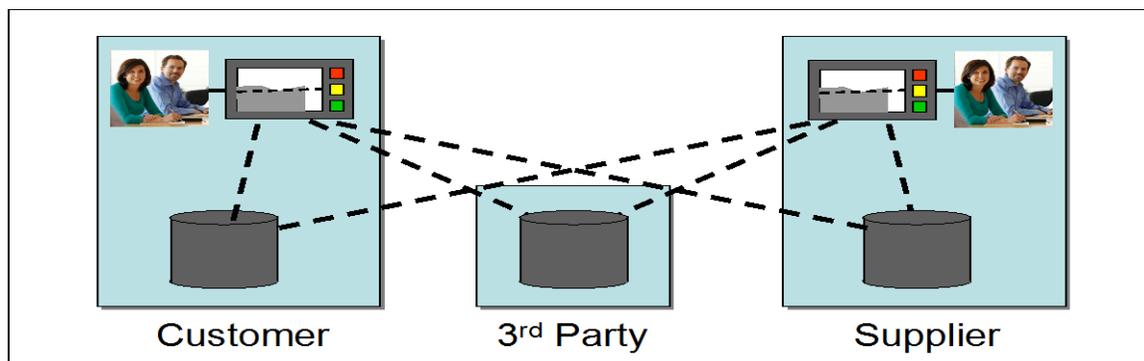
6.1.5. Hybrid

Realistically, most companies will have to accommodate multiple models. For example, a retailer may operate an extranet for smaller suppliers, while sending B2B transaction data to larger ones.

Manufacturers may need to access extranets for retailers who do not offer message interchange as an option. In this complex environment, the use of standards is vital.

6.2. Measure and Data Transmission

When companies begin to exchange results data, they have two options:

- Calculate the results based upon the underlying data, and share those.
- Share the underlying data, and allow each party to calculate the results.

Each option has advantages and disadvantages. Sharing the underlying data gives trading partners the greatest flexibility in generating aggregate measures in any number of business contexts. They also provide the best basis for investigating the conditions that caused inadequate or exceptional performance. However, this data sharing approach places a demand on each participating organization to be able to store the data, run the calculations on a consistent basis, and maintain the master data that determines which items belong in which calculations on a synchronized basis with their trading partner. Use of the GS1 Global Data Synchronization Network (GDSN) is practically essential in this scenario, but even it only covers item master data. Location and time (calendar) master data must also be synchronized.

Sharing the measure results themselves assures that all trading partners are looking at the same values at any given time, and lowers the minimum IT requirements for participation in a performance management initiative. However, sharing the results alone can make it difficult to interpret the values reported, or investigate how to address issues as they occur.

The best option is to share both the measure results and the underlying data used to calculate them. This approach allows trading partners to check whether their own local calculations still line up with those their customer or supplier has made – meaning their master data and methods are aligned.

7. Appendices

7.1. Measure Details

Note: Measure Details are sourced from the approved BRAD Trading Partner Performance Management Issue 1.0.0

7.1.1. Sales Growth (%)

7.1.1.1. Aliases

- Annual Growth Rate
- Monetary Sales Growth
- Unit Sales Growth

7.1.1.2. Definition

The percentage increase in monetary or unit sales compared to an equivalent time period one year prior to the period being measured

7.1.1.3. Rationale

The purpose is to record the growth rate and allow correlations to be made between growth and other metrics.

7.1.1.4. Formula

$$SalesGrowth\% = \left(\frac{Sales_Y - Sales_{y-1}}{Sales_{y-1}} \right) * 100$$

- ■ y = period in year being measured
- ■ y – 1 = equivalent prior-year period

✅ **Note:** Comparison Period: A given year's, quarter's, month's or week's sales can be compared to the equivalent prior year period. The options of quarter-over-quarter and month-over-month growth were excluded. Note due to calendar variations, the prior year period may have a different number of days or weeks.

7.1.1.5. Conditions

Sales is the total business in the scope of the geography being measured, not a "same store sales" growth measure.

7.1.1.6. Examples

Example 1

- ■ Sales in most recent 12 months = 12.0 Million
- ■ Sales in previous 12 months = 11.2 Million
- ■ Sales Growth = ((12.0- 11.2)/11.2)*100 =7.14%

Example 2

- ■ Sales in most recent 12 months = 100
- ■ Sales in previous 12 months = 95
- ■ Sales Growth = ((100-95)/95)*100 =5.26%

7.1.1.7. Reference Source

- ■ Annual Growth Rate GCI BM01

7.1.1.8. Typical Data Source

- ■ Retailer

7.1.2.   Share (%)

7.1.2.1. Aliases

- ■ Category share

- Market share
- Share of market
- Share of wallet (depending on the context)

7.1.2.2. Definition

The percentage of sales of a subset of items and / or locations in a broader market context, which can be defined in terms of a product category, class of trade or geography.

7.1.2.3. Rationale

Share calculations help trading partners understand the strength of their business activity relative to sales overall.

7.1.2.4. Formula

$$Share\% = \frac{SalesActivity(itemScope, locationScope)}{SalesActivity(itemContext, locationContext)} * 1oo$$

Sales may be measured in monetary or volume (unit) terms. Typical cases (with their common names) include:

18. "Supplier's market share": A manufacturer's brand sales as a percentage of a global product category (across all classes of trade) in a specified geographic area.

19. "Retailer's category share of market": A retailer's sales of a category of products (across all brands) relative to the total sales of that category of products in the region the retailer serves

20. "Supplier's share of retailer category": A manufacturer's brand sales as a percentage of a given retailer's or distributor's category sales.

Calculations of share often depend upon third-party data to ascertain the total sales volume across multiple trading partners. However, in a trading partner performance management context, most share calculations are usually relative to the customer's sales activity (whether a retailer or distributor), and they can be calculated directly based upon the customer's data.

7.1.2.5. Examples

Example 1

- Retailer A sales in Category X are €100,000 in Week 43
- Manufacturer B sales at Retailer A in Category X are €20,000 in the same week
- So Manufacturer B has a 20% share of Category X sales at Retailer A for Week 43
- Share Calculation: (20000/100000) *100 =20%

Example 2

- Distributor A sells 50,000 units of Manufacturer B products in New York State in September
- Market data estimates total sales of Manufacturer B products in New York State in September was 200,000 units
- So Distributor A has a 25% share of Manufacturer B product sales in New York State
- Share Calculation: (50000/200000) *100 =25%

7.1.2.6. Reference Source

■ Marketing Channel Management: People, Products, Programs, and Markets, Russell W. McCalley. Greenwood Publishing Group, 1996.

7.1.2.7. Typical Data Source

■ The customer is the typical source for sales data within their chain; either the customer or the supplier could gather broader market sales data (typically via third-party providers).

7.1.3. Retail Item Gross Margin (%)

7.1.3.1. Aliases

■ Margin

■ Gross Margin

■ Retail Margin

7.1.3.2. Definition

The average percentage amount a Retailer will earn for an item sold to a consumer before deducting operating expenses.

7.1.3.3. Rationale

Both Customer and Supplier need to understand the amount earned and/or the value of items sold to the consumer based on the retail price paid for these items in the market. Margins can vary based on market demographics and pricing strategy used by a Retailer.

7.1.3.4. Formula

$$RetailItemGrossMargin\% = \left(\frac{AverageItemRetailPrice - AverageItemCost}{AverageItemRetailPrice} \right) *100$$

■ Average Item Retail Price = Average Retail Price paid by the consumer in the retail market for a given item

■ Average Item Cost = Average Item Net Invoice Cost

7.1.3.5. Conditions

■ Average Item Cost does not include Retailer operating expenses.

■ Item Cost only includes allowances or other adjustments directly allocated to the item as listed on the invoice item line and does not include total invoice allowances, adjustments or other rebates provided after an invoice has been finalized.

Item Cost Calculation Included

■ Line Item Cost

■ Item Net Invoice Cost

Item Cost Calculation Excluded

- Total Invoice Allowances
- After Invoice Rebates
- Retailer Operating Expenses
- Other Total Invoice Adjustments

7.1.3.6. Examples

- Supplier Cost of Item A to Retailer = 10.50
- Retails Price of Item A in Store = 17.00
- Retail Item Gross Margin %: [(17.00 – 10.50)/17.00] * 100 = 38.24%

7.1.3.7. Reference Source

- About.com – Retailing
- http://retail.about.com/od/glossary/g/gross_margin.htm

7.1.3.8. Typical Data Source

- Retailer

7.1.4. Retail Gross Profit Margin (%)

7.1.4.1. Aliases

- Gross Profit Margin %
- Retail Profit Margin %
- Profit Margin %

7.1.4.2. Definition

The average percentage amount a Retailer will profit per item or group of items sold to a consumer after deducting operating expenses.

7.1.4.3. Rationale

A Retailer will manage an item or group of items according to the overall profit and profit margin of that item or group of items sold to the consumer based on the retail price paid for these items in the market. Profit Margins can vary based on market demographics and pricing strategy used by a Retailer and the operating costs associated with selling that item.

7.1.4.4. Formula

$$RetailGrossProfitMargin\% = \left(\frac{AverageItemRetailPrice - AverageNetItemCost}{AverageItemRetailPrice} \right) * 100$$

- Average Item Retail Price = Average Retail Price paid by the consumer in the retail market for a given item

- Average Net Item Cost = Average Item NET Cost after operating expenses

7.1.4.5. Condition

Average Net Item Cost is inclusive of all Retailer operating expenses

Item NET Cost Calculation Included:

- Line Item Cost

- Item Net Invoice Cost

- Invoice level Allowances allocated to an item or across a group of items

- After Invoice Rebates

- Retailer Operating Expenses

- Shopper Loyalty Discounts

- Item Coupons

7.1.4.6. Examples

- Retails Price of Item A in Store = 17.00

- Supplier Cost of Item A to Retailer = 10.50

- Item Rebate based on sales performance = 0.20 per 100 items sold* (Rebate)

- Retailer Loyalty Promotion discount per item sold = 0.25 (Operating Expense)

- Item Operating / Supply Chain Expenses = 0.08 per item (Operating Expense)

- *Retailer sold 120 items and has earned the Rebate offered

Calculation 1 Full Formula

- Retail Gross Profit Margin %: [[(Retail Price – Cost – Rebates) + (Operating Expenses)]/Retail Price]

- Retail Gross Profit Margin % [[17.00 – [(10.50 – 0.20) + (0.25 + 0.08)] / 17.00] * 100 = 37.47%

Calculation 2 Component Formula

- Profit = Retail Price – Total Cost + Total Operating Expense

- Retail Gross Profit Margin % = Total Profit / Retail Price

- Item Cost after Rebates 10.50 – 0.20 = 10.30

- Operating Expenses 0.25 + 0.08 = 0.33 per item

- Total Profit   17.00 – 10.30 + 0.33 = 6.37

- Retail Gross Profit Margin % = 6.37 / 17.00 = 37.47%

7.1.4.7. Reference Source

- About.com – Profit Margin

- http://retail.about.com/od/glossary/g/profit_margin.htm

7.1.4.8. Typical Data Source

- Retailer

7.1.4.9. Retail Item Gross Margin and Retail Gross Profit Margin Comparison Example

Item	Amount	Margin % Calculations
Retail Price	17.00	
Base Price	13.00	
- Discount	-1.00	
- Promo Discount	-1.00	
- Allowance	- 0.50	**Retail Item Gross Margin %**
Invoice Cost	10.50	[(17.00 – 10.50) / 17.00] * 100 = 38.24%
- Rebate	- 0.20	
Total Cost	10.30	
+ Shopper Discount Operating Expense	+ 0.25	
+ Retailer Operating Expense per item	+ 0.08	**Retail Gross Profit Margin %**
Net Cost	10.63	[(17.00 – 10.63) / 17.00] * 100 = 37.47%
Net Profit	6.37	(17.00 – 10.63)

7.1.5. Invoice Accuracy (%)

7.1.5.1. Aliases

- None

7.1.5.2. Definition

The percentage of seller invoices deemed accurate out of all invoices received.

7.1.5.3. Rationale

Invoice Accuracy provides the trading partner an ability to measure the efficiency of the invoices. It monitors the accuracy of the billing / payment process to properly invoice customers the first time.

7.1.5.4. Formula

$$InvoiceAccuracy\% = \left(\frac{InvoicesDeemedAccurate}{TotalInvoices} \right) * 100$$

7.1.5.5. Conditions

The seller's invoice must completely match the products received in terms of price, allowances, charges, quantity and unit of measure, terms of sale (payment / legal documents) and GTINs or mutually agreed and documented tolerances.

The buyer (purchasing company) determines if the invoice is accurate.

An invoice is defined as accurate when the supplier's invoice completely matches the products received in the following:

- Price

- Allowances

- Charges

- Quantity and unit of measure

- Terms of sale (Payment / Legal Documents)

- GTIN

- Or mutually agreed and documented tolerances

✅ **Note:** This is not a measure of electronic well formed / compliant invoicing. Tolerances are not part of this measure as tolerances are variable and determined by each trading partner.

7.1.5.6. Examples

- Company A determines 99 invoices are deemed accurate

- 100 Total invoices

- Invoice accuracy is 99% =(99/100)*100

7.1.5.7. Reference Source

- Invoice Accuracy GCI BM13

7.1.5.8. Typical Data Source

- Retailer

7.1.6. Item Master Data Accuracy (%)

7.1.6.1. Aliases

- None

7.1.6.2. Definition

The percentage of items with accurate physically measured dimensions and weight attributes (as provided by the seller) out of all items that were physically verified.

7.1.6.3. Rationale

Data Accuracy is critical to business applications for the foundational product information shared between trading partners. This product information is used to drive the business processes of both partners in the relationship from new item introduction, administrative set up and logistics information throughout the supply chain.

7.1.6.4. Formula

There is currently one way to calculate Item Master Data Accuracy. For the purposes of TPPM, the formula is the number of items where all attributes pass the industry tolerance divided by the total number of items physically verified.

$$ItemMasterDataAccuracy = \left(\frac{NumberofItemsPassingPhysicalVerification}{TotalNumberofItemsPhysicallyVerified} \right) * 100$$

7.1.6.5. Condition

Standards and best practices should be adhered to ensure consistency of how validations and tolerances for different packaging types are applied to products being evaluated. Please note that new tolerances for different packaging types continue to be developed; as these tolerances are standardized they will need to be applied to keep the metric consistent between the trading partners. A link is provided to these documents ensuring that the most current will be available.

■ http://www.gs1.org/docs/gsmp/gdsn/GDSN_Package_Measurement_Rules.pdf

■ http://www.gs1.org/docs/gsmp/gdsn/GDSN_Standard_Package_Measurement_Tolerances_Best_Practice_i1.pdf

■ http://www.gs1.org/docs/gsmp/gdsn/GDSN/Data Quality of Framework.pdf

The **GTIN Allocation Rules** which is located on the GS1 website at: www.gs1.org/gtinrules/

The **GS1 General Specifications** is the core standards document of the GS1 System describing how GS1 BarCodes and identification keys should be used. It is available through your local GS1 Member Organisation (MO).

7.1.6.6. Examples

	Items Passing Physical Verification	Total Number of Items Physically Verified
Count	172	179
Percent	96.09%	

Figure 7-1 Before and After Item Master Data Accuracy Implementation
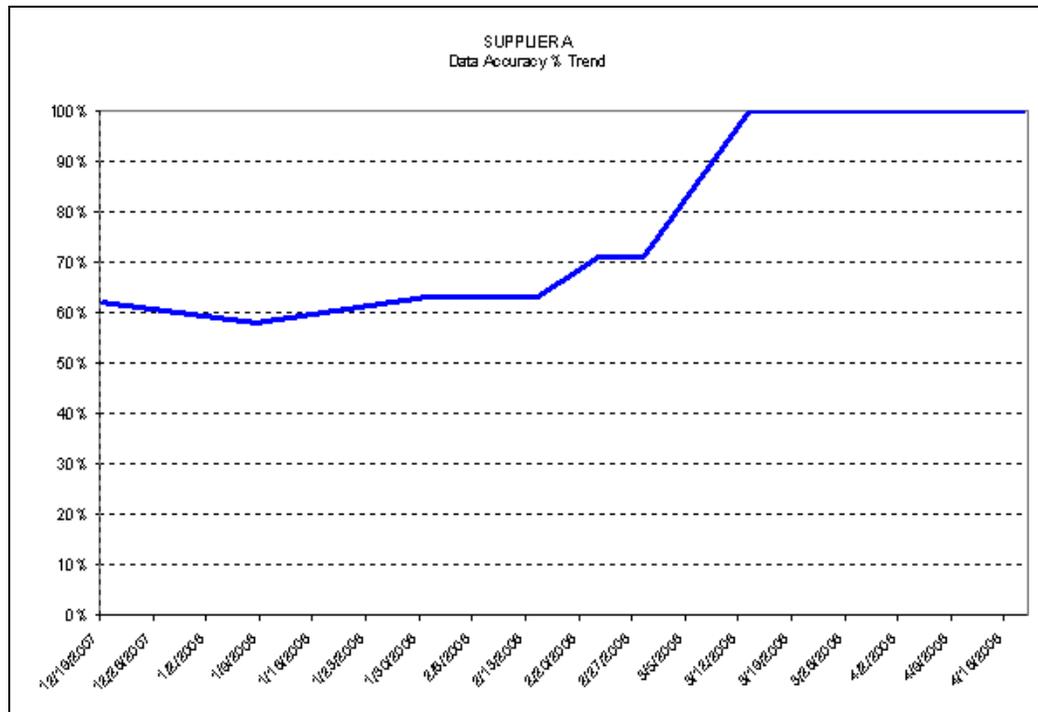
*Table of Attributes to be compared

	Height	Width	Depth	Weight	Total Retail Units
Case	X	X	X	X	X
Inner Pack	X	X	X		
Each	X	X	X		

Note These validations can extend to additional levels of an item such as a shipper, mixed modular pallet and pallet.

7.1.6.7. Reference Source

- Item Data Synchronisation GCI IM10 & 11

7.1.6.8. Typical Data Source

- Retailer

7.1.7. Item Data Synchronisation (%)

7.1.7.1. Aliases

■ None

7.1.7.2. Definition

The percentage of items (including applicable trade item hierarchy) published and sold from the seller that are synchronised by the buyer via the Global Data Synchronisation Network (GDSN).

7.1.7.3. Rationale

Item Synchronisation is the foundation for trading partner relationships, providing the product information for items that are traded between partners. This product formation is used to drive the business processes of both partners in the relationship from new item introduction, administrative set up and logistics information throughout the supply chain.

7.1.7.4. Formula

$$ItemDataSynchronisation = \left(\frac{NumberofItemsSynchronised}{TotalNumberofCata\log ItemstheTradingPartnerisExpecting} \right) * 100$$

7.1.7.5. Examples

Supplier Name	Total Number of Catalogue the Trading Partner is Expecting	Number of Item Synchronised	Item Data Synchronisation
Supplier A	2	1	50%
Supplier B	600	550	91.7%
Supplier C	20	19	95%

7.1.7.6. Condition

It is assumed that the supplier and receiver of information is adhering to the GS1 System Standards for GDS as documented in the GDSN Standards documents which can be found on the link below or through the guidance of your certified Data Pool.

http://www.gs1.org/services/gsmp/kc/gdsn/index.html

The **GTIN Allocation Rules** which is located on the GS1 website at: www.gs1.org/gtinrules/

The **GS1 General Specifications** is the core standards document of the GS1 System describing how GS1 BarCodes and identification keys should be used. It is available through your local GS1 Member Organisation (MO).

7.1.7.7. Reference Source

■ Item Data Synchronisation % GCI IM10 & 11

7.1.7.8. Typical Data Source

■ Retailer

7.1.8. Order Item / Quantity Change (%)

7.1.8.1. Aliases

- Touched Orders
- Perfect Order

7.1.8.2. Definition

The percentage of orders placed by the customer in the trading relationship that required changes in items or item quantities prior to release.

7.1.8.3. Rationale

Order Item / Quantity changes are a common source of disruptions in supply chain performance. In some trading relationships, 40% or more of the orders are revised one or more times before shipment. Reasons for order changes that are within the scope of this measure include:

- Invalid item ordered (item number incorrect, discontinued item, item not yet introduced or synchronized via the Global Data Synchronization Network (GDSN). Additional items added, removed or quantities changed.
- Delivery date changes are not included in the scope of this measure. The TPPM proposes that a future measure address this issue.

7.1.8.4. Formula

$$ItemChange|QuantityChange \Rightarrow RevisedOrder$$

$$OrderItem/QuantityChange\% = \left(\frac{\sum RevisedOrders}{\sum Orders} \right) * 100$$

Only orders that have been shipped within the time period specified for the measure are considered to be within the scope of the calculation.

7.1.8.5. Examples

A distributor places three orders with a manufacturer in October, each for 1000 litres of cola syrup. Subsequently, the distributor reduces the quantity of the second order to 500 litres. As a result, the order item / quantity change percentage for October is 1/3 * 100 = 33%.

Order Number	Ordered Units	Order Change	Absolute Deviation	Result
1	1000	0	0	
2	1000	500	500	
3	1000	0	0	
				1/3 = 33% Order Item / Quantity Change

7.1.8.6. Reference Source

- New Ways of Working Together Initiative

7.1.8.7. Typical Data Source

■ The supplier typically provides the results of this measure. It is usually evaluated at a trading relationship level, though it may be broken down to the level of a supplier's ship point or a customer's purchasing organization for root cause analysis.

7.1.9. Service Level / Fill Rate (%)

7.1.9.1. Aliases

■ Supplier Service Level

■ Order to Delivery Service Level

■ Order Fill Rate

■ Case Fill Rate

■ Item Fill Rate

■ First time fill rate (%)

7.1.9.2. Definition

The percentage of product that a buyer received or the seller shipped compared to the original ordered quantity

7.1.9.3. Rationale

Be more externally focused using a measure that includes Buyer expectation vs. purely manufactured delivered capability. Improve Buyer's Fill Rate level by comparing Received Units at the Buyer vs. Ordered Units by the Buyer. Buyer level reporting should match an individual buyer's ordering unit.

Use this measure as a complement of Out of Stock and On Time measures (recognizing that Service Level/Fill Rate partly overlaps with On Time measures of availability driven delays). As part of the Trading Partner Performance scorecard, analysis of root cause data should drive the implementation of action plans, with the goal to systemically fix supply chain issues.

Principle

Measure is kept simple (as definition) reliable and actionable and is simple to report, largely relying on readily available information.

The "ordered units" should be taken from the "Original Buyer Order". There are some events where the original orders are changed legitimately (e.g. wrong product ordered, order sent to wrong manufacturer) which could be given a reason code that updates the original order without impacting the fill rate %.

✓ **Note:** If order changes come in between the Original Order and product receipt, this will be reflected in the Order Item / Quantity Change % measure.

Double counting of repeat orders will not be adjusted as it reflects true service level the customer is experiencing when repeated orders are constantly unfulfilled.

In the event a SKU is put on allocation, during periods of tight availability, demand quantities as determined by the demand planning organizations (minimum volume based on last unconstrained forecast) should be included in the measure to accurately reflect the service level to our customers. (Some of this demand may be automatically captured through customer orders while the remainder is manually loaded. This process is referred to as Suppressed Demand.)

Cuts/delays on Continuous Replenishment Program (CRP) or Vendor Managed Inventory (VMI) generated orders should be reported in Service Level / Fill Rate, even including orders on products which are used to fill up the truck.

7.1.9.4. Formula

For Order to Receipt:

$$Fill\,Rate(\%) = \frac{Received\,Units}{Ordered\,Units} \times 100$$

For Order to Ship:

$$Fill\,Rate(\%) = \frac{Shipped\,Units}{Ordered\,Units} \times 100$$

Ordered Units: Units ordered by the buyer in the original order.

$$Ordered\,Units = System\,Captured\,Units^{(1)} + Dropped\,Units^{(2)}$$

Received Units: Units received by the buyer. These are the invoiced units minus refused units.

$$Shipped\,/\,Received\,Units = Invoiced\,Units^{(3)} - R.efused\,Units^{(5)}$$

(1) System Captured Units: Units input in the Order/Shipping/Billing (OSB) System using any order acquisition tool. Some order acquisition tools may drop some units due to product data base misalignment; this amount will be reflected as "Dropped Units".

(2) Dropped Units: Units dropped by misalignment of Product Data Base between Buyer and Seller. Some of these misalignments are: Initiatives data, depletion time alignments and prices differences. E.g. orders on closed codes which are not processed in OSB.

(3) Invoiced Units: Units billed and shipped to Buyer.

$$Invoiced\,Units^{(3)} = System\,Captured\,Units^{(1)} - Canceled\,Units^{(4)}$$

(4) Cancelled Units: Units cut (or cancelled) or delayed due to availability issues during Delivery Schedule system (DSS/ATL) process, Loading process, Buyer caused or Allotments.

(5) Refused (rejected) Units: Units rejected by buyer due to Seller or Buyer reasons. Main mistakes are codes changes, quality issues or not ordered product.

7.1.9.5. Conditions

Table 7-1 Counted against Service Level/ Fill Rate Goals

Description	When to Use
Beyond Selling Period	Product cut on items seasonal in nature with a buy period, or in-out products
CPU Space/Weight	Cut is driven by CPU truck size
Discontinued / Too Early Product	Quantity change due to a discontinued item, or new item prior to start ship
Major Service Issue	Product cut due to a major long-term supply chain issue communicated to buyers
Material Change	Materials / Orders being rejected
National Sales Allocation	Product cut due to a national allocation
Order Increment Adjustment	Quantity change because it doesn't fit in case/layer/pallet increments.
Order Size Change	If supplier changes the quantity to the size of the order
Over ship – regular order	Over ship on 1 line item does not count toward fill rate/service level %
Space/Weight Delivered	Cut due to space or weight of a delivered truck
Stock Out/Unavailable	Cuts product as product is not available
VMI Change	Change in VMI order after order has been placed.
VMI Original Order Qty	Units ordered by our Customer in the original order may not fulfill demand.
VMI return/refusal	Over ship on 1 line item and it for any reason it's returned or refused.

Table 7-2 Not Counted against Service Level/ Fill Rate Goals

Description	When To Use
Material Change	Materials / Orders being added not previously on an order
Over ship - VMI/CRP only	Over ship on 1 line item does not count toward fill rate/service level (unless it creates a cut in a different SKU.)
Quantity Change	Quantity change (increase or decrease) to item already on the order via buyer request

7.1.9.6. Examples

Example 1 Simple Scenario

■ RET Company orders 10 products that total 1000 cases, on its Purchase Order #PO1.

■ MAN Company ships out 800 cases on 3/3/2007 and the remaining 200 cases on 3/10/2007.

■ MAN Company sends an invoice for 800 cases, on its invoice #INV1 and the remaining 200 cases on its Invoice#INV2.

■ RET Company accepts 800 cases on 3/4/2007.

■ The Fill Rate for this PO1 is 80%.

Calculation:

■ **Fill Rate %** = Received Cases/ Ordered Cases. (800/1000 = 80%)

■ **Ordered Cases** = System Captured Cases + Dropped Cases (1000 + 0 =1000)

■ **Received Cases** = Invoiced Cases (System Captured Cases – Cancelled Cases) –Refused Cases ((800 -0) -0)

Example 2 Complex Scenario

■ RET Company orders 10 products that total 1000 KG on its Purchase Order #PO1.

■ MAN Company ships out 800 KG on 3/3/2007, and the remaining 200 KG on 3/10/2007.

■ MAN Company sends an invoice for 800 KG, on its invoice #INV1 and the remaining 200 KG on its Invoice#INV2.

■ RET Company accepts 500 KG and refused 300 KG on 3/4/2007.

■ The Fill Rate for this PO1 is 50%.

Calculation:

■ **Fill Rate %** = Received KG/ Ordered KG. (500/1000 = 50%)

■ **Ordered Pounds** = System Captured KG + Dropped KG (1000 + 0 =1000)

■ **Received Pounds** = Invoiced KG (System Captured KG – Cancelled KG) –Refused KG ((800 -0) -300)

7.1.9.7. Reference Source

■ GCI KPI02/03 (unit basis vs. cost basis)

7.1.9.8. Typical Data Source

■ Retailer for Received Fill Rate

■ Supplier for Shipped Fill Rate

7.1.10. Order to Delivery Cycle Time (Hours)

7.1.10.1. Aliases

■ Order / Delivery Lead Time

■ Lead Time

■ Cycle Time

■ Order Delivery Cycle Time

■ Delivery Lead Time

7.1.10.2. Definition

The average length of time between order placement (fax, phone, EDI) and the time product arrived and was available for unloading at the agreed customer location.

7.1.10.3. Rationale

This measure provides an ability to calculate how quickly an order is processed to delivery. The measure plays an important role in evaluating the effectiveness of the organizations order to delivery process.

7.1.10.4. Formula

$$OrderToDeliveryCycleTime = \frac{\sum_i \left(ReceivedDateTime_i - OrderDateTime_i \right)}{i}$$

Where *ReceivedDateTime* = Date Time on which product is 'checked in and available for unloading' by the customer (including transit, warehousing, appointment delays)

Elapsed time is measured in calendar hours, not business hours.

Order Received Date Time = Date Time 0

Order Actual Receipt Date Time = Date Time on which product is 'checked in and available for unloading' by the customer (including transit, warehousing, appointment delays)

Individual Orders

OrderActualReceiptDateTime – OrderReceivedDateTime = OrderToDeliveryCycleTime

Orders over a Period

=Average of Order to Delivery Cycle Time (for all orders delivered within period)

Note: Order to Delivery Cycle Time does not include the time during which product is being slotted in a customer's warehouse until such time as available to ship to retail outlets

7.1.10.5. Conditions

Order to Delivery Cycle Time is highly dependent on manufacturer lead-time requirements and buyer requested delivery date. It should however, be simple to report basis 2 common activities, order placement and order actual arrival at the customer's gate/dock location (i.e. checked in at gate and available for unloading).

The date time stamp of order placement should be a common metric of date time -0- and not factored into the cycle time calculation due to the variability of order placement methodologies.

Order to Delivery Cycle Time is calculated using actual elapsed time in calendar hours, not business hours.

Many activities can occur simultaneously within the cycle (ex. transportation tendering and warehouse picking)

Backorder of cut cases should be factored with a new Order to Delivery Cycle Time, even though an open component of the original purchase order.

Advanced orders can increase the cycle time substantially.

7.1.10.6. Examples

Note The unit of measure to calculate Order to Delivery Cycle Time is hours, and the alternative can be days as it can be calculated. This is consistent with GCI use of hours to calculate

Example 1: Manufacture to forecast assuming 7 calendar day operations

- Order is placed via EDI by customer (Hour #0)
- Order is processed/reviewed by manufacturer and/or sent to plant/distribution facility for fulfilment (Hour #24)

- Order is picked and transportation arranged in correspondence with the buyer 'requested delivery/pickup date' (Hour #48 - Hour #72)

- Shipment departs fulfilment location en route to customer location (Hour #96) – 24 hour transit

- <u>Product arrives at customer location and is available for unloading (Hour #120)</u>

- Order to Delivery Cycle Time = 120 hours

- Order to Delivery Cycle Time = (120-0)/1

Example 2: Manufacture to order, assuming 3 day production cycle

- Order is placed via EDI by customer (Hour #0)

- Order is processed/reviewed by manufacturer and/or sent to plant/distribution facility for fulfilment (Hour #24)

- Production of product occurs (Hour #96)

- Order is staged and transportation arranged in correspondence with the buyer 'requested delivery/pickup date' (Hour # 120)

- Shipment departs fulfilment location en route to customer location (Hour # 144) – 24 hour transit

- Product arrives at customer location and is available for unloading (Hour #168)

- Order to Delivery Cycle Time = 168 hours

- Order to Delivery Cycle Time = (168-0)/1

7.1.10.7. Reference Source

- GCI Lead Time – Order / Delivery Cycle Time

7.1.10.8. Typical Data Source

- Retailer

✓ **Note** From a Direct Store Delivery perspective-- there are too many uncontrollable factors at a store level to apply this measure

7.1.11. On Time Delivery (%)

7.1.11.1. Aliases

- None

7.1.11.2. Definition

The percentage of shipments that arrived on the receiver's premises within the agreed date time out of all shipments that were delivered. The first scheduled appointment date time is the recommended agreed date time, and the complete agreed date time list is available in the parameter table.

7.1.11.3. Rationale

On Time Delivery is a measure that is used to evaluate the timeliness of deliveries to the receiver. It is commonly used between trading partners to determine the effectiveness of the transportation carrier

that is being used, as well as the overall responsiveness of the supplier. Late deliveries create supply chain inefficiencies as they disrupt the receiving process and lead to extra trailer moves and appointment scheduling adjustments. In more "lean" or "just-in-time" environments, a poor On Time Delivery rating could have serious store service level ramifications, as it is an indicator that the product was not available for shipment to the stores.

7.1.11.4. Formula

$$OnTimeDelivery\% = \left(\frac{TotalDeliveries - NonCompliantDeliveries}{TotalDeliveries} \right) * 100$$

- **Total Deliveries:** refers the number of deliveries made from the supplier to the receiver in a given time period
- **Noncompliant Deliveries:** refers to the number of deliveries that did not arrive on the receiver's premises within the agreed date time in the same time period.

7.1.11.5. Conditions

1. On Time Delivery should be based on the receiver's record of check-in.

2. There are several commonly used definitions for this measure. For example:

   □ Some trading partners consider a delivery "on time" if it arrived within a defined time window (e.g. within 2 hours of a scheduled appointment date time). However, the most common definition considers a delivery "on time" only if it arrived <u>on</u> or <u>before</u> the scheduled appointment date time. While this measure supports both "delivery window" and "on or before" alternatives. The recommend approach is to use "on or before".

   □ Oftentimes, the timeliness of deliveries is measured against the original order (PO) date. However, the first scheduled appointment date time is the preferred target as it is the first time that both trading partners are able to confirm a delivery time. Similarly, the last scheduled appointment date time is not the preferred target as it often tends to measure a retailer, supplier, or carrier's ability to adjust to last minute changes, as opposed to truly measuring on time delivery.

3. DSD Considerations.

   □ In a traditional Direct-Store-Delivery (DSD) environment, such as beverages, packaged cookies/crackers, and bagged snacks, there is typically not a "Purchase Order," but rather an order that is generated by the supplier or an agent of the supplier. Therefore, "On Time Delivery" should be based on the order that is generated by the supplier.

   □ DSDs are typically measured by the ability to deliver the product within a date time window.

   □ Since there will not necessarily be a receiver check-in log, the DSD supplier's records will determine whether a delivery is on time or not.

   □ Given these considerations, DSD On Time Delivery should be the percentage of a supplier's shipments that arrived at the store by the end of the agreed upon delivery window.

21. Backhaul / CPU Considerations

   □ On Time Delivery for Customer Pick-Ups (CPU) should be measured the same as it is for traditional deliveries.

7.1.11.6. Examples

Example 1: "On or before" appointment time vs delivery window

A retail buyer creates a Purchase Order, which includes a delivery date of March 15. The supplier contracts with a carrier to make the delivery. The carrier calls the retailer to obtain an appointment date time at the retail distribution centre. The carrier is given an appointment date time of 3PM on March 15. According to the retail check-in records, the carrier arrived at the retail distribution guard shack at 3:15PM.

This delivery is late when the Delivery Time Reference Basis parameter is the "first scheduled appointment" date time and the Appointment Time Measurement Basis is "on or before".

If the Appointment Time Measurement Basis is set to "delivery window" and the Delivery Window is equal to or greater than 15, the delivery would be considered on time.

Example 2: First vs Last scheduled appointment date time (weather related)

A retail buyer creates a Purchase Order, which includes a delivery date of March 15. The supplier contracts with a carrier to make the delivery. The carrier calls the retailer to obtain an appointment date time at the retail distribution centre. The carrier is given an appointment date time of 3PM on March 15. Due to a snow storm, the retailer contacts the carrier and pushes the delivery appointment back to 1PM on March 17. According to the retail check-in records, the carrier arrived at the retail distribution guard shack at 12:30PM on March 17.

The delivery is considered to be on time when the Delivery Time Reference Basis parameter is based on recipient last scheduled appointment date time and the Appointment Time Measurement Basis is "on or before".

The delivery is considered late when the Delivery Time Reference Basis parameter is based on first scheduled appointment date time and the Appointment Time Measurement Basis is "on or before".

Example 3: First vs Last scheduled appointment date time (production issue)

A retail buyer creates a Purchase Order, which includes a delivery date of March 15. The supplier contracts with a carrier to make the delivery. The carrier calls the retailer to obtain an appointment date time at the retail distribution centre. The carrier is given an appointment date time of 3PM on March 15. Due to a production problem, the supplier is behind and the product is not ready for shipment. The carrier calls the retailer to reschedule the delivery and they agree on a new appointment date time of 1PM on March 17. According to the retail check-in records, the carrier arrived at the retail distribution guard shack at 12:30PM on March 17.

The delivery is considered to be on time when the Delivery Time Reference Basis parameter is based on recipient last scheduled appointment date time.

The delivery is considered late when the Delivery Time Reference Basis parameter is based on first scheduled appointment date time.

Example 4: First scheduled appointment date time vs. need-by date

On March 14, a retail buyer creates a Purchase Order, which includes a delivery date of March 15. The supplier requires 3 days of lead time, so the product will not be available for delivery at the distribution centre until March 17. The carrier calls the retailer to obtain an appointment date time at the retail distribution centre. The carrier is given an appointment date time of 3PM on March 17. According to the retail check-in records, the carrier arrived at the retail distribution guard shack at 2:30PM on March 17.

This load would be considered late when the Delivery Time Reference Basis parameter is based on the original P.O. need-by date.

This load would be considered on time when the Delivery Time Reference Basis parameter is based on first scheduled appointment date time.

Example 5: (direct store delivery)

Retail Outlet has set delivery days assigned by the supplier. Store has agreed upon delivery windows within those given days for DSD suppliers to arrive. Retailer has this schedule in their receiving system. Suppliers' delivery driver arrives at the store on the day of the week and within the delivery window they are assigned to.

This is considered on time when the Delivery Time Reference Basis parameter is based on first scheduled appointment date time.

Example 6: Early delivery

A retail buyer creates a Purchase Order, which includes a delivery date of March 15. The supplier contracts with a carrier to make the delivery. The carrier calls the retailer to obtain an appointment date time at the retail distribution centre. The carrier is given an appointment date time of 3PM on March 15. According to the retail check-in records, the carrier arrived at the retail distribution guard shack at 12:30 PM.

This delivery is on time when the Delivery Time Reference Basis parameter is the "first scheduled appointment" date time and the Appointment Time Measurement Basis is "on or before."

If the Appointment Time Measurement Basis is set to "delivery window" and the Delivery Window is less than 150, the delivery would be considered non-compliant.

7.1.11.7.Reference Source

- None

7.1.11.8.Typical Data Source

- Receiver (Retailer, Wholesaler) for the non DSD environment
- Supplier for the DSD environment

7.1.12. Finished Goods Inventory Cover (Days)

7.1.12.1.Aliases

- Days of Supply
- Days of cover
- Manufacturer / Supplier finished goods inventory
- Retail Distribution Centre Finished Goods Inventory
- Retail Store Finished Goods Inventory

7.1.12.2.Definition

The amount of finished goods inventory at the stocking location (or locations) in terms of the estimated daily demand.

7.1.12.3. Rationale

The GCI Scorecard currently contains four separate definitions for Inventory Cover spanning across various points of the supply chain. Those definitions include **raw materials** at the manufacturer and **finished goods** at the supplier, the retail distribution centre, and the retail store. For the purposes of this exercise, Finished Goods Inventory Cover will be defined to encompass all finished goods regardless of where they exist in the supply chain. Raw Materials Inventory Cover will be defined separately. In the future, the ability to aggregate inventory across the entire supply chain will allow for better purchasing and distribution decisions.

7.1.12.4. Formula

$$InventoryCover_{Days} = \frac{OnHandInventoryBalance}{EstimatedDemand_{Day}}$$

- **OnHandInventoryBalance** = Finished goods inventory on hand in units or cases. Pipeline finished goods inventory (en route to next recipient in supply chain) is also included if the Inventory Basis parameter is set to PIPELINE INVENTORY INCLUDED. The default is not to include pipeline inventory.

- **Estimated Demand =** Demand in number of cases or units required for one day. Demand is estimated based upon average historical movement by default, but if the Demand Estimation Basis is set to FORECAST BASIS, forecasted demand is used instead.

    Note Units could be substituted for cases (especially useful for DSD measurements)

7.1.12.5. Condition

The valuation of Finished Goods Inventory and demand should be expressed using a consistent basis. For example, the number of cases in Finished Goods Inventory and the demand could each be expressed in terms of cases or units. Both variables must be expressed in the same context.

Finished Goods Inventory on hand and pipeline Finished Goods Inventory are snapshots that must be captured at consistent time periods.

7.1.12.6. Examples

Example 1: Manufacturer/Supplier's Finished Goods Inventory Cover

A manufacturer has 10,000 cases of finished goods inventory on hand, and 5,000 cases of finished goods inventory in transit to their retailers. They project a demand of 35,000 cases for the upcoming 7 days.

- **OnHandInventoryBalance** = 10,000 Cases on Hand + 5,000 Cases in Pipeline

- **Estimated Demand** = 5,000 cases per day **(35000/7)**

- **OnHandInventoryBalance / Estimated Demand** =   10,000 cases + 5,000 cases / 5,000 cases = 3 days of cover

Example 2: Retail Distribution Centre Finished Goods Inventory Cover

A retailer has 125,000 cases of finished goods inventory on hand in their distribution centre, and 12,000 cases of finished goods inventory in transit to their retail stores. They project a demand of 105,000 cases for the upcoming 7 days.

- **OnHandInventoryBalance** = 125,000 Cases on Hand + 12,000 Cases in Pipeline

- **Estimated Demand** = 15,000 cases per day (105000/7)

- **OnHandInventoryBalance / Estimated Demand** = 125,000 cases + 12,000 cases / 15,000 cases = 9.13 days of cover

Example 3: Retail Store Finished Goods Inventory Cover

A retailer has 500 cases of finished goods inventory on hand in their store (includes the sales floor and the backroom). They project a demand of 350 cases for the upcoming 7 days.

- **OnHandInventoryBalance** = 500 cases

- **Estimated Demand** = 50 cases per day (350/7)

- **OnHandInventoryBalance / Estimated Demand** = 500 cases / 50 cases = 10 days of cover

7.1.12.7. Reference Source

- GCI BM07/8/9

7.1.12.8. Typical Data Source

- Retailer

- Supplier for Scenario #1 Manufacturer/Supplier's Finished Goods Inventory Cover

7.1.13. Forecast Accuracy (%)

7.1.13.1. Aliases

- Forecast Quality

7.1.13.2. Definition

The mean absolute percent agreement of the forecast with the actual sales, receipt or shipment quantity, expressed in unit volume or monetary terms.

7.1.13.3. Rationale

Forecast Accuracy is the measure that business people most commonly use to evaluate the effectiveness of sales, order or shipment forecasts. While forecasting as an academic discipline most often measures forecast quality in terms of forecast error, it is more typical in trading partner relationships to set goals in terms of improving accuracy.

7.1.13.4. Formula

There are many ways to calculate forecast accuracy. For the purposes of Trading Partner Performance Management (TPPM), the preferred formula is one minus the unit-sales-weighted mean absolute percentage error (MAPE). This is the sum of the absolute values of the forecast errors (unit forecast – actual sales units) divided by the sum of the actual sales units.

$$ForecastAccuracy\% = \left(1 - \left(\frac{\sum_{i=1}^{n}|Actual_i - Forecast_i|}{\sum_{i=1}^{n}Actual_i}\right)\right)*100$$

Period of Time is defined by the submitter of the Forecast

Technically, this formula is more properly referred to as a Percentage Mean Absolute Deviation (PMAD), because classical MAPE calculations sum together the individual percentage errors, rather than summing the absolute errors and dividing by the total sales. The reason that the PMAD approach is preferred in practice for retail sales forecasting is because classical MAPE causes a divide-by-zero error if any product in the scope of the calculation has zero sales. The PMAD approach usually avoids this problem when used at a category or business level, where forecast accuracy is usually reported.

There are situations in which forecast error can be greater than 100%, and as a result, forecast accuracy is negative. In these cases, forecast accuracy is defined as 0%.

7.1.13.5. Condition

Forecast Accuracy should be measured at a product item level for the scope of the business being evaluated. Sales forecast accuracy for XYZ brand in the trading relationship between Retailer A and Manufacturer B would take the forecast for each item in the XYZ brand, and compare it to actual sales for that brand summed across all Retail A unit store sales.

Forecast Accuracy should also be measured based upon a lagged forecast – that is, a forecast that was made some time prior to the actual sales being recorded. TPPM recommends that a forecast lag of four weeks (or one month) be used. If the forecast was based upon a different lag, the lag value should be noted.

7.1.13.6. Examples

A retailer has three stores – 1, 2 and 3 – that sell Item A. On February 1, the retailer forecasts sales of 100 units of Item A for each store for the week of March 1.

On March 2, the retailer reports that actual sales of Item A at stores 1, 2 and 3 for the week of March 1 were 90, 100, and 110. As a result, the forecast accuracy for Item A was:

Store	Forecast Unit Sales	Actual Unit Sales	Absolute Deviation	Result
1	100	90	10	
2	100	100	0	
3	100	110	10	
Total	300	300	20	20/300 = 6.7% Forecast Error. 100% - 6.7% = 93.3% Forecast Accuracy

7.1.13.7. Typical Data Source

- Retailer

7.1.14. On Time Payment (%)

7.1.14.1. Aliases

- None

7.1.14.2. Definition

The percentage of payments made within a seller's terms of sale out of all payments received.

7.1.14.3. Rationale

On time payment is a critical measure to drive the implementation of action plans, with the goals to drive timely payment of invoice.

7.1.14.4. Formula

$$IF\left(FundsReceiptDate - InvoiceDate\right) \leq SellerTerms \Rightarrow OnTimePaymentOccurence$$

$$OnTimePayment\% = \left(\frac{\sum OnTimePaymentOccurrence}{\sum PaymentOccurence}\right) * 100$$

Where Start of Terms Date is the date at which the invoice is generated by the seller (Day 0).

Receipt of Funds Equals:

1. Funds in the Mail: Date of payment postmark by US Postal Service

2. Funds in the Bank: Date at which funds are received into the manufacturers account

   a. Electronic Funds Transfer: Date at which verifiable 'good funds' (bank clearing date) are received into the Manufacturer's account.

   b. Bank Clearing Date: When the funds are cleared and available to the recipient (which is often 24 hours after the initiation of the payment).

7.1.14.5. Condition

On Time Payment is highly dependent on each manufacturer's terms of sale.

The Start of Terms Date should be a common metric to commence the On Time Payment metric (Day 0)

Receipt of funds ends the On Time Payment metric

7.1.14.6. Examples

Example 1 Simple Scenario – In the Mail Terms

- Manufacturer: Net 30 Terms
- Start of Terms Date: 9/1/2007
- Invoice is generated on 9/1/2007 (Day 0)
- Customer mails payment on 9/30/2007
- Postmarked by USPS on 10/1/2007
- Payment is considered 100% On-Time

Example 2 Complex Scenario - EFT w/discount ***

- Manufacturer: 2%/10 days, Net 20, In the Bank
- Payment Method   EFT
- Start of Terms Date: 9/1/2007
- Invoice is generated on 9/1/2007 (Day 0)
- Customer begins EFT transaction on 9/10/2007 (w/2% discount)

- Bank clears funds on 9/11/2007
- Payment is considered 100% On-Time

- OR -

- Invoice is generated on 9/1/2007
- Customer begins EFT transaction on 9/20/2007 (for full invoice $)
- Bank clears funds on 9/21/2007
- Payment is considered 100% On-Time

Note Calculation is strictly a measure of timing; it does not take into consideration compliance with other terms (e.g. discount).

7.1.14.7.Reference Source

- None

7.1.14.8.Typical Data Source

- Manufacturer

7.1.15. Out of Stock (%)

7.1.15.1.Aliases

- Stockout Percentage
- Use of the reciprocal (in-stock percentage) is also common

7.1.15.2.Definition

The percentage of items that is not available at their expected stocking locations out of the set of item stocking locations that were evaluated.

7.1.15.3.Rationale

The most basic way to evaluate the effectiveness of distribution practices is to measure the percentage of items that are out of stock at a store or distribution centre at any given time.

While the formula for out-of-stock percentage is simple, the means of identifying which locations are out of stock can vary dramatically – particularly when the measure is being calculated at the store shelf. Common techniques of out-of-stock measurement include the following:

Manual audits – Personnel scan a set of stocking locations at a point in time, and note how many items is out-of-stock.

Perpetual inventory – Automated systems adjust the on-hand quantity by the number of items sold and received each day.

RFID/EPC – RFID tags identify each unit, or each case or pallet of product at the location.

Sales data analysis – Statistical models identify which items are likely to be out-of-stock based on deviations from an expected sales rate. For example, if sales for a fast-moving item are zero at a store on a given day, it can be assumed to be out-of-stock.

Some techniques try to determine the cost or duration of particular out-of-stocks. However, for trading partner performance measurement purposes, the out-of-stock percentage is usually reported in aggregate, and a simple point-in-time calculation is recommended. Related measures such as lost sales can be used to estimate the financial impact of in-stock improvements.

7.1.15.4. Formula

$$OnHandInventory(StockingLocation) = 0 \Rightarrow OutOfStockLocation$$

$$OutOfStockPercentage = \left(\frac{\sum OutofStockLocation}{\sum StockingLocation} \right) * 100$$

7.1.15.5. Examples

A retailer hires a firm to conduct weekly audits of out-of-stock items in the beverage category across all of its stores. The firm finds that, on average, 150 items are out of stock out of an average of 2000 total beverage items that are stocked in each store. As a result, the out-of-stock percentage at shelf level for the beverages category is (150/2000)*100 = 7.5%.

7.1.15.6. Reference Source

■ A more detailed discussion of out-of-stock measurement and remediation can be found in "A Comprehensive Guide to Retail Out-of-Stock Reduction in the Fast-Moving Consumer Goods Industry" by Thomas Gruen and Daniel Corsten, published by the GMA, FMI and NACDS. It can be found at:

■ http://www.gmaonline.org/publications/docs/2007/OOS_fullreport.pdf.

7.1.15.7. Typical Data Source

■ Retailer

■ Third Party Data (i.e. Nielsen, IRI)

7.1.16. Unsaleables (%)

7.1.16.1. Aliases

■ None

7.1.16.2. Definition

The percentage of products that were removed from the primary channel of distribution due to damage, expiration, discontinuation, seasonality, promotion completion or defects.

7.1.16.3. Rationale

Provide a common framework for the calculation of unsaleables for CPG products. As part of the Trading Partner Performance scorecard, results of the unsaleables measurement should drive collaborative discussions between manufacturers and wholesalers/distributors. These discussions should focus on:

■ Collaboration to identify root causes of unsaleables

- Plans to reduce overall unsaleable expense in the supply chain

- Sharing of expenses associated with unsaleables

- Use of reclamation centres remains widespread and provides useful data to identify and address the root causes of Unsaleables.

Note The payment process for unsaleables typically occurs in one of two formats, retailer reclamation invoice/deduction or a vendor's reimbursement program. For purposes of this document, payment of unsaleables process /method of reimbursement are NOT addressed.

7.1.16.4. Formula

$$Unsaleables\% = \left(\frac{TotalItemCost - UnsaleableItemCost}{TotalItemCost} \right) * 100$$

7.1.16.5. Condition

Unsaleable Reasons may include

Unsaleable Reason	Description
DAMAGED	product that the average retailer would choose not to shelve or consumer would choose not to purchase based on condition of external packaging
DEFECTS	items that are not in workable condition
DISCONTINUED	products that are no longer active in the marketplace
OUTDATED	product beyond its 'best if used by' or shelf life
POST_PROMOTIONAL	post promotional items that are not able to be placed into open stock on the shelf (i.e. unique and not stocked)
SEASONAL_ITEMS	post seasonal items that are not able to be placed into open stock on the shelf (i.e. unique and not stocked)

Note Quality or Safety recalls are not considered part of the unsaleables process and should be addressed separately.

7.1.16.6. Examples

Cost of goods removed as unsaleable	$10		100	
Cost of total goods purchased	$1,000	X	1	= 1%

Note The "true cost" of Unsaleables, when measured in financial terms, should be **_NET_** of any manufacturer provided allowances or discounts

Results of the above calculation are typically 'benchmarked' against other vendors and/or against other Wholesalers/Distributors depending on the party analyzing the information.

7.1.16.7. Reference Source

- "Improving Unsaleables Management Business Practices – Joint Industry Recommendation", 2005 FMI, GMA

- "Product Reclamation Centres: A Joint Industry Report", 1990, FMI, GMA et al.

7.1.16.8.Typical Data Source

- Retailers

7.1.17. Markdowns (%)

7.1.17.1.Aliases

- None

7.1.17.2.Definition

The percentage of monetary sales that were sold at below the normal retail price (that can include but not exclusive to) seasonal clearance, discontinuation, employee discount, response to competitive activity or other retailer-initiated price reductions.

7.1.17.3.Rationale

This measure captures the extent to which items sold did not yield the (unit retail) revenue that might have been expected. Some level of markdowns can always be expected, but increases in this value could indicate that seasonal timing, assortments, pricing or product placement need to be adjusted.

7.1.17.4.Formula

$$Markdown\% = \left(\frac{Sales_{Markdown}}{Sales_{Total}} \right) * 100$$

- $Sales_{Markdown}$ = Monetary sales in the period for items sold at lower than the normal retail price.
- $Sales_{Total}$ = All monetary sales for items sold in the period.

✔ **Note:** This measure depends upon the retailer's information systems being able to capture and report instances of sales made at markdown prices.

7.1.17.5.Conditions

The monetary sales values used to calculate markdown percentage are the total business in the scope of the geography being measured, not a "same store sales" measure.

7.1.17.6.Example

- Sales in most recent 12 months = 12.0 Million
- Sales of items at marked down price in most recent 12 months = 300,000
- Markdown percentage = ((300,000)/12,000,000)*100 =2.5%

7.1.17.7.Reference Source

- None

7.1.17.8.Typical Data Source

- Retailer

8. Summary of Changes

8.1. BMS Release 3.0

Change	BSD Version	Associated CR Number
Updated the BMS to be compliant with MR3.0, and added Performance Measurement Identification and Appointment Window to meet the requirements of the CRQ	1.0.0	10-201 10-258
For Publication ■ Added Copyright R in GS1 Logo ■ Changed Status to Approved ■ Removed year reference in footer copyright statement ■ Replaced Section 10 with updated AG Principles	1.0.0	Not Applicable

8.2. BMS Release 3.1

No work requests. Indirect changes due to upgrade to new Shared and eCom Common libraries.