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Project Schedule and Cost Performance Management Business Process Use Cases

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Project Schedule and Cost Performance Management Business Process Use Cases

1. Objective

The objective of this document is to provide high level business process use cases for developing a set of XML schemas for the purpose of exchanging project schedule and cost performance management data. These use cases are a prerequisite for defining the related Business Requirements Specification (BRS) and the detail data element requirements (the Requirements Mapping Specification or RMS) for the XML schemas.

2. Scope

Project schedule and cost performance data exchange occurs once a contract for a program or project has been approved and funded. Project schedule and cost data is provided to a contract customer on a periodic basis (such as weekly or monthly) for the purpose of providing the customer schedule status and cost performance information. This periodic schedule and cost data is used to determine if the project is ahead or behind schedule, or if the project is over or under running the cost plan (the budget). It can also be used to identify high risk or problem areas for the project and for planning future work based on project performance to date.

This periodic performance management schedule and cost data exchange occurs throughout the life of a project and includes the many tiers of suppliers, prime contractors, and the end customer. Suppliers, prime contractors, and end customers may also have internal customers that they are required to provide periodic project performance data for financial portfolio management purposes.

The focus of this data exchange is world wide across a number of industries including government functional entities (such as defense, energy, transportation, and social services), aerospace and defense, engineering and construction, oil and gas, utility (such as energy, telecom, and municipal services), scientific research and development, and information technology.

The project schedule data includes this type of detail:

- Activities (work tasks and milestones; activity status can provide basis for calculating earned value costs);
- Activity relationships (dependencies or logic – defines the sequence of tasks);
- Resource assignment data (generally provides a basis for the time phased budget/estimate to complete cost values).

The project cost data includes this type of detail:

- Budget costs (cum to date, current period, at complete);
- Actual costs (cum, current);
- Earned value (cum, current);
- Estimate to complete;
- Calculated values such as cost variance, schedule variance, and at complete variance.

This schedule and cost data is coded for planning and reporting purposes using hierarchy structures such as a work breakdown structure (WBS - what is being built or delivered), organization breakdown structure (OBS – functional responsibility), or milestone hierarchy

(sequence of key events). It may also include resource type detail (labor, material, other direct costs, subcontract).

Related periphery data includes:

- Summary contract details such as contract reference numbers, type of contract, procuring entity, funding sources, and summary cost values and schedule dates;
- Accounting calendar fiscal periods (identifies fiscal periods for cost details);
- Schedule calendar (identifies work days, number of working hours per day, holidays);
- Structures (work breakdown structure, organization breakdown structure, milestone hierarchy);
- Code lists such as contract line item numbers (map to a work breakdown structure element);
- Resources (work task assignment, says who is doing work on the project);
- Time phased cost data based on fiscal calendar periods (as opposed to the cum, current, at complete view);
- Thresholds (used for exception reporting; when a cost or schedule variance exceeds a cost or percent limitation, it means there is a problem on the project);
- Funding specifics (a project can be funded by one or more entities, must track which tasks are using which pot of money).

Note: Various US government agencies such as the Department of Defense (DOD), Department of Energy (DOE), and NASA have paper forms, data item descriptions (DID), and other formal documents that dictate the data content for project performance management reporting such as the Contract Performance Report (CPR) and Contract Funds Status Report (CFSR) DID. These are usually included in the contract data requirements list for the contractor. In addition, US government agencies must submit yearly program/project business cases to the Office of Management and Budget (OMB) (Exhibit 300 forms). The XML schemas developed for exchanging schedule and cost data must support all formal reporting requirements for the US government agencies. The intent of the XML schemas is to replace the ANSI X12 806 (schedule) and 839 (cost) transaction sets and complementary UN/EDIFACT PROTAP (schedule) and PROCST (cost) messages with a more robust and flexible approach.

3. Definition of Terms

Earned value	The value of completed or partially completed work expressed in terms of the budget assigned to the work. When compared to the budget, indicates if work is being completed as planned (ahead or behind schedule in cost terms). When compared to the actual costs, indicates if the money spent to do the work is greater than or less than the value of the work completed (over or under budget).
Earned value management	Process of defining and controlling a project in a disciplined manner so that project objectives are met.
Program management	The process of managing a group of projects in a coordinated way.
Program	Overall endeavor to reach an end objective. A program can include many projects.
Project	A temporary and unique endeavor with a well defined scope of work with schedule and cost targets.

IMP/IMS

US Air Force/DOD term. Integrated master plan/integrated master schedule. The integrated master plan establishes the key event guide posts for a project (sequence). It provides the basis for developing the schedule for the project based on what is being produced (the work breakdown structure). In this document, the generic term “milestone hierarchy” is used instead of integrated master plan.

4. The Participants

Customers

Customers are the entities that are responsible for managing a program or project and have the authority to obligate funds (issue a contract) to a contractor or supplier to perform work. They are responsible for collecting the project status and performance data (they receive the data) for analysis on a periodic basis (weekly or monthly). There can be three types of customers.

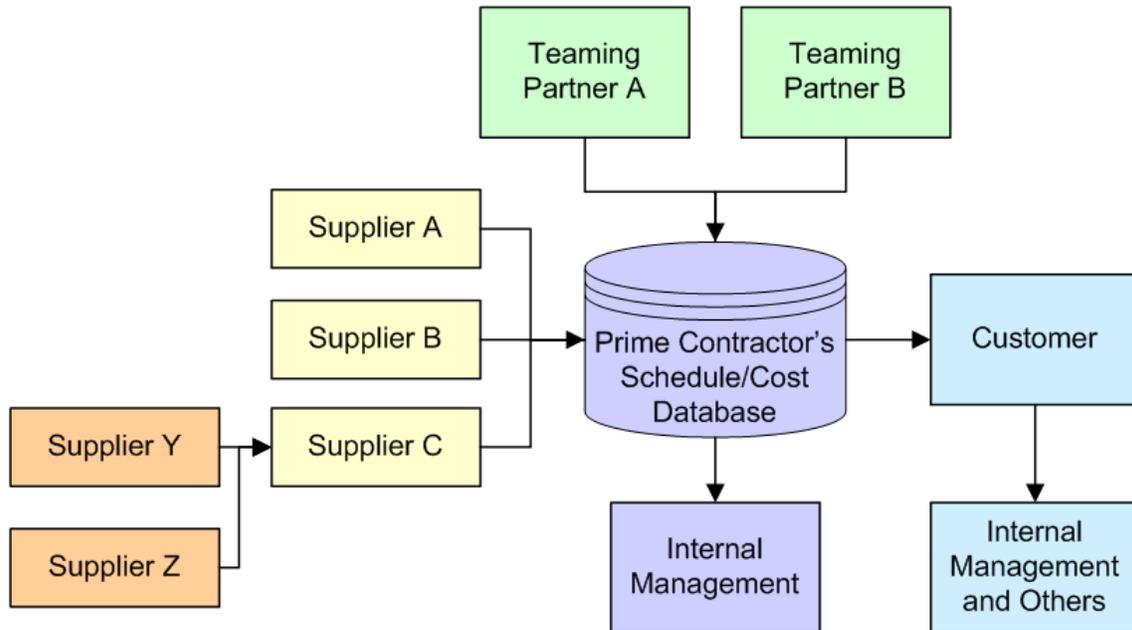
- Government Agency. This can be any government agency that has the authority to commit government money for one or more contractors to perform a service or to build products. A program office is established for the purpose of managing a specific program/project.
- Contractor. This is any commercial entity responsible for the execution of a project.
- Internal Management. This is any internal management entity that wants to review the status or performance of a given project. For a government agency, it could be the head of the agency or other oversight entities such as the US Office of Management and Budget (OMB) that have funding authority. For a corporation, this is upper level management or financial management that is responsible for assessing the performance of a project (project portfolio analysis).

Data Sources

Data sources are the entities that are responsible for doing the work or aggregating the project data for an end customer. There can be three types of data sources.

- Supplier. This is any commercial entity responsible for providing a service or producing a product for a contractor (the customer). There can be many tiers of suppliers and contractors. For the purposes of this document, teaming partners (two or more companies bid on a contract as a joint team), are grouped into the supplier category because one contractor in the teaming relationship functions as the lead contractor. Teaming partners must provide their data to the lead contractor much like a supplier though their schedule and cost is likely to be more integrated with the lead contractor's than supplier's data would be.
- Contractor. This is any commercial entity responsible for the execution of a project. They have the role of aggregating their project data with supplier data to produce the required status and performance data to their customer (another higher level contractor, government agency, or internal management).
- Government Agency Program Office. This is the entity responsible for managing the program/project for the government agency. They have the role of aggregating program data to produce required status and performance data to their customer (internal agency management and any other higher level funding authority).

The most typical data exchange (collecting supplier and teaming partner data for consolidation by a prime contractor who then provides the data to internal and external customers) is illustrated below.



5. Use Cases

Note: In the sections that list the applicable business processes, the purpose of the list is to provide common categories of data that can be exchanged. They are meant to be high level lists representative of the type of data exchanged; they are not requirements. For example, a supplier with a fixed price contract may only be required to provide deliverable milestone status data on a monthly basis to their customer (the contractor); they may not be required to provide any cost data (since it is a fixed price contract).

5.1 Supplier Project Performance

Business Process Use Case	
Business Process Name	Manage Project
Form ID	BPUC-01-Supplier Project Performance
Identifier	Procurement Management
Description	<p>A supplier sends current reporting period activity schedule status and project cost data to a contractor on a periodic basis.</p> <p>Note: A supplier may be required to send cum to date cost data instead of periodic cost data. In that instance, the second use case (BPUC-02) would be used instead.</p>
Participants	<p>Supplier (data source)</p> <p>Contractor (customer)</p>
Frequency	Weekly or monthly (specified in contract)
Performance Goals	Specified in the contract with the supplier
Begins When	Contract begins
Ends When	Contract ends or is cancelled
Traceability	Contractor acknowledges receipt
Business Process Data Categories	<ul style="list-style-type: none"> • Network schedule data (work tasks, milestones, logic) • Network schedule data with resource assignments (resource amounts assigned to activities) • Period based (fiscal calendar) cost data (earned value, actual, estimate to complete)
Typical Scenario	<p>This is a complete data transmission of all applicable data categories for the current reporting period.</p> <p>A supplier sends current reporting period actual costs and earned value costs to their customer. These are period based values (for example, values for July, 2005), not cumulative to date values.</p> <p>In addition, the supplier sends a statused network schedule (work tasks, milestones, and logic) to their customer that reflects the current progress to date (shows completed activities, in process activities, and updated start and finish dates for future activities).</p> <p>As an alternative to the network schedule, the supplier only sends milestone data with status dates to their customer (these are handoff or deliverable milestones the supplier is responsible for).</p>

5.2 Contractor Project Performance

Business Process Use Case	
Business Process Name	Manage Project
Form ID	BPUC-02-Contractor Project Performance
Identifier	Procurement Management
Description	A contractor sends current reporting period project schedule status and cost performance data or project funding data to an external customer on a periodic basis.
Participants	Contractor (data source) Government Agency (customer)
Frequency	Performance data is provided weekly or monthly (specified in contract) Funding data may be provided quarterly or yearly (specified in contract)
Performance Goals	Specified in the contract with the contractor
Begins When	Contract begins (there may be an initial delay at the start of the contract; the first delivery of performance data may not be required until 60 to 120 days after contract award)
Ends When	Contract ends or is cancelled
Traceability	Customer acknowledges receipt
Business Process Data Categories	<ul style="list-style-type: none"> • Summary contract data as applicable (include updates as a result of any change orders since the last performance report) • Network schedule data (work tasks, milestones, logic) • Cum to date, at complete cost data (budget, earned value, actual, estimate to/at complete) • Cum to date, at complete cost and schedule variance/trend data (these values can be calculated) • Staffing data (labor equivalent heads by fiscal period) • Baseline change data • Funding data
Typical Scenario	<p>This is a complete data transmission of all applicable data categories for the current reporting period.</p> <p>The contractor first collects and incorporates all supplier and teaming partner schedule status and cost performance data. They then prepare the required schedule and cost data for their customer as specified in their contract. The data is then sent to the customer.</p> <p>Or, the contractor prepares funding status data for their customer and sends the data to the customer.</p>

5.3 Project or Program Performance

Business Process Use Case	
Business Process Name	Manage Project
Form ID	BPUC-03-Project or Program Performance
Identifier	Procurement Management
Description	A contractor sends current reporting period project schedule status and cost performance data to an internal customer on a periodic basis. Or, the government agency program office sends current reporting period project schedule status and cost performance data to an internal customer on a periodic basis.
Participants	Contractor (data source) Government Agency Program Office (data source) Internal Management (customer)
Frequency	Weekly, monthly, or yearly as specified by the customer
Performance Goals	Dependent on customer requirements
Begins When	Project/program begins
Ends When	Project/program ends or is cancelled
Traceability	Customer acknowledges receipt
Business Process Data Categories	<ul style="list-style-type: none"> • Summary contract data as applicable (include updates as a result of any change orders since the last performance report) • Network schedule data (work tasks, milestones, logic) • Cum to date, at complete cost data (budget, earned value, actual, estimate to/at complete) • Cum to date, at complete cost and schedule variance/trend data (these values can be calculated)
Typical Scenario	This is a complete data transmission of all applicable data categories for the current reporting period. The data source prepares the required data for the internal customer and sends the data or makes the data available to the customer.

5.4 Reset Project Baseline

Business Process Use Case	
Business Process Name	Manage Project
Form ID	BPUC-04-Reset Project Baseline
Identifier	Procurement Management
Description	The participants in a change order action exchange applicable data (they can both send and receive data). The project's schedule and cost baselines must be reset as a result. This reset action may be required as a result of a customer directed change (scope of work or funding changed) or because the project has an unrecoverable schedule or cost condition. These are authorized changes to the schedule and cost baselines.
Participants	Supplier or Contractor (party subject to change order) Contractor or Government agency (customer)
Frequency	Occurs infrequently during the life of a project; the data exchanges may be frequent during the process of resetting the baseline much like a new project event
Performance Goals	Dependent on needs of the project
Begins When	Authorization has been given to update the baselines
Ends When	The schedule and cost baselines are reset
Traceability	Party who receives the data acknowledges receipt
Business Process Data Categories	<ul style="list-style-type: none"> • Summary contract data including change order data • Reporting structure data (work breakdown structure, milestone hierarchy) • Network schedule data (work tasks, milestones, logic) • Network schedule data with resource assignments (resource amounts assigned to activities) • Period based (fiscal calendar) cost data (budget, estimate to complete)
Typical Scenario	<p>This is a complete or partial data transmission of all applicable data categories depending on what has changed.</p> <p>Scenario example 1: Customer sends change order specifics (such as summary contract cost data) to the contractor/supplier.</p> <p>Scenario example 2: The contractor sends updated contractual milestone dates to the supplier based on a revised baseline plan. The supplier uses the new milestone dates to create revised schedule and cost data to support the milestones. The supplier then sends their updated schedule and time phased budget plan to their customer.</p>

5.5 New Project

Business Process Use Case	
Business Process Name	Manage Project
Form ID	BPUC-05-New Project
Identifier	Procurement Management
Description	The supplier and contractor exchange data (they can both send and receive data) when authorization to proceed has been given.
Participants	Supplier Contractor
Frequency	As needed during the project start up phase before the schedule and cost baselines are set (roughly 3 months or so after contract award).
Performance Goals	Dependent on needs of the project
Begins When	Authorization to proceed (contract award) is given
Ends When	Schedule and cost baselines are set
Traceability	Party who receives the data acknowledges receipt
Business Process Data Categories	<ul style="list-style-type: none"> • Summary contract data • Reporting structure data (work breakdown structure, milestone hierarchy) • Code lists (used for selecting and sorting data) • Calendars (fiscal and schedule) • Thresholds • Network schedule data (work tasks, milestones, logic) • Network schedule data with resource assignments (resource amounts assigned to activities) • Period based (fiscal calendar) cost data (budget)
Typical Scenario	<p>This is a complete or partial data transmission of all applicable data categories as needed.</p> <p>Scenario example 1: Contractor sends the preliminary project work breakdown structure to a supplier for initial project planning and scheduling. When the work breakdown structure is finalized, the updated structure is sent to the supplier.</p> <p>Scenario example 2: Supplier sends preliminary schedule data or time phased budget data to the contractor for review. Contractor then updates contractual milestone dates and sends the data to the supplier. Supplier must revise their schedule and budget plans and resend them to the contractor.</p>

5.6 Update Project

Business Process Use Case	
Business Process Name	Manage Project
Form ID	BPUC-06-Update Project
Identifier	Procurement Management
Description	The supplier and contractor exchange data (they can both send and receive data) when minor changes and updates need to be incorporated into the current working schedule or cost estimate to complete data. These change actions incorporate maintenance and other minor changes that do not impact the schedule or cost baselines.
Participants	Supplier Contractor
Frequency	As needed
Performance Goals	Dependent on needs of the project
Begins When	Schedule and cost baselines are set
Ends When	Project ends or is cancelled
Traceability	Party who receives the data acknowledges receipt
Business Process Data Categories	<ul style="list-style-type: none"> • Network schedule data (work tasks, milestones, logic) • Network schedule data with resource assignments (resource amounts assigned to activities) • Period based (fiscal calendar) cost data (estimate to complete)
Typical Scenario	<p>This is a complete or partial data transmission of all applicable data categories depending on what has been updated or changed.</p> <p>Scenario example: Prime contractor updates their estimate to complete data on a regular basis (perhaps this is a quarterly exercise for this company). All suppliers are required to provide updated estimate to complete data (future fiscal calendar time periods) on a quarterly basis.</p>

5.7 Error Notice

Business Process Use Case	
Business Process Name	Manage Project
Form ID	BPUC-07-Error Notice
Identifier	Procurement Management
Description	The customer receiving the data (typically use cases BPUC-01 and 02) discovers an error in the data. The customer sends an error notice to the sender (the data source) identifying the data in error.
Participants	Supplier or Contractor (data source) Contractor or Government Agency (customer)
Frequency	As needed in response to a previous data exchange
Performance Goals	Dependent on needs of the project
Begins When	The customer identifies an error in the data the data source has provided
Ends When	The data the data source has provided is correct
Traceability	Party who receives the error notice acknowledges receipt. Depending on the extent of the errors, the sending part may need to resend (with corrections) a complete set of data or a small subset that corrects the data in error (update notice use case BPUC-08) to the customer.
Business Process Data Categories	Can be any category of data including: <ul style="list-style-type: none"> • Network schedule data (work tasks, milestones, logic) • Network schedule data with resource assignments (resource amounts assigned to activities) • Period based (fiscal calendar) cost data (earned value, actual, estimate to complete) • Cum to date, at complete cost data (budget, earned value, actual, estimate to/at complete) • Staffing data (labor equivalent heads by fiscal period) • Baseline change data • Funding data
Typical Scenario	This is small subset of the applicable data. It only identifies the data in error. Scenario example: Contractor notices the supplier is using incorrect milestone hierarchy codes for a given set of milestones. Contractor sends an error notice identifying the items in error. Supplier replies with an update (use case BPUC-08) to correct the items in error.

5.8 Update Notice

Business Process Use Case	
Business Process Name	Manage Project
Form ID	BPUC-08-Update Notice
Identifier	Procurement Management
Description	The data source sends an update to their customer to modify data previously sent. The data sent can identify data to be added, data to be replaced (change), or data to be deleted. This update can be in response to an error notice from the customer (the receiving party) to correct data in error (use case BPUC-07); or it can be updates that the data source deems necessary to complete any previous exchange of data.
Participants	Supplier or Contractor (data source) Contractor or Government Agency (customer)
Frequency	As needed based on a previous data exchange
Performance Goals	Based on needs of the project
Begins When	The data source identifies updated data to be sent to the customer
Ends When	Customer updates the data previously sent from the data source
Traceability	May be required when updates are in response to a previous error notice (which error notice). May also be required to identify the data previously sent (what data the updates apply to).
Business Process Data Categories	Can be any category of data including: <ul style="list-style-type: none"> • Network schedule data (work tasks, milestones, logic) • Network schedule data with resource assignments (resource amounts assigned to activities) • Period based (fiscal calendar) cost data (earned value, actual, estimate to complete) • Cum to date, at complete cost data (budget, earned value, actual, estimate to/at complete) • Staffing data (labor equivalent heads by fiscal period) • Baseline change data • Funding data • Reporting structure data (work breakdown structure, milestone hierarchy) • Code lists (used for selecting and sorting data) • Calendars (fiscal and schedule) • Thresholds

Typical Scenario	<p>This is a small subset of the data categories or data specific to one or more categories.</p> <p>Scenario example 1: Supplier sends corrected data based on an error notice previously sent from their customer. The new data replaces the data in error.</p> <p>Scenario example 2: Contractor notices they included the wrong set of cost data for a small subset of the work breakdown structure cost performance report they provided to their customer. They send an update notice to the customer that replaces the incorrect data with the correct data.</p> <p>Scenario example 3: Contractor notices they forgot to delete a planning package activity that they replaced with detailed activities. They send an update notice to the customer that deletes the planning package activity and updates the applicable schedule logic.</p>
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