



Integrated Shipbuilding Environment Consortium Phase 3 Electronic Commerce Task Milestone 6 - Common Parts Catalog Use Cases

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Common Parts Catalog (CPC) Extended Use Cases

Problem Definition

A number of mid-size US Shipyards and the US Navy have expressed a particular interest in extending Common Parts Catalog (CPC) capability, currently being implemented by EB, BIW, Ingalls and Avondale, across the US Shipbuilding Industry including Public Shipyards and DOD logistics organizations. The extension of CPC capability requires the following items to be defined:

- Definition of the needs/requirements from the additional parts catalog users
- A set of use cases defining the industry wide CPC Shipyard Supplier Scenarios
- A set of CPC Interface Definitions to enable the extension of CPC capabilities

Tier 1 Shipyard Implementation Alternatives

The original CPC work concentrated on the Tier 1 US Shipyards. These include: Northrop Grumman Ship Systems (Ingalls and Avondale Operations), Northrop Grumman Newport News, General Dynamics – Electric Boat, General Dynamics Bath Iron Works and General Dynamics NASSCO. From this work, several different types of implementations emerged. Sister yards such as Northrop Grumman Ship Systems (Ingalls & Avondale) and Northrop Grumman-Newport News Shipbuilding may choose to adopt a tightly coupled approach with the original CPC system. Other clients including 2nd tier and Navy yards may choose to adopt a more loosely coupled approach as demonstrated in the ISE Project. Industry wide use of CPC “like” capabilities may be built on the initial EB, BIW, Ingalls and Avondale deployments.

A potential model of an industry-wide deployment that takes advantage of ISE work is illustrated in the following figure:

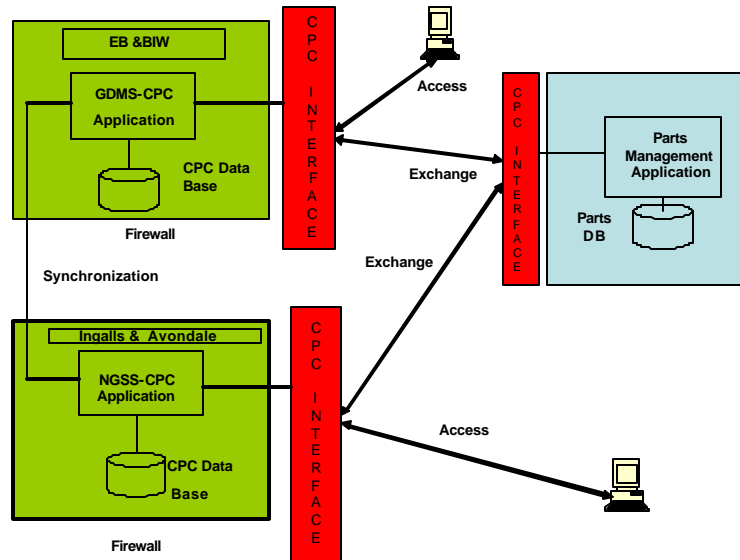


Figure 1 – Industry-wide CPC

The green portion illustrates the extent of the original CPC deployment. The red portion illustrates future development work needed to extend CPC capability beyond the original members. The CPC Interface provides access to CPC functionality. These interfaces provide access to clients such as second tier yards and Navy yards. There is no additional work required by those organizations (beyond a client browser and access privileges to the service).

Should second tier yards implement “CPC Like” capability, a similar set of interfaces can be established. The second tier shipyards could act as suppliers as well as consumers of information. The blue box represents this work. It entails a parts library capability at the second tier/Navy yard as well as an implementation of an interface so the other yards could access that data. In both cases these services would have to provide the appropriate security, access control, query capability and exchange capacity.

In order for such a wide-scale interoperability capability to be deployed it is important that there be agreement on the interfaces, and this agreement must be defined as a formal interface specification.

Shipyard Supplier Scenarios

The ISEC EC team has worked with the major US New Build (NB) shipyards for over 3 years in the SPARS Consortium. There is a major difference between the “New Build (NB)” shipyards and the “Repair and Overhaul (RAO)” shipyards.

The bulk of the US NB shipyard work is concentrated in the 6 Major US Shipyards:

1. Newport News Shipbuilding
2. Electric Boat
3. Bath Iron Works
4. Ingalls Shipbuilding
5. Avondale Shipbuilding
6. NASSCO

In these shipyards the parts identification and procurement process is well structured and organized with a high degree of discipline

Although the NB shipyards all have the same basic processes, there are significant and subtle differences among them. This reflects the wide range of products from complex nuclear submarines and aircraft carriers to auxiliaries and commercial cargo carriers.

The roles, responsibilities and reporting structures vary widely from yard to yard. There is a significant variance between the “de jure” process and the “de facto” of actual daily practices. Process automation will require a degree of flexibility and tailoring to adapt to shipyard organizations and information flow.

There are significant operational benefits to be gained from electronic interchange of parts information from suppliers to shipyards. The benefits are reduced cycle time, reduced labor content in the process, and the potential of overall reduced material costs.

There is a strong basis for collaboration amongst the various shipyards and suppliers in the area of electronic parts data definition and parts classification. A super-set of shipbuilding data elements has been defined to cover the broad range of shipbuilding products as well as a shipbuilding industry parts classification schema (Taxonomy) to permit parametric searches and aggregation of shipyard requirements for multiple shipyard buying consortiums

The requirements for the interchange of part geometry between suppliers and shipyards appears to be limited to a significant sub-set of the overall part geometry.

The required elements are:

1. Foundation and mounting information
2. Operating and maintenance clearances
3. Connecting points for power, fluids, and other attached equipment

There are an additional set of requirements from the second tier shipyards where the bulk of the work is repair and overhauls. However there is some degree of new build as second tier yards participate as sub-contractors in such new programs as Littoral Combat Ship and Deepwater as well as some commercial work for the “Offshore” Industry.

The shipyards visited were:

1. Bender
2. Bollinger
3. VT Halter
4. Todd Pacific
5. Detyens
6. Atlantic
7. Tampa Ship
8. Cascade
9. Kvaerner Massa
10. First Wave

Shipyards Supplier Use Cases

This section contains a series of use cases that identify how shipyards can use the Common Parts Catalog (CPC) to meet their needs today and in the future. The CPC consists of a catalog data-store and a set of tools that facilitate standard part-data access.

A number of mid-size US Shipyards and the US Navy have expressed a particular interest in extending Common Parts Catalog (CPC) capability, currently underdevelopment by EB, BIW, Ingalls and Avondale, across the US Shipbuilding Industry including Public Shipyards and DOD logistics organizations.

This document elaborates on potential uses of the CPC by the Shipyards and the Navy. These use cases are separated into 4 different use models, as described in the next section.

Use Case Models

A Use Case Model describes the functional interactions between actors and use cases. An *actor* is a type of user of the system or *an additional system* that will interact with the

system in question. A *use case* describes how these interactions take place. The CPC Use Cases in this document have been grouped into four Use Case Models:

1. Tier 1 Shipyards
2. Navy/PNSY Shipyards
3. Tier 2 Shipyards
4. Suppliers

Tier 1 Shipyard Use Cases

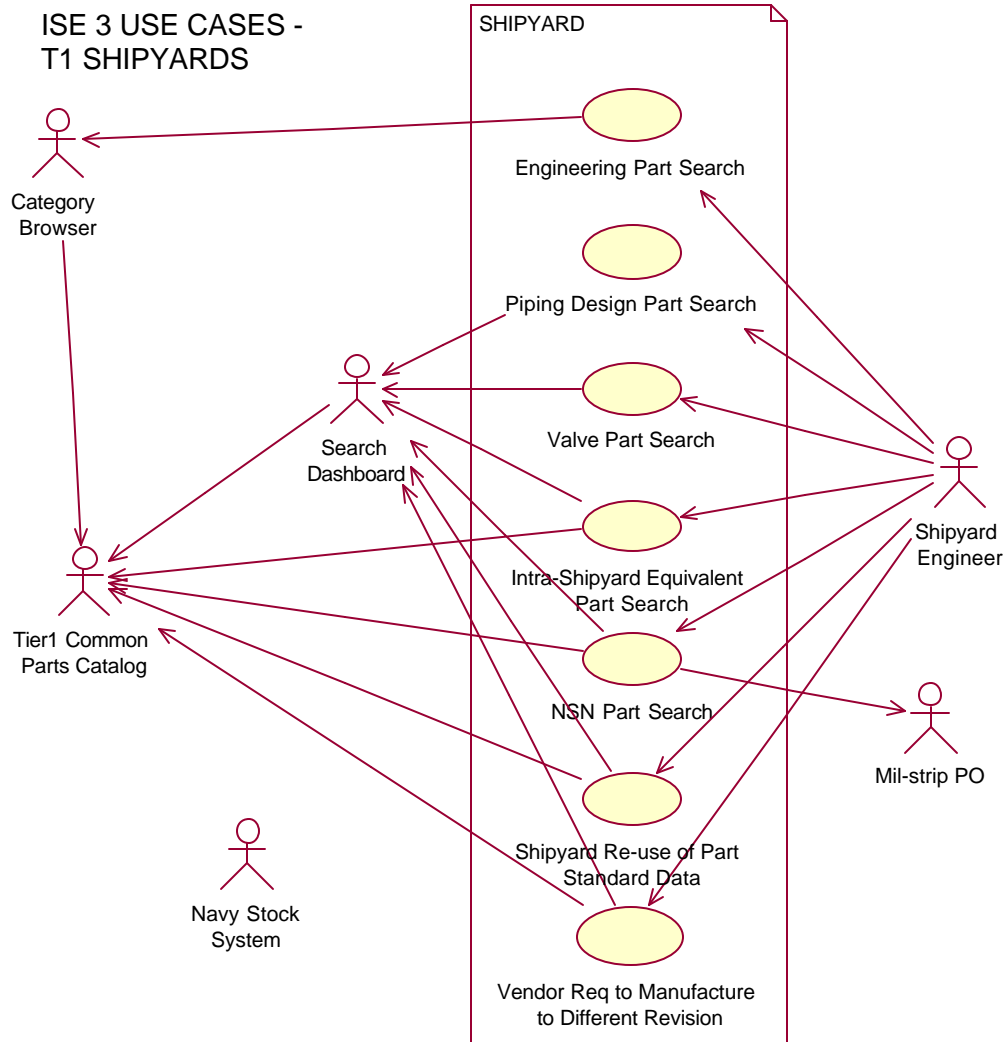


Figure 2 Use Case Model – Tier 1 Shipyards

The above figure, Figure 2 Use Case Model – Tier 1 Shipyards depicts the Use Case Model for the CPC with a primary focus on Tier 1 shipyard use cases. The model consists of the following components:

Actors:

1. Shipyard Engineer

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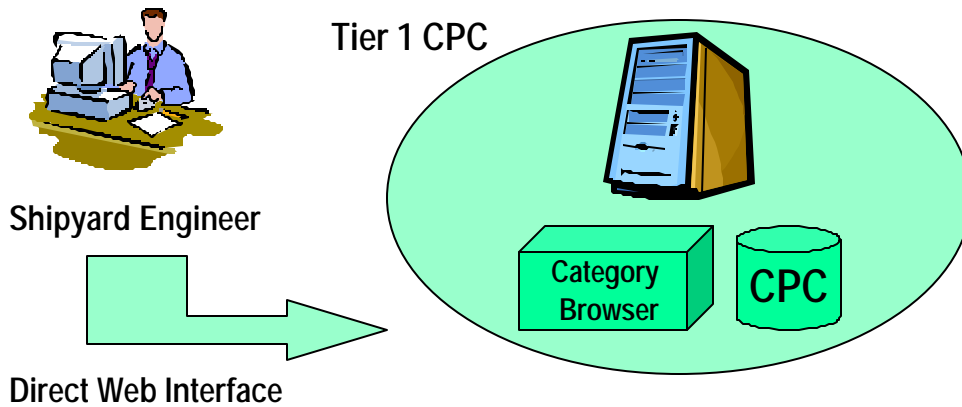
2. Category Browser (CPC Tool)
3. Search Dashboard (CPC Tool)
4. Navy Stock System
5. Mil-strip PO
6. Common Parts Catalog (CPC)
7. Engineer

Use Case List

The following use cases have been identified for this model:

1. Engineering Part Search – Engineering has requested identification of a population of ship catalog numbers for part standardization analysis.
2. Piping Design Part Search – Design Needs a listing of all part instances in the catalog manufactured by a specific vendor to evaluate the vendor’s ability to conform to contracted tolerances.
3. Valve Part Search – An engineer searches for a valve based on specified quality testing requirements.
4. Intra-shipyard Equivalent Part Search – A valve is found to be defective during new construction, is out of stock, and has too long a lead time from the vendor, which leads to the search for an equivalent part.
5. NSN Part Search – Procuring from the Navy Stock System
6. Shipyard Re-use of Part Standard Data – Re-use of existing part data when cataloging a new part.
7. Vendor Request to Manufacture to Different Revision – Review of part information to validate a vendor’s request to use an older revision of a part.

Engineering Part Search



Security: Local Authentication
Data: CPC Classification Schema (CPC format),
EXCEL export

Use Case

Engineering Part Search

Actors

Shipyard Engineer (initiator), Category Browser, CPC

Brief Description

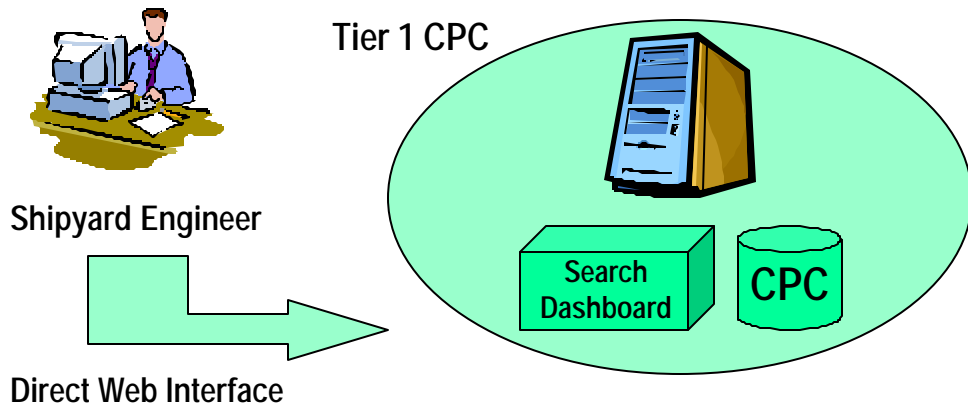
Engineering has requested identification of a population of ship catalog numbers for part standardization analysis.

Flow of Events

1. Shipyard Engineer opens Category Browser tool.
2. System displays choices of Web-style, Picture, Outline, or List display options.

3. Shipyard Engineer selects the Outline display mode to show the outline form of the CPC Classification Schema.
4. System displays schema in Outline form (expandable tree structure.)
5. Shipyard Engineer opens folders in the tree structure until the needed leaf class is found.
6. System displays options for display of all part instances in the desired leaf class.
7. Shipyard Engineer selects Search option.
8. System displays form to enter Search parameters (appropriate part attributes.)
9. Shipyard Engineer submits Search.
10. System displays Search results.
11. Shipyard Engineer selects Export option to export search results.
12. System displays Export parameters (format of export data, All or Range of data, etc.)
13. Shipyard Engineer selects EXCEL format and ALL Records.
14. System exports Search results to EXCEL for further manipulation and distribution.

Piping Design Part Search



Security: Local Authentication
Data: CPC part data

Use Case

Piping Design Part Search

Actors

Shipyard Engineer (initiator), Search Dashboard, CPC

Brief Description

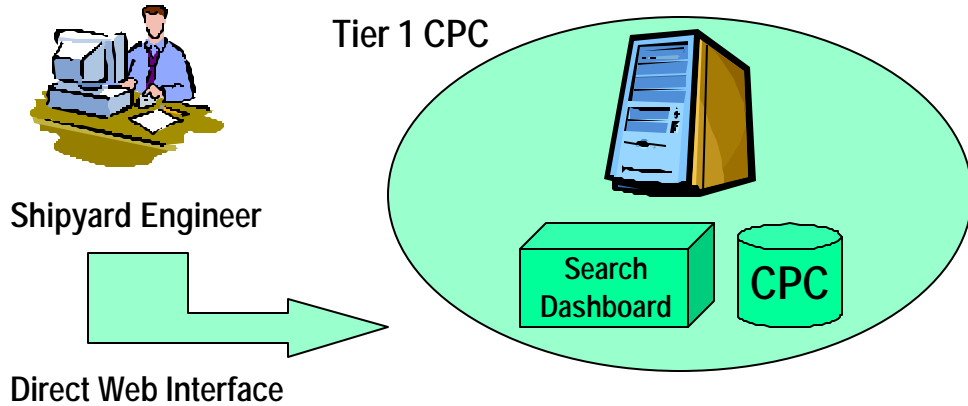
Design needs a listing of all part instances in the catalog manufactured by a specific vendor to evaluate the vendor's ability to conform to contracted tolerances.

Flow of Events

1. Shipyard Engineer opens Search Dashboard tool.
2. System displays search template supporting property values.
3. Shipyard Engineer selects the Noun Name property.
4. System displays field to enter noun name value.

5. Shipyard Engineer enters noun name in filter or searches list to find desired noun name and selects it.
6. System redisplay list of properties.
7. Shipyard Engineer selects Materials property.
8. System list of enumerated valid values for that property.
9. Shipyard Engineer selects a value for the property to use in the search.
10. System displays search form with noun name and property name and values selected.
11. Shipyard Engineer submits Search.
12. System displays Search results – all CPC participating shipyard part numbers with the requested criteria.

Valve Part Search



Security: Local Authentication
Data: CPC part data

Use Case

Valve Part Search

Actors

Shipyard Engineer (initiator), Search Dashboard, CPC

Brief Description

An engineer searches for a valve based on specified quality testing requirements.

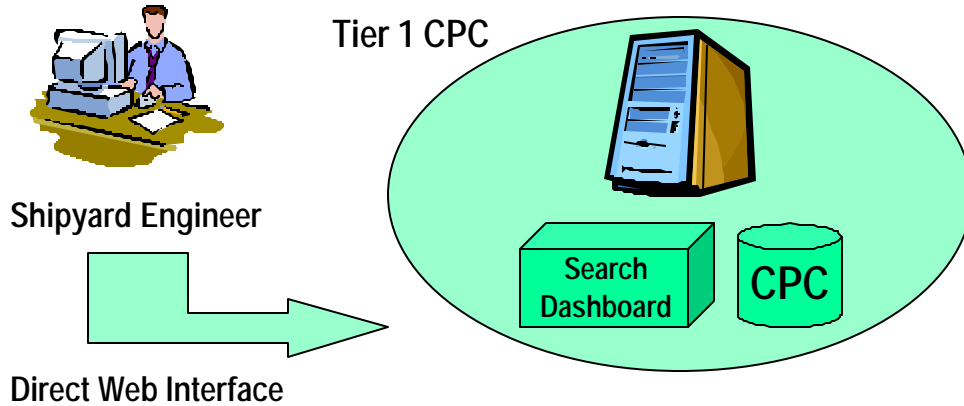
Flow of Events

1. Shipyard Engineer opens Search Dashboard tool.
2. System displays search template supporting property values.
3. Shipyard Engineer selects the Noun Name property.
4. System displays field to enter noun name value.

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5. Shipyard Engineer enters noun name in filter or searches list to find desired noun name and selects it.
6. System redisplay list of properties.
7. Shipyard Engineer selects Materials Level property.
8. System list of enumerated valid values for that property.
9. Shipyard Engineer selects a value for the property to use in the search.
10. System redisplay list of properties.
11. Shipyard Engineer selects Nuclear/Non-Nuclear property.
12. System list of enumerated valid values for that property.
13. Shipyard Engineer selects a value for the property to use in the search.
14. Shipyard Engineer submits Search.
15. System displays Search results – all CPC participating shipyard part numbers with the requested criteria.
16. Shipyard Engineer chooses the part required and picks the shipyard specific class.
17. System displays shipyard specific data which indicates this part has multiple testing requirements

Intra-shipyard Equivalent Part Search



Security: Local Authentication
Data: CPC part data, equivalence data

Use Case

Intra-shipyard Equivalent Part Search

Actors

Shipyard Engineer (initiator), Search Dashboard, CPC

Brief Description

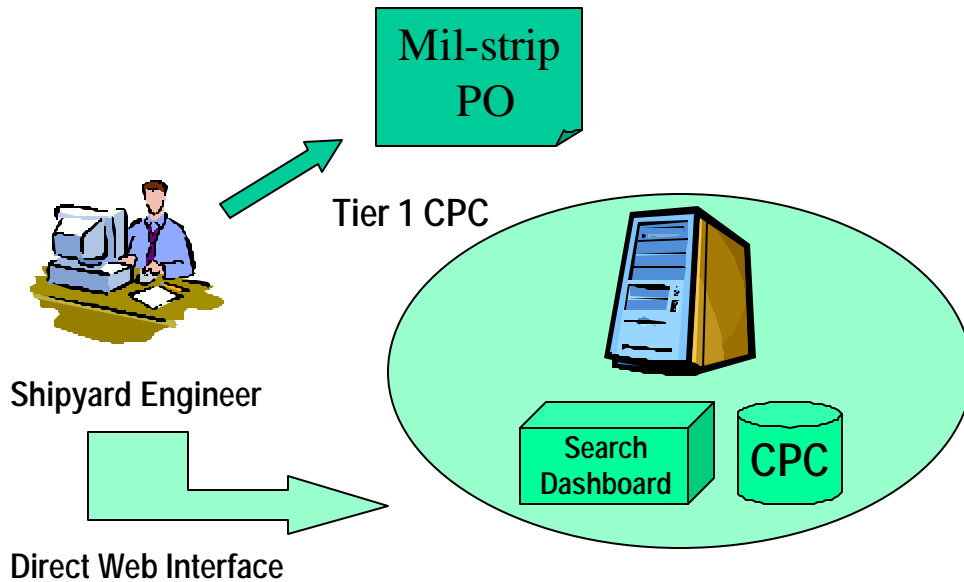
A valve is found to be defective during new construction, is out of stock, and has too long a lead time from the vendor, which leads to the search for an equivalent part.

Flow of Events

1. Shipyard Engineer opens Search Dashboard tool.
2. System displays search template supporting property values.
3. Shipyard Engineer selects the Catalog Number property.

4. System displays field to enter Catalog Number value.
5. Shipyard Engineer enters noun name in filter or searches list to find desired Catalog Number and selects it.
6. System redisplay list of properties.
7. Shipyard Engineer enters value for noun name submits Search.
8. System displays Search results – all CPC participating shipyard part numbers with the requested criteria.
9. Shipyard Engineer chooses the part required chooses the CPC Procured parts view.
10. System displays data that indicates part equivalency and obsolescence information.
11. Shipyard Engineer selects “Equivalent to” tab.
12. System displays electronic link between existing part and equivalent replacement part.

NSN Part Search



Security: Local Authentication
Data: CPC part data, NSN data

Use Case

NSN Part Search

Actors

Shipyard Engineer (initiator), Search Dashboard, CPC, Mil-strip PO

Brief Description

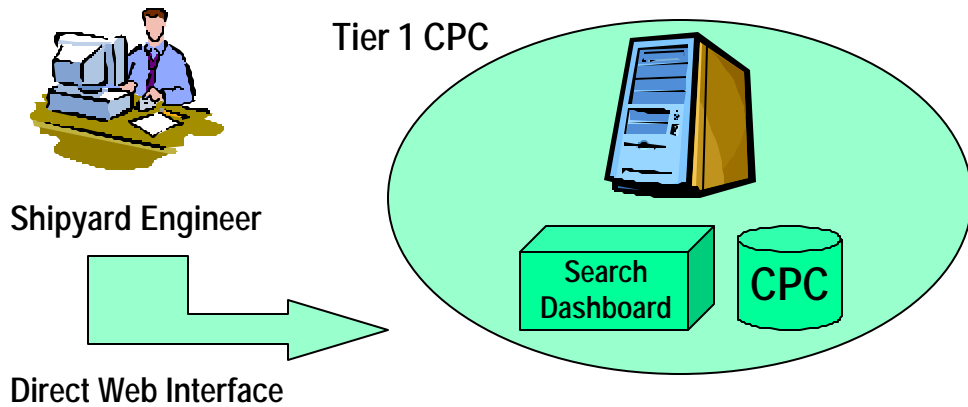
Procuring a part from the Navy Stock System. This is a variation on use case 0 Intra-shipyard Equivalent Part Search, whereby the found equivalent part is already designated for use, and a decision is made to research procuring from the Navy Stock System.

Flow of Events

1. Shipyard Engineer opens Search Dashboard tool.

2. System displays search template supporting property values.
3. Shipyard Engineer selects the Catalog Number property.
4. System displays field to enter Catalog Number value.
5. Shipyard Engineer enters noun name in filter or searches list to find desired Catalog Number and selects it.
6. System redisplay list of properties.
7. Shipyard Engineer enters value for noun name and submits Search.
8. System displays Search results – all CPC participating shipyard part numbers with the requested criteria.
9. Shipyard Engineer chooses the part required chooses the CPC Procured parts view.
10. System displays data that indicates part equivalency and obsolescence information.
11. Shipyard Engineer selects “Equivalent to” tab.
12. System displays electronic link between existing part and equivalent replacement part.
13. Shipyard Engineer determines that the identified equivalent part is already designated for use on another ship, and decides to research procuring from the Navy Stock System.
14. Shipyard Engineer selects the applicable part on the screen and then selects NSN to CPC Part tab.
15. System displays part associations to NSN parts.
16. Shipyard Engineer identifies correct part and initiates a Mil-strip PO for procurement from the government to support the construction schedule.

Shipyard Re-use of Part Standard Data



Security: Local Authentication
Data: CPC part data

Use Case

Shipyard Re-use of Part Standard Data

Actors

Shipyard Engineer (initiator), Search Dashboard, CPC

Brief Description

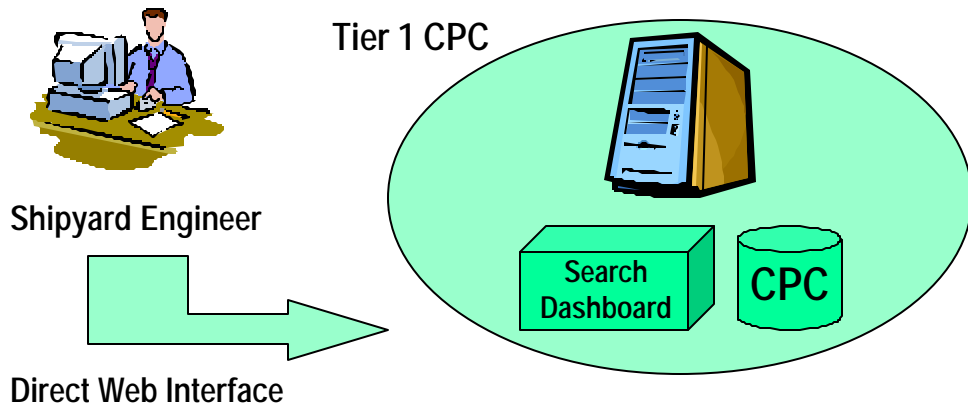
Re-use of existing part data when cataloging a new part.

Flow of Events

1. (NGSS) Shipyard Engineer opens Search Dashboard tool.
2. System displays search template supporting property values.
3. Shipyard Engineer selects the Noun Name property.
4. System displays field to enter Noun Name value.

5. Shipyard Engineer enters noun name in filter or searches list to find desired noun name and selects it.
6. System redisplay list of properties.
7. Shipyard Engineer submits Search.
8. System displays Search results – No NGSS part matches the search criteria.
9. Shipyard Engineer selects Extended Search.
10. System displays data that indicates an EB part number that could support the design requirements. (NGSS) Shipyard Engineer realizes most of the data from the EB part could be reused in specifying an NGSS part
11. Shipyard Engineer copies EB catalog part standard data to create a new NGSS catalog part number and updates information to meet NGSS requirements.

Vendor Request to Manufacture to Different Revision



Security: Local Authentication
Data: CPC format, spec/revision data

Use Case

Vendor Request to Manufacture to Different Revision

Actors

Shipyard Engineer (initiator), Search Dashboard, CPC

Brief Description

Review a part's information to validate a vendor's request to use an older revision (F3) of a part that the purchase order calls out as revision F4.

Flow of Events

1. Shipyard Engineer opens Search Dashboard tool.
2. System displays search template supporting property values.
3. Shipyard Engineer selects the Noun Name property.
4. System displays field to enter Noun Name value.

5. Shipyard Engineer enters noun name in filter (part document id) or searches list to find desired noun name and selects it.
6. System redisplay list of properties.
7. Shipyard Engineer enters mil-spec name as value for part document id and submits Search.
8. System displays list of documents that contain mil-spec name.
9. Shipyard Engineer selects document for this mil-spec that by its name identifies that there is interchangeability between revisions F through F4.
10. System displays all document revision levels.
11. Shipyard Engineer selects the Document Rev/Amend tab.
12. System displays documents, revision, and amendment data as well as the interchangeability code that indicates interchangeability between revisions F3 and F4.
13. Shipyard Engineer selects the required revision/amendment document and then selects the Spec History tab.
14. System displays the spec revision compare document that establishes interchangeability between the subject revisions. The vendor's request is approved.

Navy/PNSY Use Cases

ISE 3 USE CASES - NAVY/PNSY

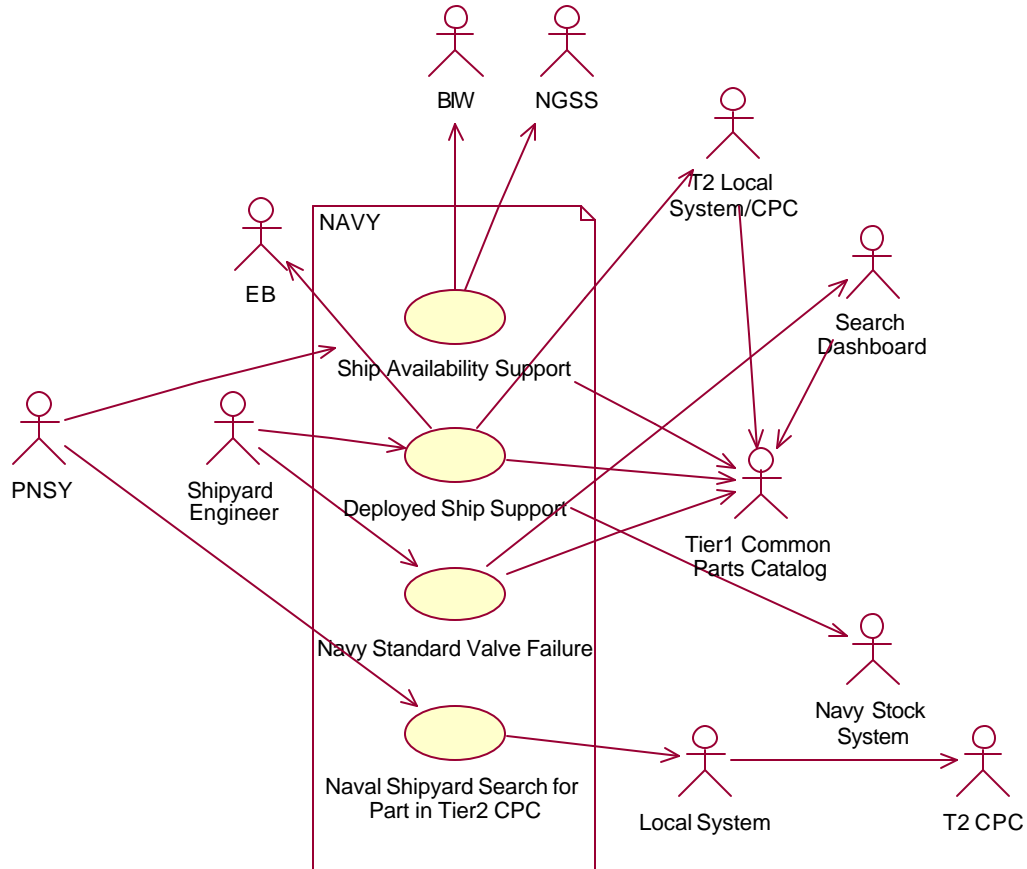


Figure 3 Use Case Model - Navy/PNSY

The above figure, Figure 3 Use Case Model - Navy/PNSY depicts the Use Case Model for the CPC with a primary focus on Navy/PNSY shipyard use cases. The model consists of the following components:

Actors :

1. Shipyard Engineer
2. PNSY (Public Naval Shipyard)

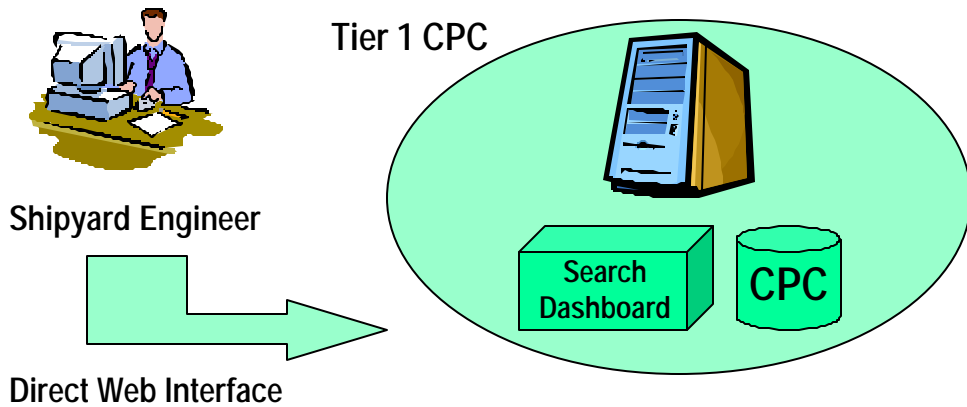
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3. BIW (Bath Iron Works)
4. NGSS (Northrop Grumman Ship Systems)
5. EB (Electric Boat)
6. Search Dashboard (CPC Tool)
7. Navy Stock System
8. Local System (talks to remote CPC)
9. Common Parts Catalog (CPC)
10. T2 CPC (Common Parts Catalog) (Remote)

Use Case List:

1. Navy Standard Valve Failure
2. Deployed Ship Support
3. Ship Availability Support
4. Naval Shipyard Search for Part in Tier 2 CPC

Navy Standard Valve Failure



Security: Local Authentication
Data: CPC part data, part documents

Use Case

Navy Standard Valve Failure

Actors

Shipyard Engineer (initiator), Search Dashboard, CPC

Brief Description

Search test reports regarding a Navy Standard part.

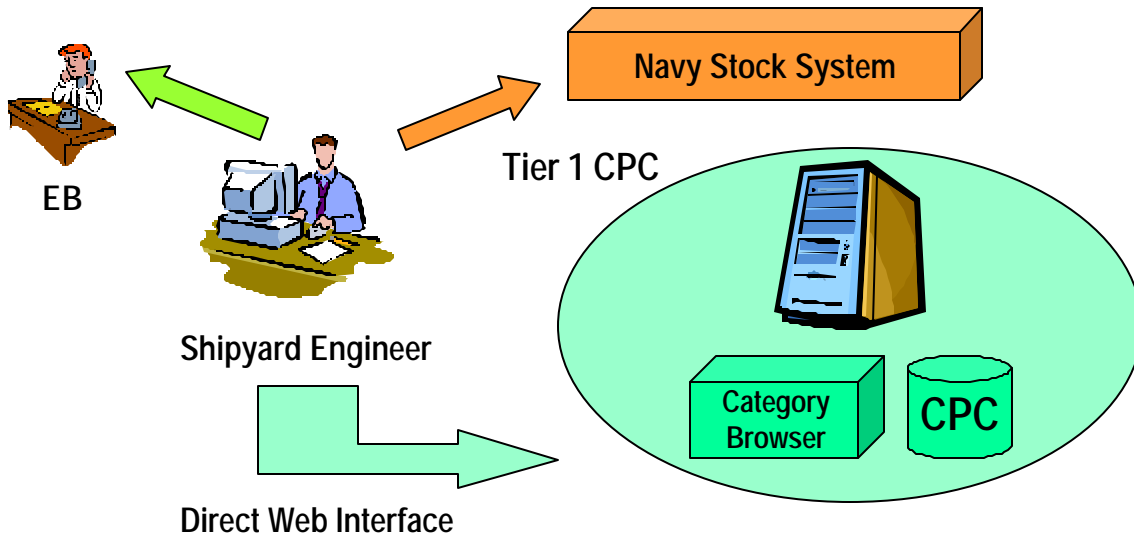
Flow of Events

1. Shipyard Engineer opens Search Dashboard tool.
2. System displays search template supporting property values.
3. Shipyard Engineer selects the Noun Name property.
4. System displays field to enter Noun Name value.

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5. Shipyard Engineer enters noun name in filter or searches list to find desired noun name and selects it.
6. System redisplay list of properties.
7. Shipyard Engineer enters values for Material and Drawing Number.
8. Shipyard Engineer submits Search.
9. System displays list of parts that meet the search criteria.
10. Shipyard Engineer selects “All Parts” then selects Doc Id to CPC Part tab.
11. System displays all documents related to the selected parts.
12. Shipyard Engineer enters search criteria (a procurement note) to narrow list to those meeting a specific test criteria, and selects Search.
13. System displays list of documents for parts that meet the specific test criteria.
14. Shipyard Engineer enters search criteria with appropriate modifiers to show list of those parts that do not have the procurement note and selects Search.
15. System displays list of all parts not having the specified test.

Deployed Ship Support



Security: Local Authentication

Data: CPC part data, part documents, NSN data

Use Case

Deployed Ship Support

Actors

Shipyard Engineer (initiator), Category Browser, CPC, Navy Stock System, EB

Brief Description

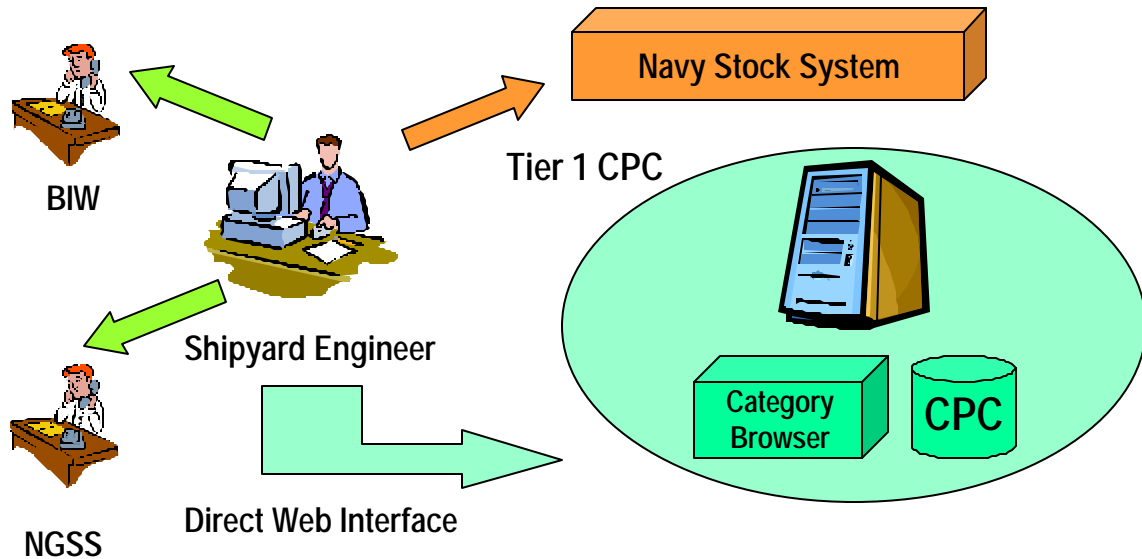
Identify a replacement part for a failed assembly on a deployed Navy ship.

Flow of Events

1. Shipyard Engineer opens Navy Stock System and uses the NAVORD drawing number to find the NSN and Description of the assembly. The Stock System shows no stock on-hand.

2. Shipyard Engineer opens Category Browser tool.
3. System displays CPC outline.
4. Shipyard Engineer selects the NSN to CPC Part class from the Associated Part Information folder property.
5. System displays NSN to CPC Part Search screen.
6. Shipyard Engineer enters NSN value and selects Search.
7. System displays list of results that shows an EB catalog number that cross-references to the required NSN.
8. Shipyard Engineer selects the EB catalog number.
9. System displays the details of the assembly that describes the correct part.
10. Shipyard Engineer selects CPC Part to Document ID tab.
11. System displays list of documents for this part that includes the correct NAVORD drawing.
12. Shipyard Engineer contacts EB for part.

Ship Availability Support



Security: Local Authentication

Data: CPC part data, part documents, NSN data

Use Case

Ship Availability Support

Actors

Shipyard Engineer (initiator), Category Browser, CPC, Navy Stock System, BIW, NGSS

Brief Description

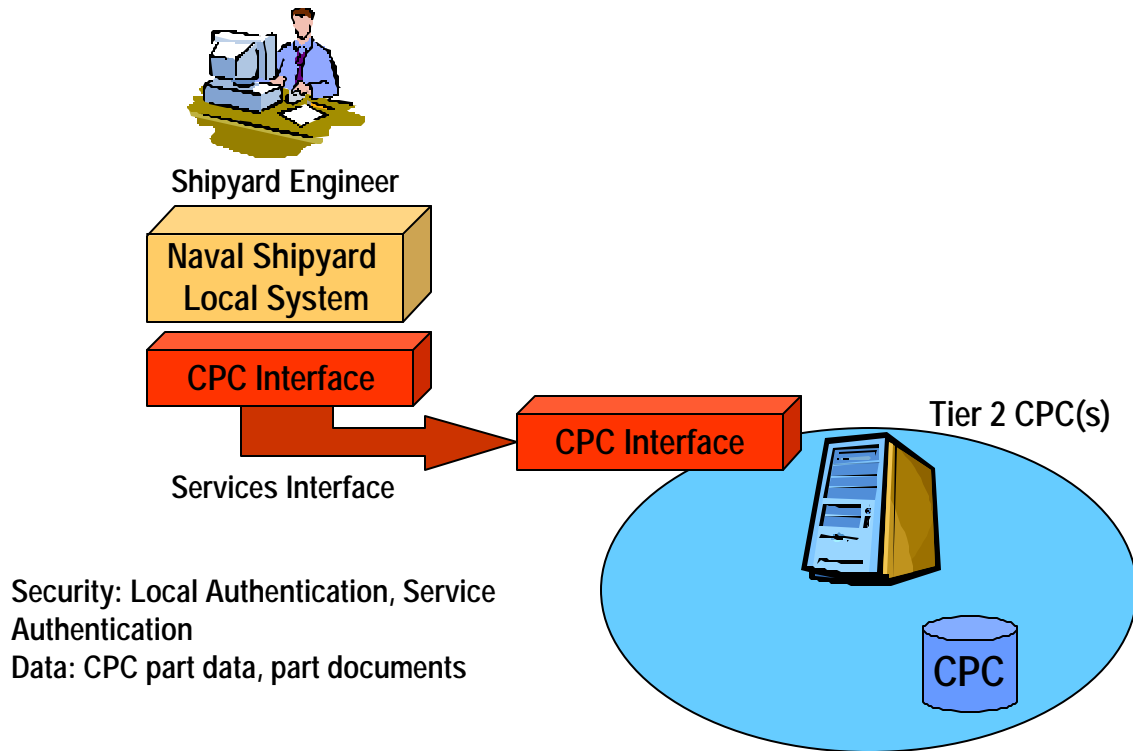
Find replacement parts for a ship during availability at PNSY

Flow of Events

1. Shipyard Engineer opens Navy Stock System and uses the Navy Standard drawing number to find the NSN and Description of the assembly. The Stock System shows no stock on-hand and the vendor lead-time does not support the availability schedule.

2. Shipyard Engineer opens Category Browser tool.
3. System displays CPC outline.
4. Shipyard Engineer selects the NSN to CPC Part class from the Associated Part Information folder property.
5. System displays NSN to CPC Part Search screen.
6. Shipyard Engineer enters NSN value and selects Search.
7. System displays list of results that shows there is no match.
8. Shipyard Engineer selects Documents tab and enters a document number from the NSN that is associated with the part, then selects Search.
9. System displays a list of CPC parts with that part document ID.
10. Shipyard Engineer selects candidate parts and selects “Doc ID to CPC Class” tab.
11. System displays search results showing both EB and BIW catalog numbers.
12. Shipyard Engineer selects BIW catalog number.
13. System displays information for part with BIW catalog number.
14. Shipyard Engineer identifies the part as useful and contacts BIW. BIW identifies no material on-hand. Shipyard Engineer selects Equivalent Catalog Number.
15. System displays an NGSS catalog number.
16. Shipyard Engineer contacts NGSS and identifies material as in-stock and procures the part.

Naval Shipyard Search for Part in Tier 2 CPC



Use Case

Naval Shipyard Search for Part in Second Tier CPC

Actors

Naval Shipyard Engineer (initiator), Naval Shipyard Local System, Second Tier Shipyard CPC

Brief Description

Pearl Harbor Shipyard is searching for part documentation for work done by Bender as a subcontractor to NGSS, which is accomplished by using Pearl Harbor's local system to access the NGSS CPC through the CPC Interface.

Flow of Events

1. Shipyard Engineer accesses local system
2. System displays menu of options

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3. Shipyard Engineer navigates to Remote CPC access function
4. System displays list of CPC instances
5. Shipyard Engineer Selects Bender CPC
6. System displays list of services offered by the Bender CPC
7. Shipyard Engineer selects Search for Part
8. System displays screen to enter search parameters
9. Shipyard Engineer enters search/display criteria and submits
10. System invokes Search service on Bender CPC
11. Bender CPC returns search service invocation results
12. System displays search results
13. Shipyard Engineer selects part and selects Get Document List
14. System invokes Get Document List service on Bender CPC
15. Bender CPC returns Get Document List results
16. System displays document list
17. Shipyard Engineer selects needed document and selects Get Document
18. System invokes Get Document service on Bender CPC
19. Bender CPC returns error code – file not found.
20. System displays error code
21. Shipyard Engineer switches selection to NGSS CPC
22. System displays list of services offered by the NGSS CPC
23. Shipyard Engineer selects Search for Part
24. System displays screen to enter search parameters

25. Shipyard Engineer enters search/display criteria (includes information for Bender part equivalence) and submits
26. System invokes Search service on NGSS CPC
27. NGSS CPC returns search service invocation results
28. System displays search results
29. Shipyard Engineer selects part and selects Get Document List
30. System invokes Get Document List service on NGSS CPC
31. NGSS CPC returns Get Document List results
32. System displays document list
33. Shipyard Engineer selects needed document and selects Get Document
34. System invokes Get Document service on NGSS CPC
35. Bender CPC returns document
36. System displays document
37. Shipyard Engineer detaches document

Tier 2 Shipyard Use Cases

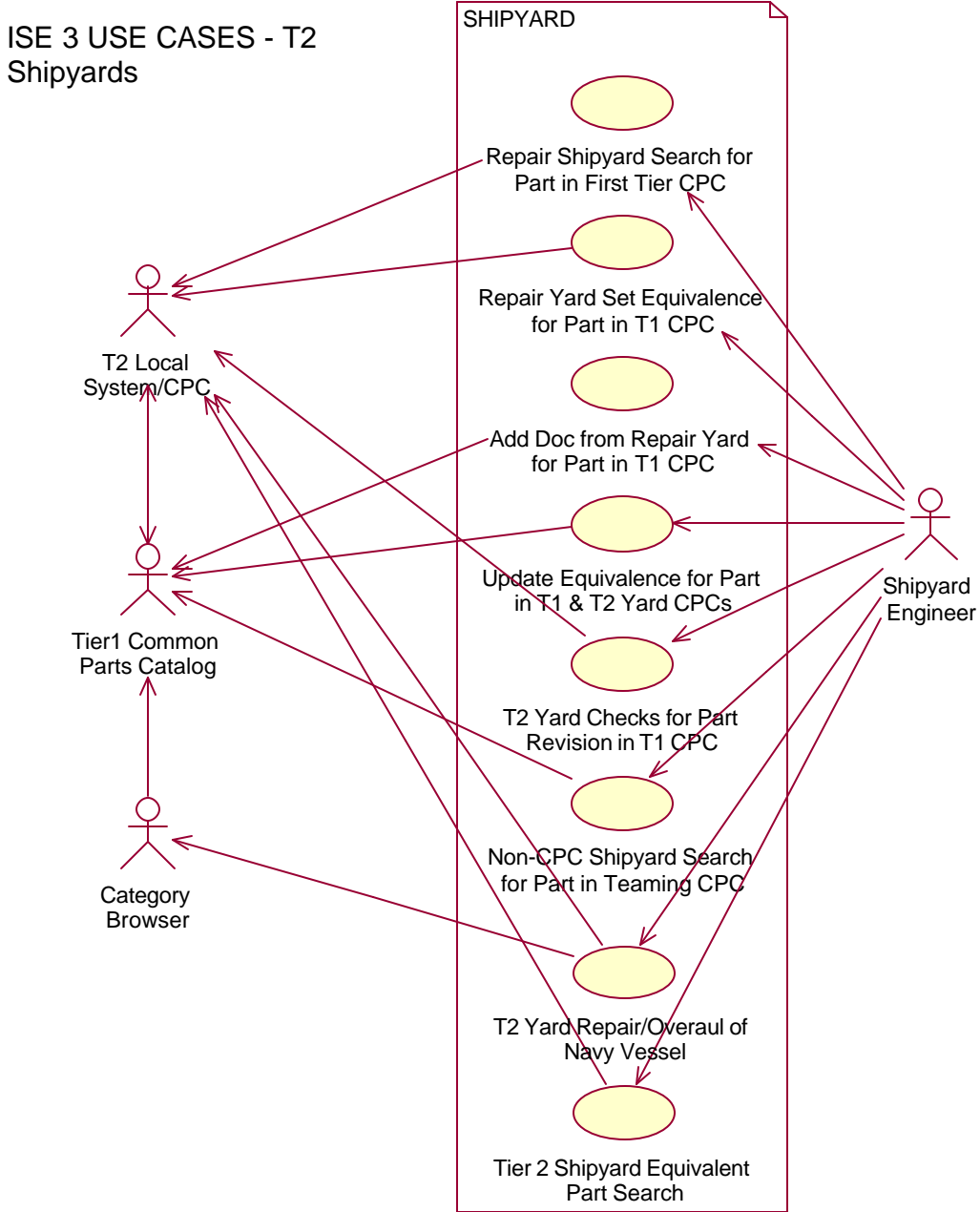


Figure 4 Use Case Model - Tier 2 Shipyards

The above figure, Figure 4 Use Case Model - Tier 2 Shipyards, depicts the Use Case Model for the CPC with a primary focus on Tier 2 shipyard use cases. The model consists of the following components:

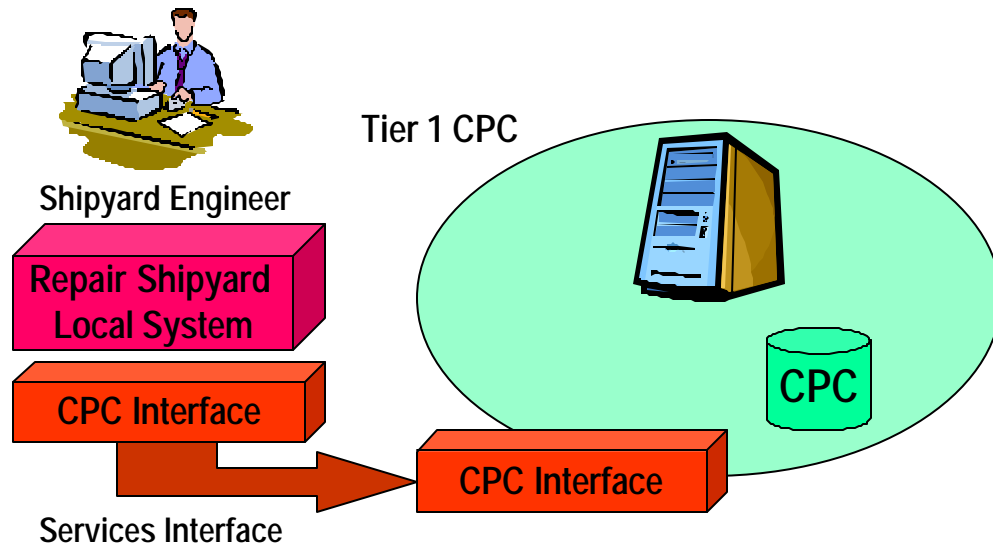
Actors:

1. Shipyard Engineer
2. Local System/CPC
3. Tier 1 Common Parts Catalog (CPC)
4. Category Browser
5. Other Tier 2 CPC (e.g. Bender MIDAPS)

Use Case List:

1. Repair Shipyard Search for Part in First Tier CPC
2. Repair Shipyard Set Equivalence for Part in Tier 1 CPC
3. Add Document from Repair Yard to Part in Tier 1 CPC
4. Update Equivalence for Part in Tier 1 and Tier 2 Shipyard CPCs
5. Tier 2 Shipyard Checks for Part Revision in Tier 1 CPC
6. Non-CPC Shipyard Search for Part in Teaming CPC

Repair Shipyard Search for Part in First Tier CPC



Security: Local Authentication, Service Authentication

Data: CPC part data, part documents, equivalence data

Use Case

Repair Shipyard Search for Part in First Tier CPC

Actors

Repair Yard Shipyard Engineer (initiator), Repair Yard Local System, First Tier CPC

Brief Description

Bender shipyard repair work requires replacement part search in the NGSS CPC, which is accomplished by using Bender's MIDAPS (Material Identification and Procurement System) system to access the NGSS CPC through the CPC Interface.

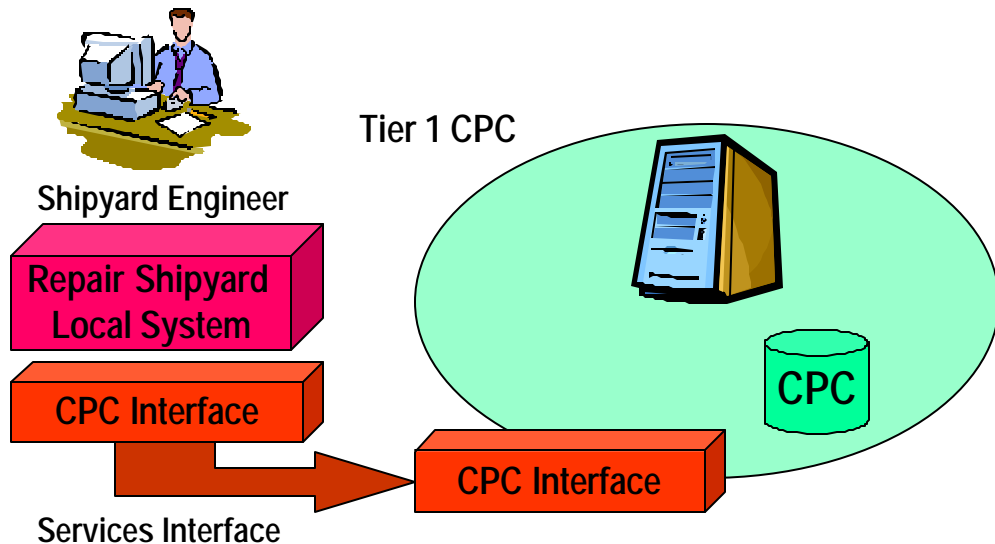
Flow of Events

1. Shipyard Engineer accesses MIDAPS
2. System displays menu of options

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3. Shipyard Engineer navigates to Remote CPC access function
4. System displays list of CPC instances
5. Shipyard Engineer Selects NGSS CPC
6. System displays list of services offered by the NGSS CPC
7. Shipyard Engineer selects Search for Part
8. System displays screen to enter search parameters
9. Shipyard Engineer enters search/display criteria and submits
10. System invokes Search service on NGSS CPC
11. NGSS CPC returns search service invocation results
12. System displays search results
13. Shipyard Engineer searches results for Bender equivalent part and identifies local part to perform repair

Repair Shipyard Set Equivalence for Part in First Tier CPC



Security: Local Authentication, Service Authentication

Data: CPC part data, part documents, equivalence data

Use Case

Repair Shipyard Set Equivalence for Part in First Tier CPC

Actors

Repair Yard Shipyard Engineer (initiator), Repair Yard Local System, First Tier CPC

Brief Description

Bender shipyard repair work results in the identification of equivalence between a part used by Bender for repair and a part in the NGSS CPC. Bender and NGSS engineers analyze the parts and decide to indicate part equivalence, which is accomplished by using Bender's MIDAPS (Material Identification and Procurement System) system to access the NGSS CPC through the CPC Interface.

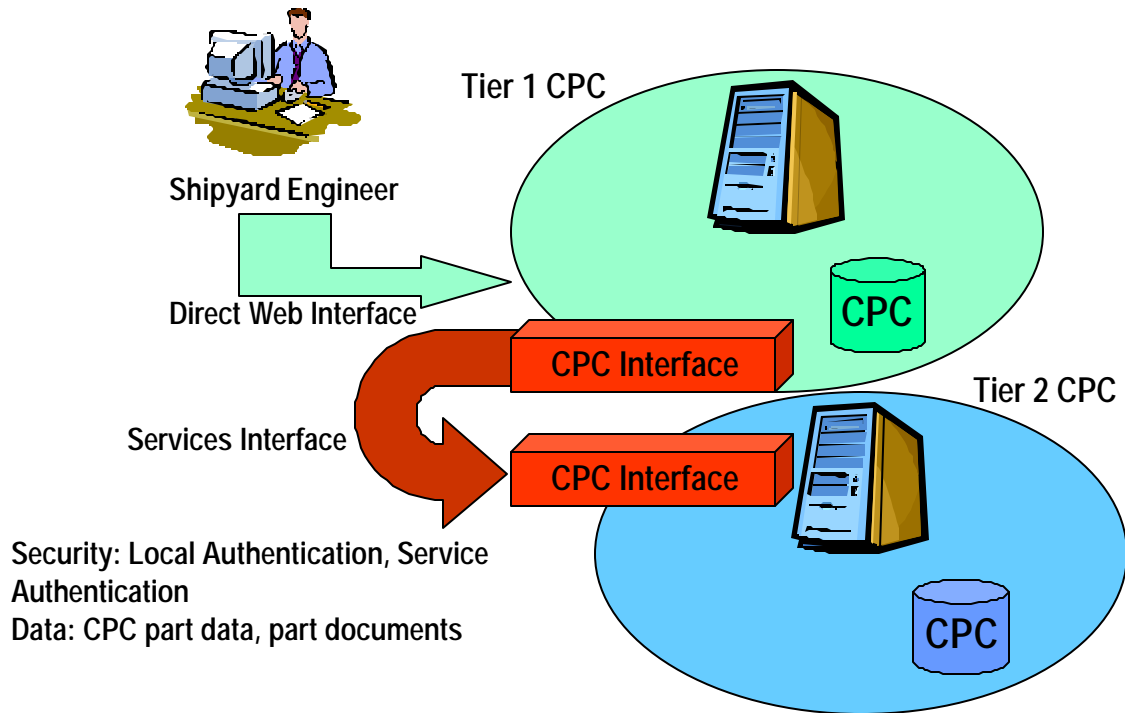
Flow of Events

1. Shipyard Engineer accesses MIDAPS

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2. System displays menu of options
3. Shipyard Engineer navigates to Remote CPC access function
4. System displays list of CPC instances
5. Shipyard Engineer Selects NGSS CPC
6. System displays list of services offered by the NGSS CPC
7. Shipyard Engineer selects Search for Part
8. System displays screen to enter search parameters
9. Shipyard Engineer enters search/display criteria and submits
10. System invokes Search service on NGSS CPC
11. NGSS CPC returns search service invocation results
12. System displays search results
13. Shipyard Engineer selects desired CPC part and selects Set Equivalence
14. System displays to enter equivalence information
15. Shipyard Engineer enters equivalence information and submits
16. System invokes Set Equivalence service on NGSS CPC
17. NGSS CPC returns Set Equivalence service invocation results
18. System displays Set Equivalence results

Add Documentation from Repair Shipyard for Part in First Tier CPC



Use Case

Repair Shipyard Add Documentation for Part in First Tier CPC

Actors

First Tier Shipyard Engineer (initiator), Repair Yard Local System and parts catalog, First Tier CPC

Brief Description

Bender shipyard repair work results in the creation of new test result documentation for a part in their local parts database that they know, is also in the NGSS CPC. Bender notifies NGSS of the availability of the new information. NGSS engineers decide to add the new documentation to the NGSS CPC, which is accomplished by using NGSS' CPC interface to Bender's MIDAPS (Material Identification and Procurement System) system through the Bender CPC Interface.

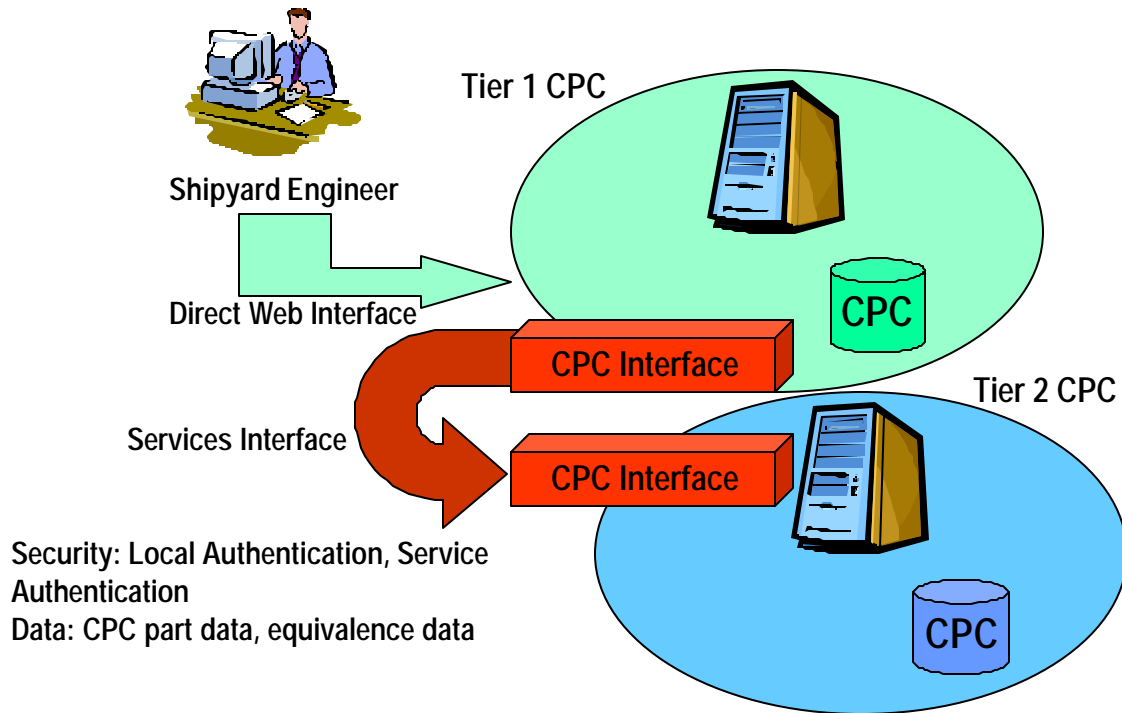
Flow of Events

1. Shipyard Engineer navigates to Remote CPC access function

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2. System displays list of CPC instances
3. Shipyard Engineer Selects Bender CPC
4. System displays list of services offered by the Bender CPC
5. Shipyard Engineer selects List Part Documents
6. System displays screen to enter part number
7. Shipyard Engineer enters part number and submits
8. System invokes List Part Documents service on Bender CPC
9. Bender CPC returns List Part Documents invocation results
10. System displays List Part Document results
11. Shipyard Engineer selects desired document part and selects Get Document
12. System invokes Get Document service on Bender CPC
13. Bender CPC returns Get Documents invocation results
14. System displays Get Document results
15. Shipyard Engineer selects document and clicks on Add Document
16. System displays screen to enter Add Document information
17. Shipyard Engineer enters document information
18. System displays added document
19. Shipyard Engineer selects added document and selects Link to Part
20. System displays screen to enter part number
21. Shipyard Engineer enters part number
22. System displays updated document with link to part number

Update Equivalence for Part in First Tier and Second Tier CPCs



Use Case

Update Equivalence for Part in First Tier and Second Tier CPCs

Actors

First Tier Shipyard Engineer (initiator), First Tier CPC, Second Tier CPC

Brief Description

After a part equivalence analysis meeting at NGSS, NGSS and Bender engineers want to add updated equivalence information to the NGSS CPC and the Bender CPC, which is accomplished by using NGSS' CPC interface to Bender's MIDAPS (Material Identification and Procurement System) system through the Bender CPC Interface.

Flow of Events

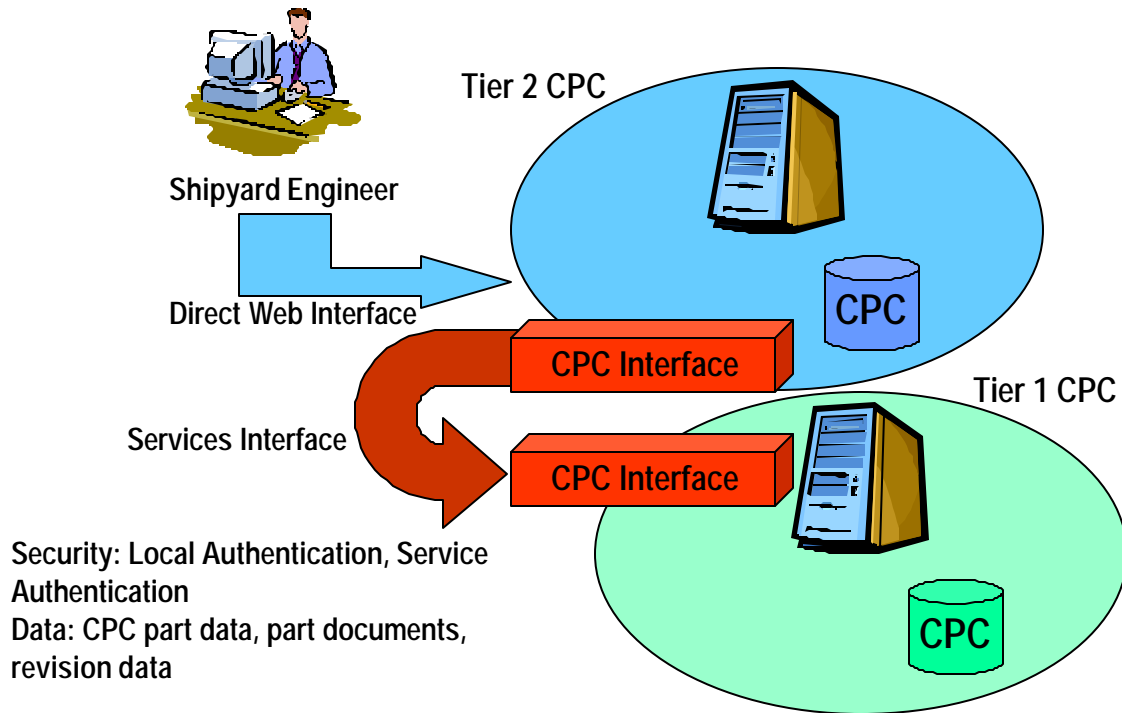
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1. Shipyard Engineer opens Search Dashboard tool.
2. System displays search template supporting property values.
3. Shipyard Engineer selects the Catalog Number property.
4. System displays field to enter Catalog Number value.
5. Shipyard Engineer enters value for part number and submits Search.
6. System displays Search resulting part information
7. Shipyard Engineer elects Add Equivalence
8. System displays screen to enter Equivalence information
9. Shipyard Engineer enters Equivalence information and submits
10. System displays updated Equivalence information
11. Shipyard Engineer navigates to Remote CPC access function
12. System displays list of CPC instances
13. Shipyard Engineer Selects Bender CPC
14. System displays list of services offered by the Bender CPC
15. Shipyard Engineer selects Update Equivalence
16. System displays screen to enter part number
17. Shipyard Engineer enters part number and submits
18. System invokes Get Part Information service on Bender CPC
19. Bender CPC returns Get Part Information invocation results
20. System displays Get Part Information results
21. Shipyard Engineer selects Update Equivalence
22. System displays screen to enter Equivalence information



23. Shipyard Engineer enters Equivalence information
24. System invokes Update Equivalence service on Bender CPC
25. Bender CPC returns Update Equivalence invocation results
26. System displays Update Equivalence results

Second Tier Shipyard Checks for Part Revision in First Tier CPC



Use Case

Second Tier Shipyard Checks for Part Revision in First Tier CPC

Actors

Second Tier Shipyard Engineer (initiator), Repair Yard Local System, First Tier CPC

Brief Description

Bender shipyard preparation for new construction work subcontracted from NGSS results in the identification of a previous revision part, which could be used by Bender. Bender checks the acceptability of using a part with a previous revision, which is accomplished by using Bender's MIDAPS (Material Identification and Procurement System) system to access the NGSS CPC through the CPC Interface.

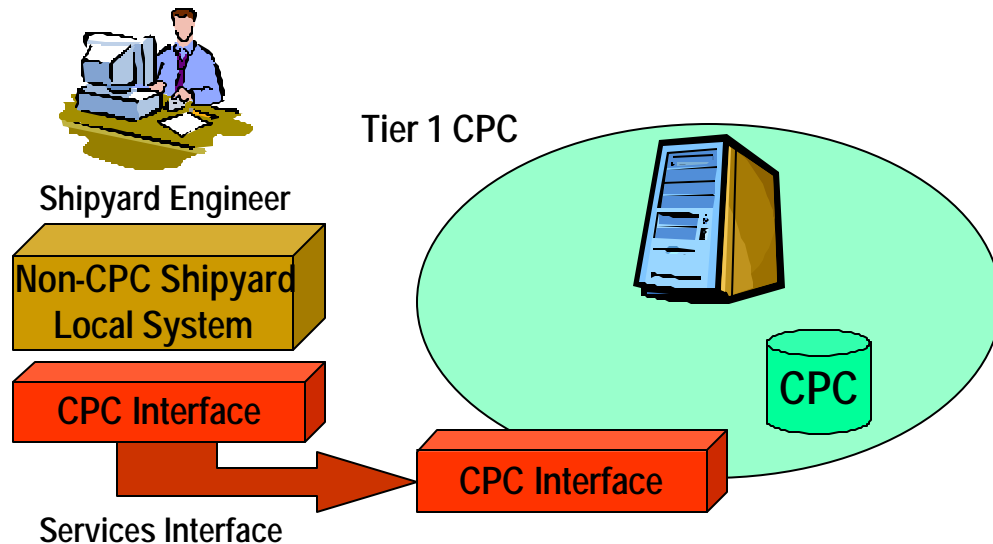
Flow of Events

1. Shipyard Engineer accesses MIDAPS
2. System displays menu of options

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3. Shipyard Engineer navigates to Remote CPC access function
4. System displays list of CPC instances
5. Shipyard Engineer Selects NGSS CPC
6. System displays list of services offered by the NGSS CPC
7. Shipyard Engineer selects Search for Part
8. System displays screen to enter search parameters
9. Shipyard Engineer enters part number and submits
10. System invokes Search service on NGSS CPC
11. NGSS CPC returns search service invocation results
12. System displays search results
13. Shipyard Engineer enters mil-spec name as value for part document id and submits Search.
14. System displays list of documents that contain mil-spec name.
15. Shipyard Engineer selects document for this mil-spec that by its name identifies that there is interchangeability between revisions C2 through C5.
16. System displays all document revision levels.
17. Shipyard Engineer selects the Document Rev/Amend tab.
18. System displays documents, revision, and amendment data as well as the interchangeability code that indicates interchangeability between revisions C2 and C5.
19. Shipyard Engineer selects the required revision/amendment document and then selects the Spec History tab.
20. System displays the spec revision compare document that establishes interchangeability between the subject revisions. It is OK to use the part.

Non-CPC Shipyard Search for Part in Teaming CPC



Security: Local Authentication, Service Authentication

Data: CPC part data, part documents, equivalence data

Use Case

Non-CPC Shipyard Search for Part in Teaming CPC

Actors

Non-CPC Shipyard Engineer (initiator), Non-CPC Shipyard Local System, Teaming yard CPC

Brief Description

NGNN is teaming with EB and needs to find a part in the EB CPC, which is accomplished by using NGNN's SAP system to access the EB CPC through the CPC Interface.

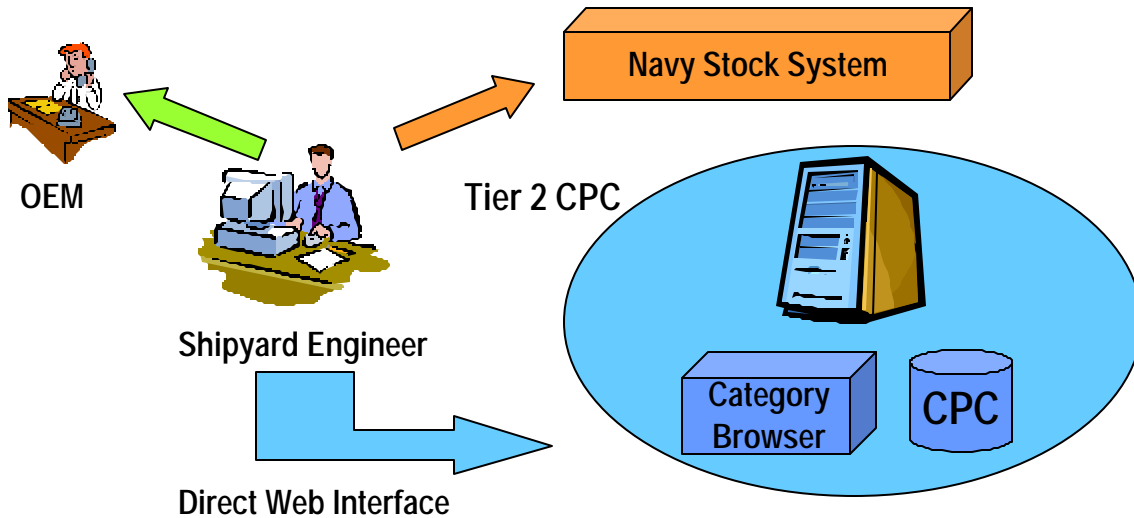
Flow of Events

1. Shipyard Engineer accesses SAP

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2. System displays menu of options
3. Shipyard Engineer navigates to Remote CPC access function
4. System displays list of CPC instances
5. Shipyard Engineer Selects EB CPC
6. System displays list of services offered by the EB CPC
7. Shipyard Engineer selects Search for Part
8. System displays screen to enter search parameters
9. Shipyard Engineer enters search/display criteria and submits
10. System invokes Search service on EB CPC
11. EB CPC returns search service invocation results
12. System displays search results

Second Tier Overhaul/Repair of a US NAVY Vessel



Security: Local Authentication

Data: CPC part data, part documents, NSN data

Use Case

Naval Ship Overhaul/Repair

Actors

Shipyard Engineer (initiator), Category Browser, CPC, Navy Stock System, Tier 2 yard

Brief Description

Find replacement parts for a ship during availability at Second Tier yard

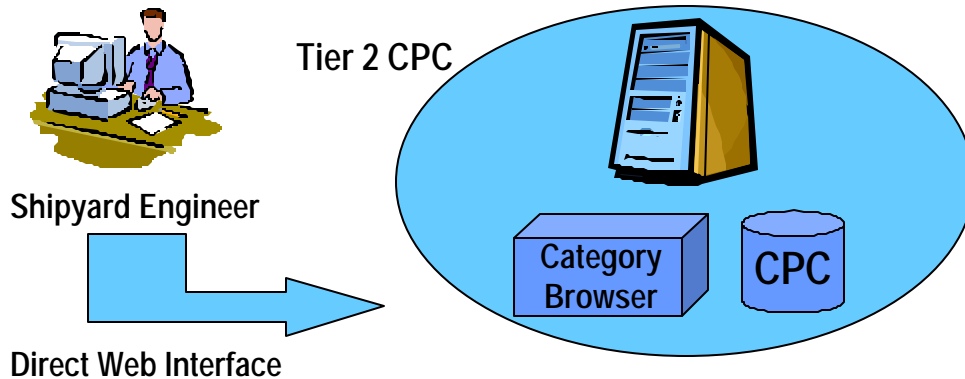
Flow of Events

1. Shipyard Engineer opens Navy Stock System and uses the Navy Standard drawing number to find the NSN and Description of the assembly. The Stock System shows no stock on-hand and the vendor lead-time does not support the availability schedule.

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2. Shipyard Engineer opens Category Browser tool.
3. System displays CPC outline.
4. Shipyard Engineer selects the NSN to CPC Part class from the Associated Part Information folder property.
5. System displays NSN to CPC Part Search screen.
6. Shipyard Engineer enters NSN value and selects Search.
7. System displays list of results that shows there is no match.
8. Shipyard Engineer selects Documents tab and enters a document number from the NSN that is associated with the part, then selects Search.
9. System displays a list of CPC parts with that part document ID.
10. Shipyard Engineer selects candidate parts and selects “Doc ID to CPC Class” tab.
11. System displays search results showing original equipment manufacturing designation.
12. Shipyard Engineer selects OEM catalog number.
13. System displays information for part with OEM part number
14. Shipyard Engineer identifies the part as useful and contacts OEM. OEM identifies no material on-hand. Shipyard Engineer selects OEM Catalog Number.
15. System displays an OEM catalog number.
16. Shipyard Engineer contacts OEM and identifies material as in-stock and procures the part.

Second Tier Shipyard Equivalent Part Search



Security: Local Authentication

Data: CPC part data, equivalence data, EXCEL export

Use Case

Equivalent Part Search

Actors

Shipyard Engineer (initiator), Category Browser, CPC

Brief Description

Engineering has requested identification of a population of ship catalog numbers for part standardization analysis.

Flow of Events

1. Shipyard Engineer opens Category Browser tool.
2. System displays choices of Web-style, Picture, Outline, or List display options.
3. Shipyard Engineer selects the Outline display mode to show the outline form of the CPC Classification Schema.

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4. System displays schema in Outline form (expandable tree structure.)
5. Shipyard Engineer opens folders in the tree structure until the needed leaf class is found.
6. System displays options for display of all part instances in the desired leaf class.
7. Shipyard Engineer selects Search option.
8. System displays form to enter Search parameters (appropriate part attributes.)
9. Shipyard Engineer submits Search.
10. System displays Search results.
11. Shipyard Engineer selects Export option to export search results.
12. System displays Export parameters (format of export data, All or Range of data, etc.)
13. Shipyard Engineer selects EXCEL format and ALL Records.
14. System exports Search results to EXCEL for further manipulation and distribution.

Supplier Use Cases

ISE 3 USE CASES - SUPPLIER

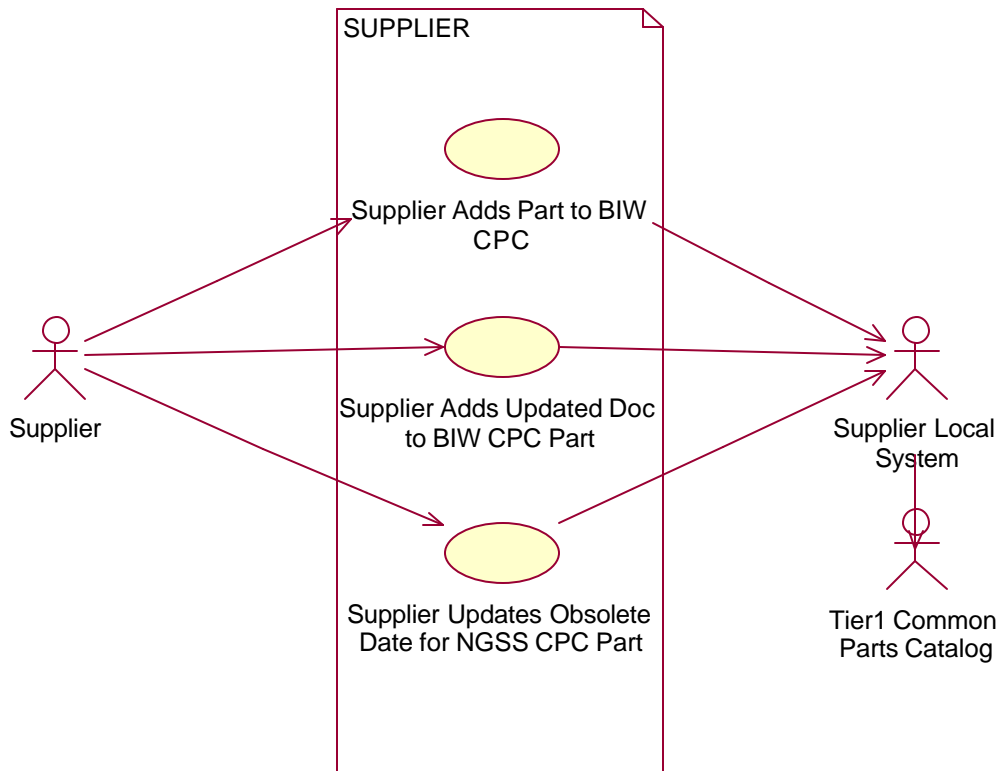


Figure 5 Use Case Model - Suppliers

The above figure, Figure 5 Use Case Model - Suppliers, depicts the Use Case Model for the CPC with a primary focus on Supplier - shipyard use cases. The model consists of the following components:

Actors:

1. Supplier
2. Local System

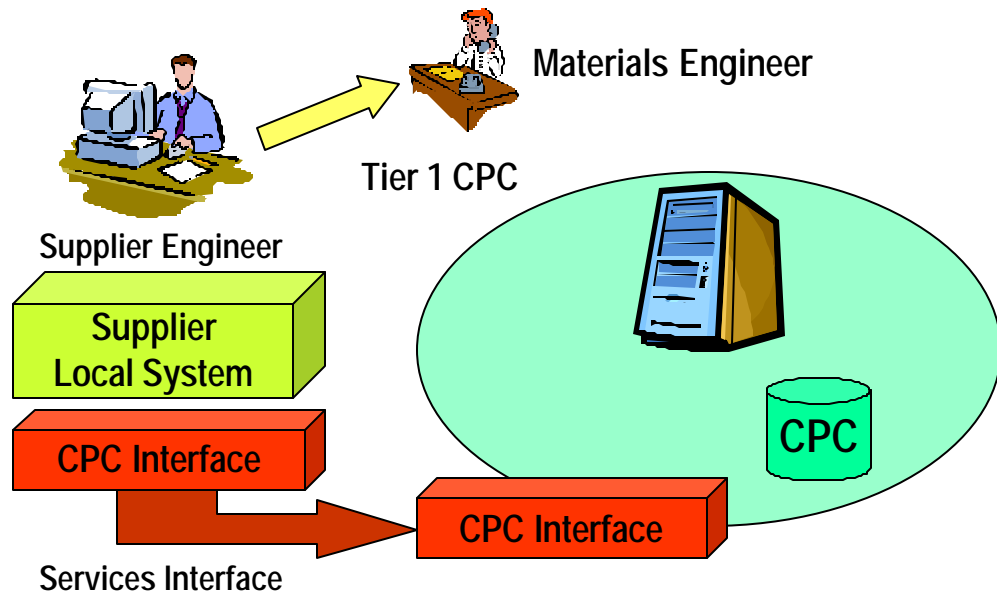
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3. Tier 1 Common Parts Catalog (CPC)
4. NGSS
5. BIW

Use Case List:

1. Supplier Adds Part to BIW CPC
2. Supplier Adds Updated Document to BIW CPC Part
3. Supplier Updates Obsolete Date for NGSS CPC Part

Supplier Adds Part to BIW CPC



Security: Local Authentication, Service Authentication

Data: CPC part data, part documents

Use Case

Supplier Adds Part in BIW CPC

Actors

Supplier, Supplier system, BIW CPC

Brief Description

A Supplier adds the information describing a new part to the BIW CPC after discussing it with a BIW Materials Engineer.

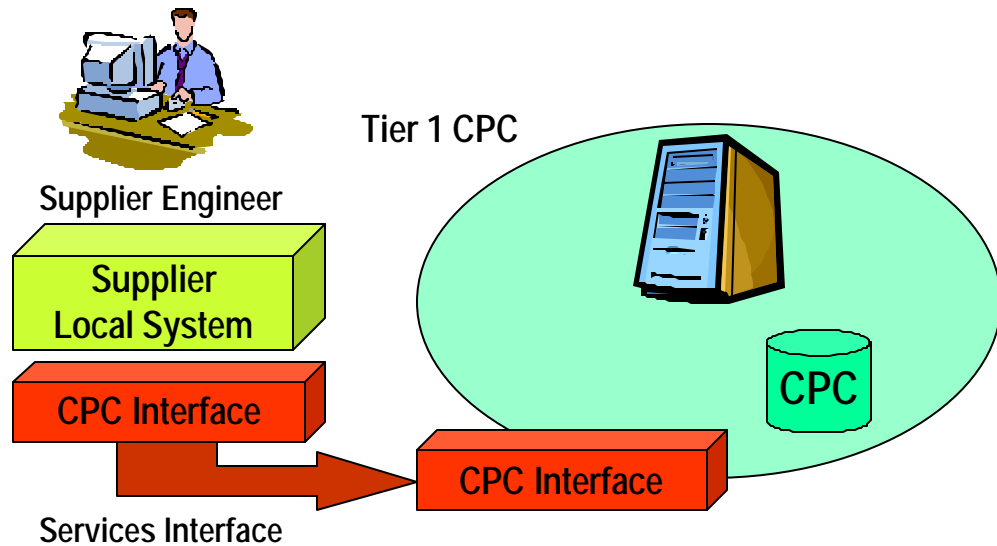
Flow of Events

1. Supplier accesses their local system.
2. System displays menu of options

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3. Supplier navigates to Remote CPC access function
4. System displays list of CPC instances
5. Supplier Selects BIW CPC
6. System displays list of services offered by the BIW CPC
7. Supplier selects Add Part
8. System displays screen to enter part information.
9. Supplier enters part information and submits
10. System invokes Add Part service on BIW CPC
11. BIW CPC returns Add Part invocation results
12. System displays Add Part results (the part has been partially specified and is placed in the Not Ready state).
13. The Supplier calls the Materials Engineer to complete the Add Part process.

Supplier Adds Updated Documentation to BIW CPC Part



Security: Local Authentication, Service Authentication

Data: CPC part data, part documents

Use Case

Supplier Adds Updated Documentation to BIW CPC Part

Actors

Supplier, Supplier system, BIW CPC

Brief Description

A Supplier adds updated documentation for a part to the BIW CPC.

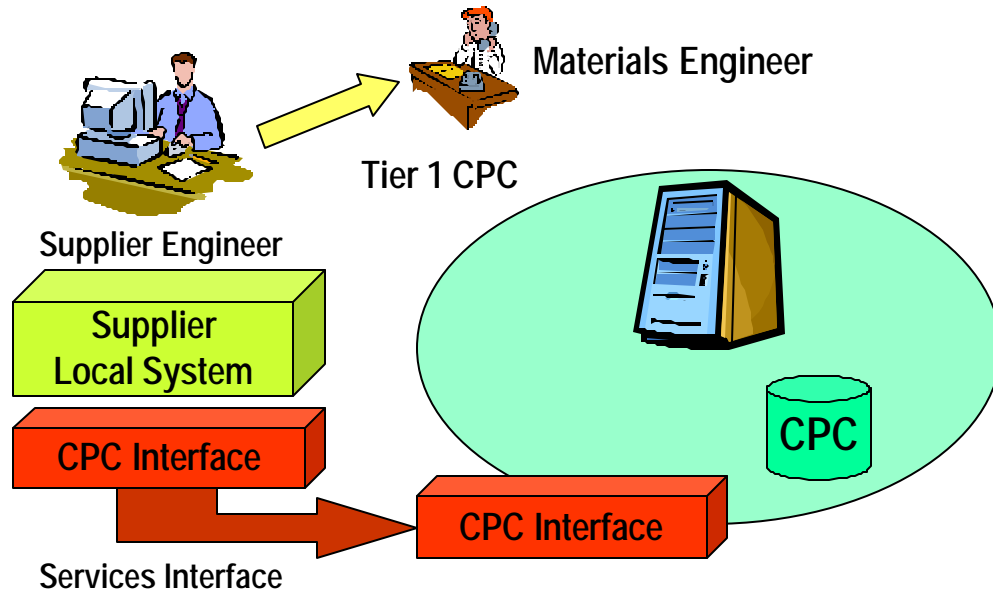
Flow of Events

1. Supplier accesses the ir local system.
2. System displays menu of options
3. Supplier navigates to Remote CPC access function

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4. System displays list of CPC instances
5. Supplier Selects BIW CPC
6. System displays list of services offered by the BIW CPC
7. Supplier selects List Part Documents
8. System displays screen to enter part number
9. Supplier enters part number and submits
10. System invokes List Part Documents service on BIW CPC
11. BIW CPC returns List Part Documents invocation results
12. System displays List Part Document results
13. Supplier selects desired document part and selects Get Documents
14. System invokes Get Document service on BIW CPC
15. BIW CPC returns Get Documents invocation results
16. System displays Get Document results
17. Supplier selects document and clicks on Add Document
18. System displays screen to enter Add Document information
19. Supplier enters document information
20. System displays added document
21. Supplier selects added document and selects Link to Part
22. System displays screen to enter part number
23. Supplier enters part number
24. System displays document with link to part number

Supplier Updated Obsolete Date for NGSS CPC Part



Security: Local Authentication, Service Authentication

Data: CPC part data, part documents, obsolescence data

Use Case

Supplier Updates Obsolete Date for NGSS CPC Part

Actors

Supplier, Supplier system, NGSS CPC

Brief Description

A Supplier updates the obsolete information for a part in the NGSS CPC.

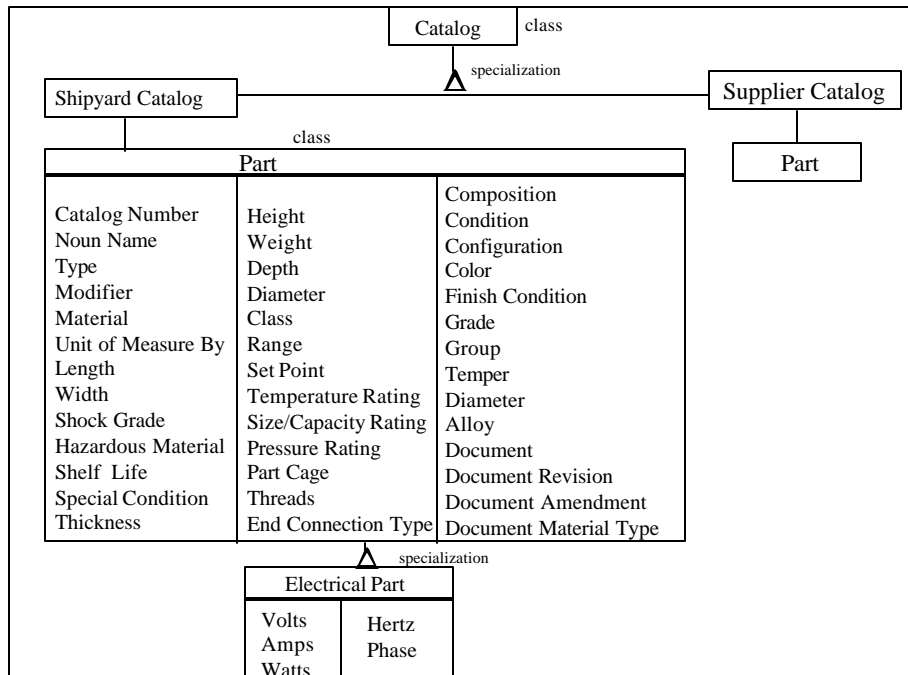
Flow of Events

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1. Supplier accesses their local system.
2. System displays menu of options
3. Supplier navigates to Remote CPC access function
4. System displays list of CPC instances
5. Supplier Selects NGSS CPC
6. System displays list of services offered by the NGSS CPC
7. Supplier selects List Part Information
8. System displays screen to enter part number
9. Supplier enters part number and submits
10. System invokes List Part Information service on NGSS CPC
11. NGSS CPC returns List Part Information invocation results
12. System displays List Part Information results
13. Supplier selects desired part and selects Update Information
14. System displays screen that allows Supplier to update certain information.
15. Supplier updates Obsolete Date and submits.
16. System invokes Update Information service on NGSS CPC
17. NGSS CPC returns Update Information invocation results
18. System displays Update Information results
19. NGSS CPC notifies Materials Engineer to review the proposed updates to the part information.

Object Analysis

Analysis object models identify classes, the key attributes of each class and the relationship between the classes. In specific, these are used to help define the contents and taxonomy of the part data to be transferred. The class diagram given below contains a representative set of attributes exchanged during the CPC Use Cases, including the extended use cases, presented in the preceding sections.



Technology Considerations

Connectivity

Revisiting the implementation alternatives discussed at the beginning of this document (see Tier 1 Shipyard Tier 1 Shipyard Implementation Alternatives), it is apparent that there will be several possible kinds of connections between the actors (people and systems) documented in the use cases (see **Figure 1 Implementation Alternatives - Connectivity** below):

- Tier 1 shipyard to Tier 1 shipyard – essentially shared CPCs

This connection can be characterized as tightly coupled with synchronization to maintain a consistent level of information across the constituent CPCs.

- Tier 1 (non-CPC) shipyard to Tier 1 (CPC) shipyard

A loosely coupled connection utilizing the CPC interface (implemented as a service provider at the Tier 1 end and a service user at the non-CPC end), possibly as a set of web services, which provide a controlled set of functions while meeting authentication, authorization and data security needs. Note that if the CPC yard needs to initiate interaction with the non-CPC yard, the non-CPC yard will need to provide some set/subset of the CPC interface functionality as a front end to a “local/CPC-like system.”

- Tier 1 CPC shipyard to Tier 2 shipyard / Tier 2 shipyard to Tier 1 shipyard

A loosely coupled connection utilizing the CPC interface implemented at each end, possibly as a set of web services, which provide a controlled set of functions while meeting authentication, authorization and data security needs. Note that if the CPC yard needs to initiate interaction with the non-CPC yard, the non-CPC yard will need to provide some set/subset of the CPC interface functionality as a front end to a “local/CPC-like system.”

- PNSY to Tier 1 shipyard

Some PNSY access to Tier 1 shipyard may be via Virtual Private Network (VPN) connections, which allow them to use the Tier 1 CPC local web interface directly. If this is not available, the PNSY will need to implement some local client function to make calls to the CPC interface at the Tier 1 shipyard.

- PNSY to Tier 2 shipyard

The PNSY will need to implement some local client function to make calls to the CPC interface at the Tier 2 shipyard.

- Supplier to Tier 1 shipyard

The supplier will need to implement some local client function to make calls to the CPC interface at the Tier 1 shipyard.

- Supplier to Tier 2 shipyard

The supplier will need to implement some local client function to make calls to the CPC interface at the Tier 1 shipyard.

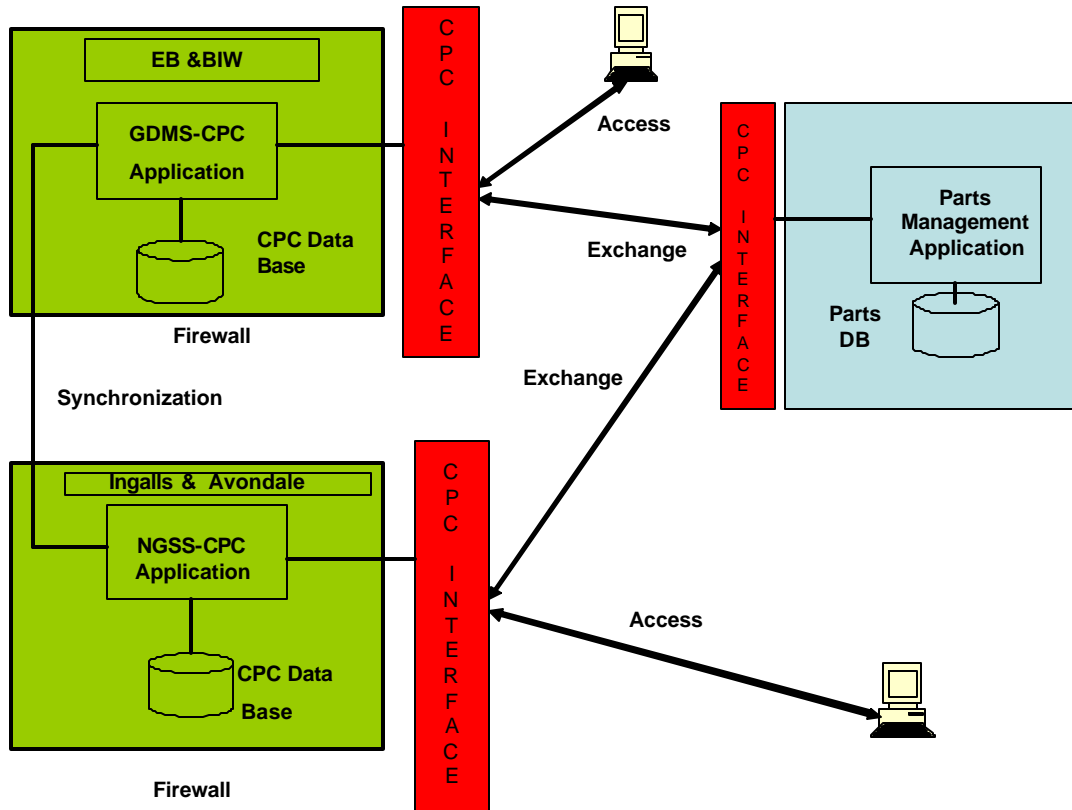


Figure 1 Implementation Alternatives - Connectivity

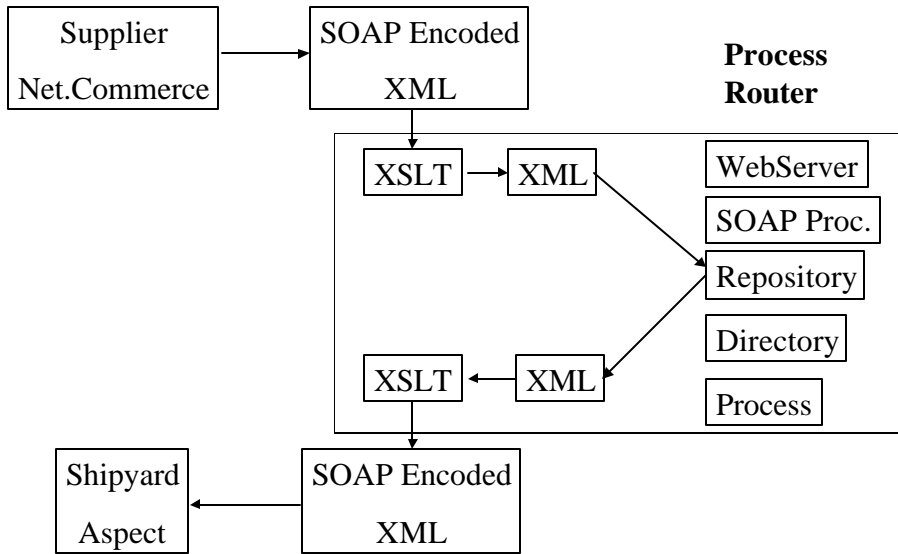
In all cases information being added to the CPC must comply with the CPC schema. For the case of a supplier submitting part information to the CPC, the mechanics of handling

data flow and part data schema translation (if needed to bridge between a suppliers internal part data scheme and the CPC schema) is elaborated in the following example:

A high description of the overall data flow and function is given in figure 7 - below. The specific functions to be used are:

- A Java servlet (or application) will be written for the supplier's parts catalog, that will emit the selected parts data (encoded in SOAP) upon receipt of a HTTP message from a process router.
- An XSLT translation file will be created to support the translation of the XML from the preceding step into forms defined by the STEP SOAP and OSEB data binding, as modified to support the PLIB subset, and shipyard/supplier Data Element Dictionary (DED) and Parts Data Classification. This translation will occur on the process router.
- A SOAP message processor and router will be added to the process router to handle both the transmission and encoding of the SOAP messages.
- The appropriate control process and user authorizations will be added to the process router process and LDAP services for the supplier/shipyard parts data exchange.
- An optional data viewer (exploiting the SOAP encoding) may be required depending on shipyard specific process requirements
- An XSLT translation file is created to support the generation of the XML required for part data transmission to the shipyard parts library.
- A Java servlet (or application or web service) will be written for the shipyard parts library catalog, which will consume the selected parts data (encoded in SOAP) upon receipt of a HTTP message from the process

The Java servlets which appear as each of the process, i.e. Generate and Consume the Parts Data XML are a type of connector, and would be unique for each different source and sink used.



**ISEC-EC Technology Selection for Shipyard-Supplier
Parts Interchange**