

Architecture Reuse in Command Inform Battlespace Management



IBM MODAF Conference

Bristol 8th July 2010

EADS DS System Design Centre (UK)

Structure of Presentation

- Who am I?
- Who is EADS?
- What kinds of re-use are there?
- How do we re-use modelling?
- Example programme – CIBM
 - What the programme is about
 - The MODAF Model
 - Animation of Model

Introduction








- Sarah Norton
- BSc Mathematics
- 3 years as an Analyst at Defence Science and Technology Laboratory (Dstl)
- 2 years working for a charity based onboard a ship
- 3 years as an Enterprise Modeller in the System Design Centre UK, EADS Defence and Security



The European Aeronautic Defence and Space Company

A large, stylized version of the EADS logo, consisting of the word "EADS" in a bold, black, sans-serif font, with a blue four-pointed star positioned to its right. The logo is set against a background of light blue and white geometric patterns, including a large grey arrow pointing upwards and to the right, and a faint grid.

EADS at a Glance: A Global Leader

Commercial Aircraft		No. 1
Helicopters		No. 1
Commercial Launch Vehicles		No. 1
Missile Systems		No. 2
Satellites		No. 3
Military Transport		No. 3
Military Air Systems		No. 4

EADS Structure



Airbus



Eurocopter



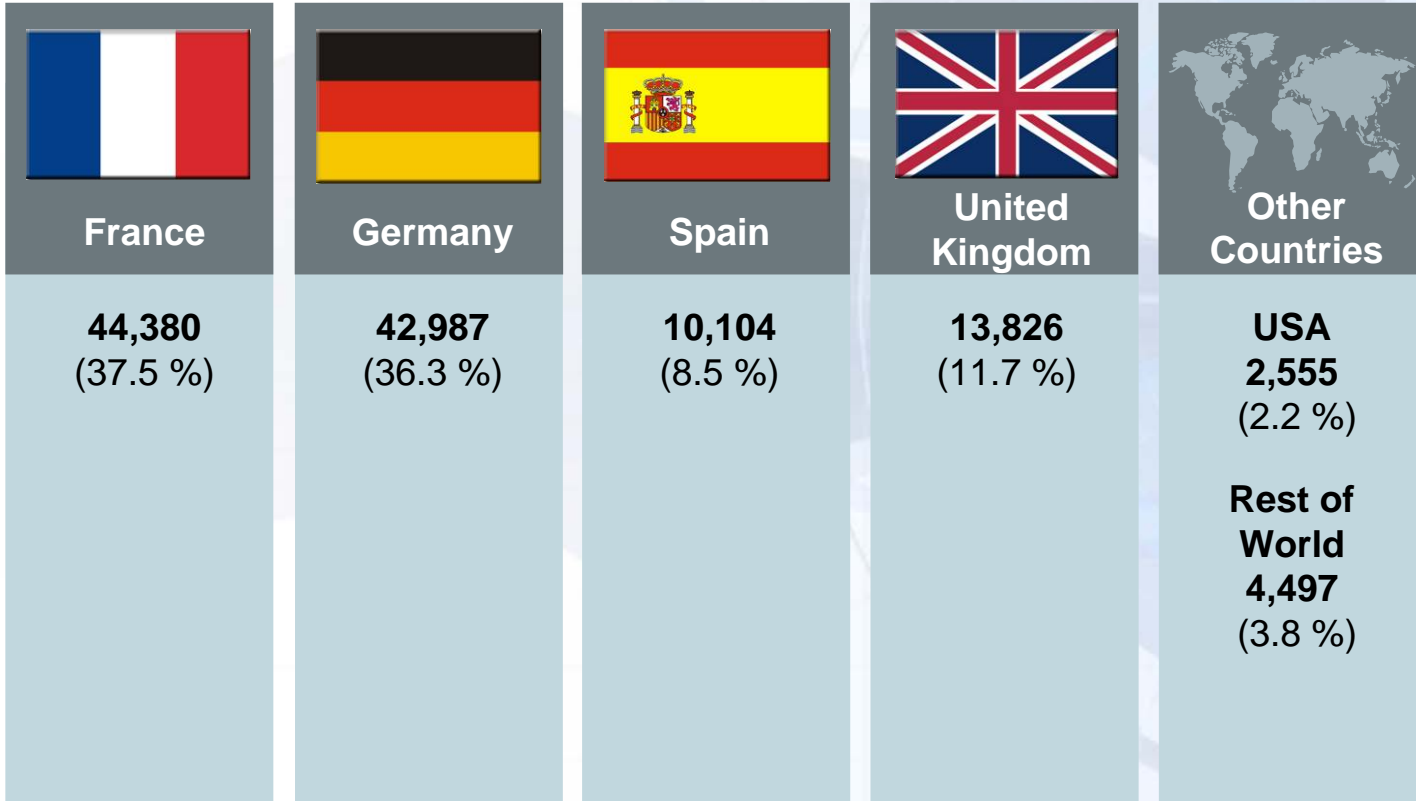
**EADS Defence &
Security**



EADS Astrium

EADS Employees by Country

as of December 31, 2008



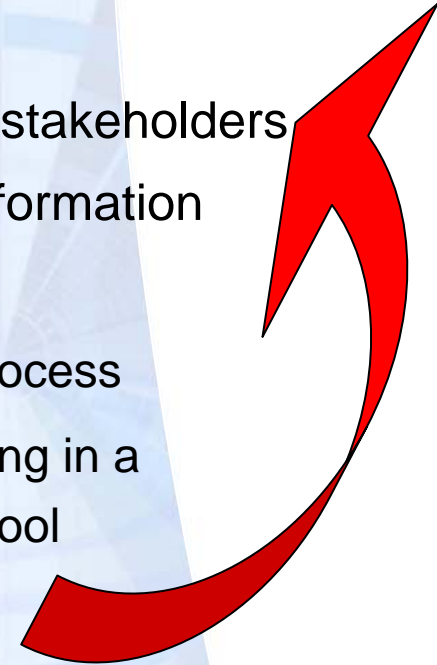
Total Number of Employees: 118,349

Re-use of architecture

- **Why re-use?**
- Saves time and money
- **What is it that takes the time and money?**
- Interviewing stakeholders
- Gathering information
- Modelling
 - Thought process
 - Diagramming in a modelling tool
- Validation

Re-use of architecture

- **What kind of architecture materials exist?**
- Validated MODAF models in standard modelling tools
- Documents with architecture type materials
- Spreadsheets with definitions / data
- Visio / other drawing tools with diagrams
- Random paper print outs of diagrams from no-one's sure where, found in a drawer somewhere
- Interviewing stakeholders
- Gathering information
- Modelling
 - Thought process
 - Diagramming in a modelling tool
- Validation



Re-use within EADS

- System Architect and Mega are widely used within EADS
- DoDAF (US) / MODAF (UK) / AGATE (Fr) / NAF (NATO)
- Software conversions between modelling and simulations tools
- We re-use as much as possible though we face challenges
 - National Caveats
 - Awareness of what is ‘out there’

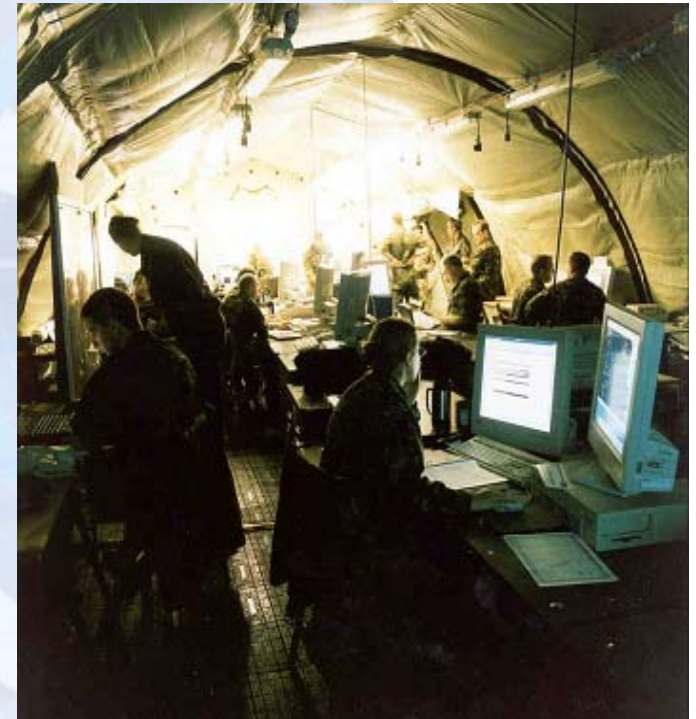
CIBM



Command Inform Battlespace Management

CIBM Aims

- The aim is to improve the ability of the UK Armed forces to deliver desired effects.
 - Appropriate
 - Timely
 - Synchronised
 - Precise
 - Joint
 - National
 - Multinational

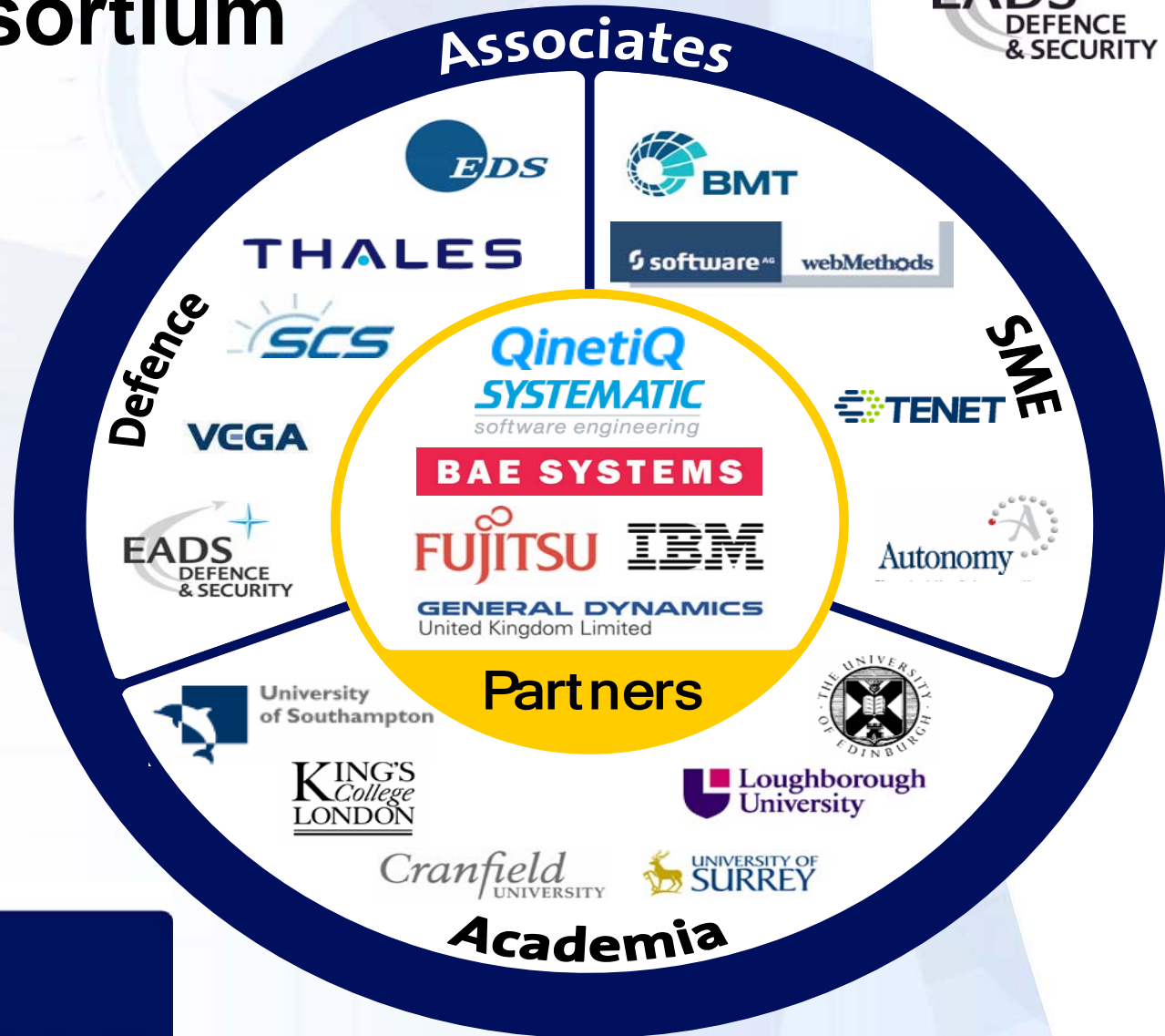


CIBM Aims

- The capabilities developed by the CIBM programme will meet the needs for increased agility
- Highly mobile tactical forces - Strategic headquarters
- Improved working with non - government organisations



CIBM Consortium



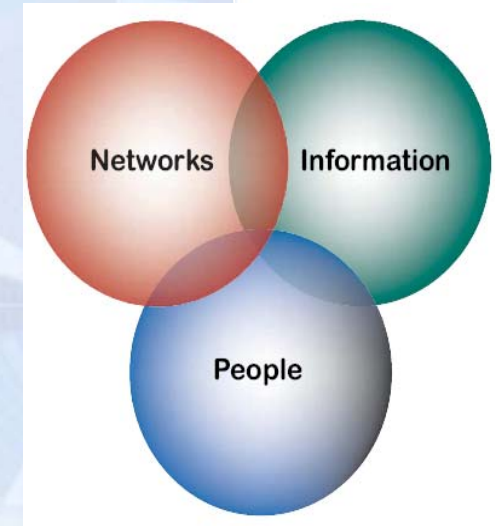
ACTIONABLE ADVICE AND SOLUTIONS

Gaps in current Capability

- Situational Awareness (SA) is dependent upon Common Operational Picture (COP).
- Current COP architectures are unable to meet the Commanders' information sharing requirements.
- Operational Pictures are currently stove piped.

CIBM Task - SA Pictures for NEC

- **Define an approach to delivering coherent SA pictures**
 - Improve access and sharing of critical information
 - Maximise consistency and clarity between different SA pictures
 - Enhance common understanding between users at all levels of command



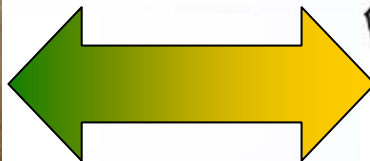
Real World



Computer World



Human World



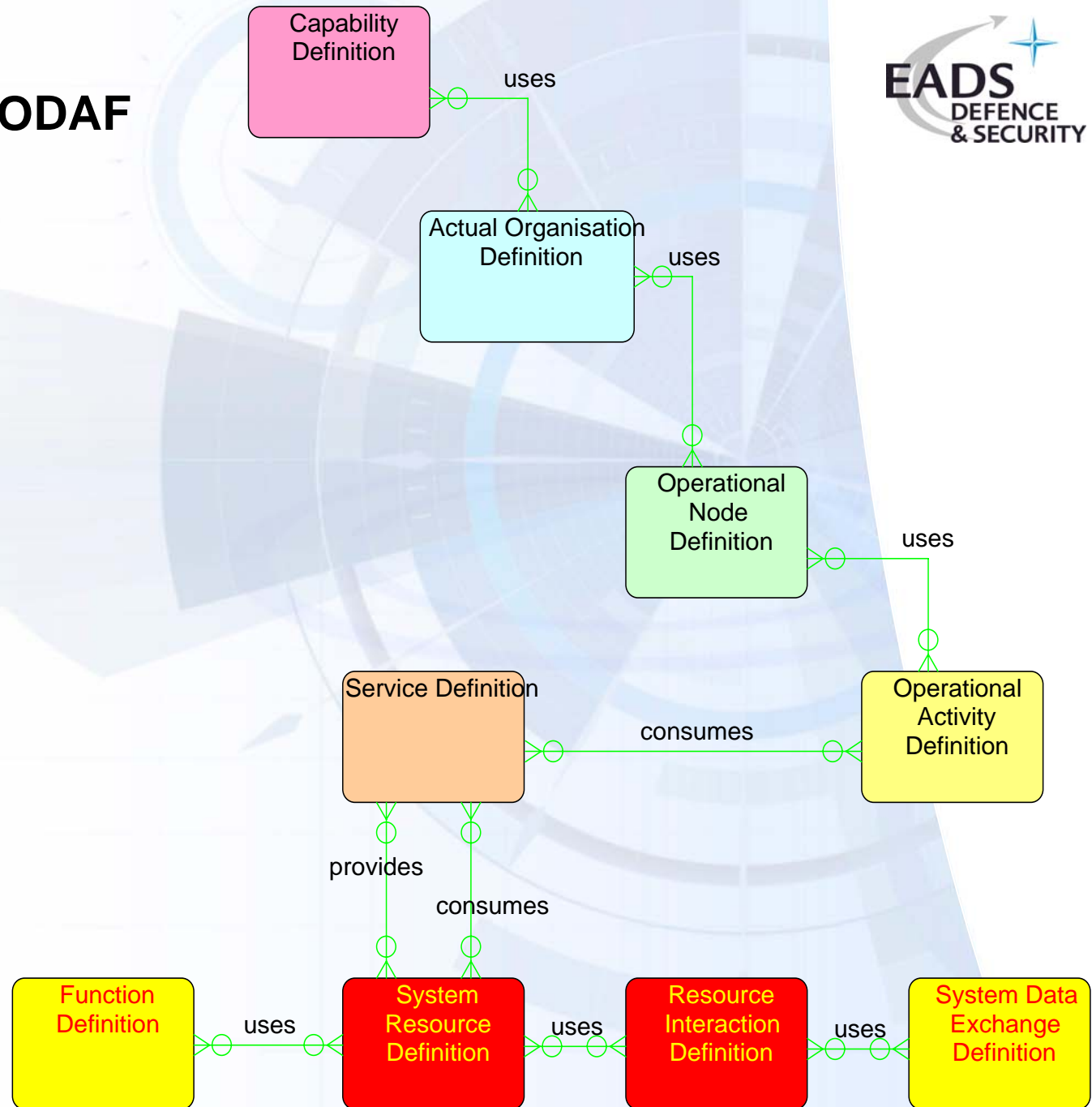
CIBM MODAF Model



MODAF Model

- Meta model
- Capability Taxonomy (STV2)
- Activity Diagrams (OV5) and Node Relationships View (OV2)
- Vignette Operational Rules Models (OV6a)
- Services View – User and Resource Facing – (SOV1)
- Resource Interaction Diagram (SV1)
- System Functions (SV4), Service Provision (SV12)
- Resource Event Trace (SV10c)
- System Resource Animation

Overview of MODAF Model

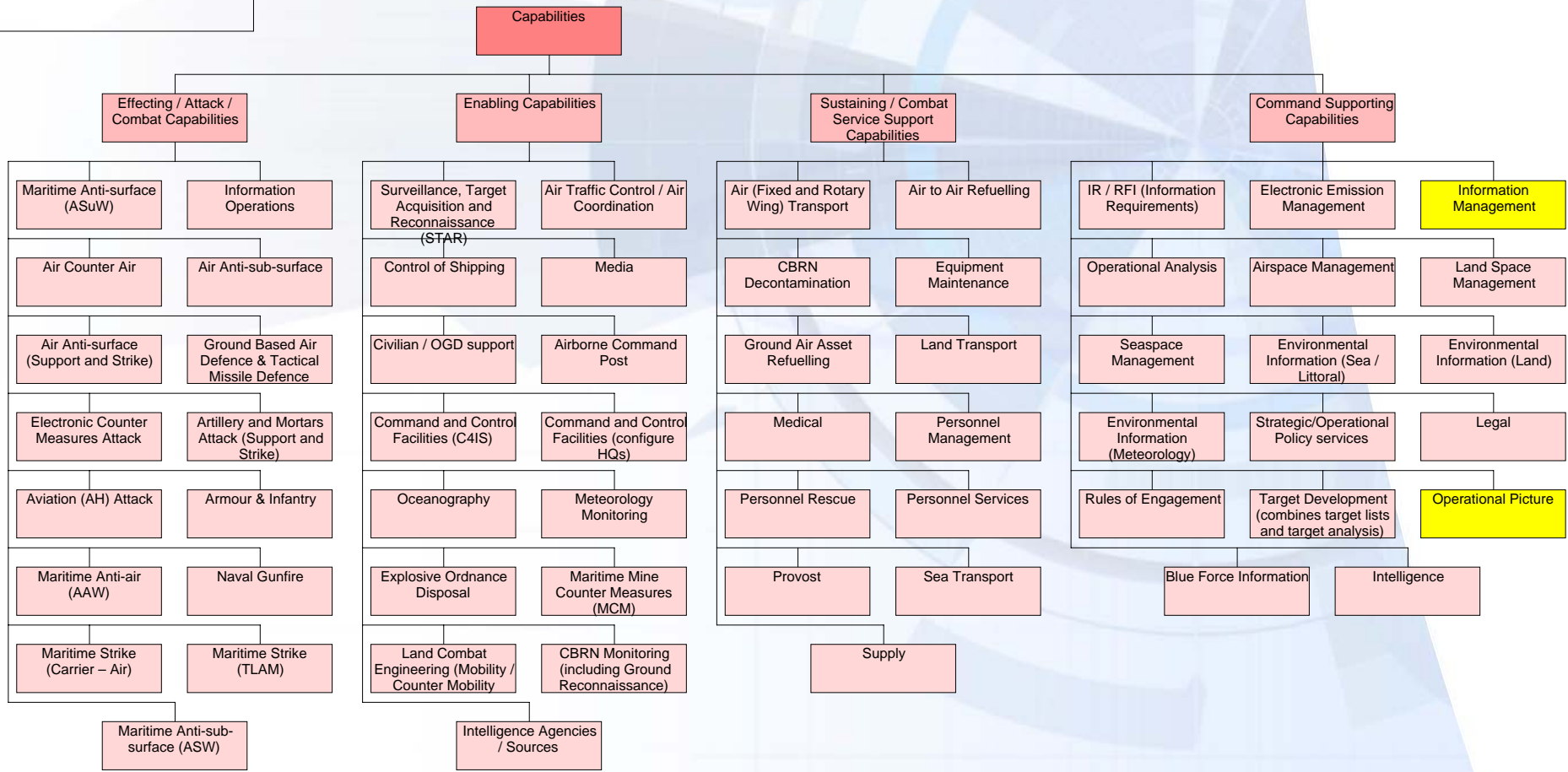


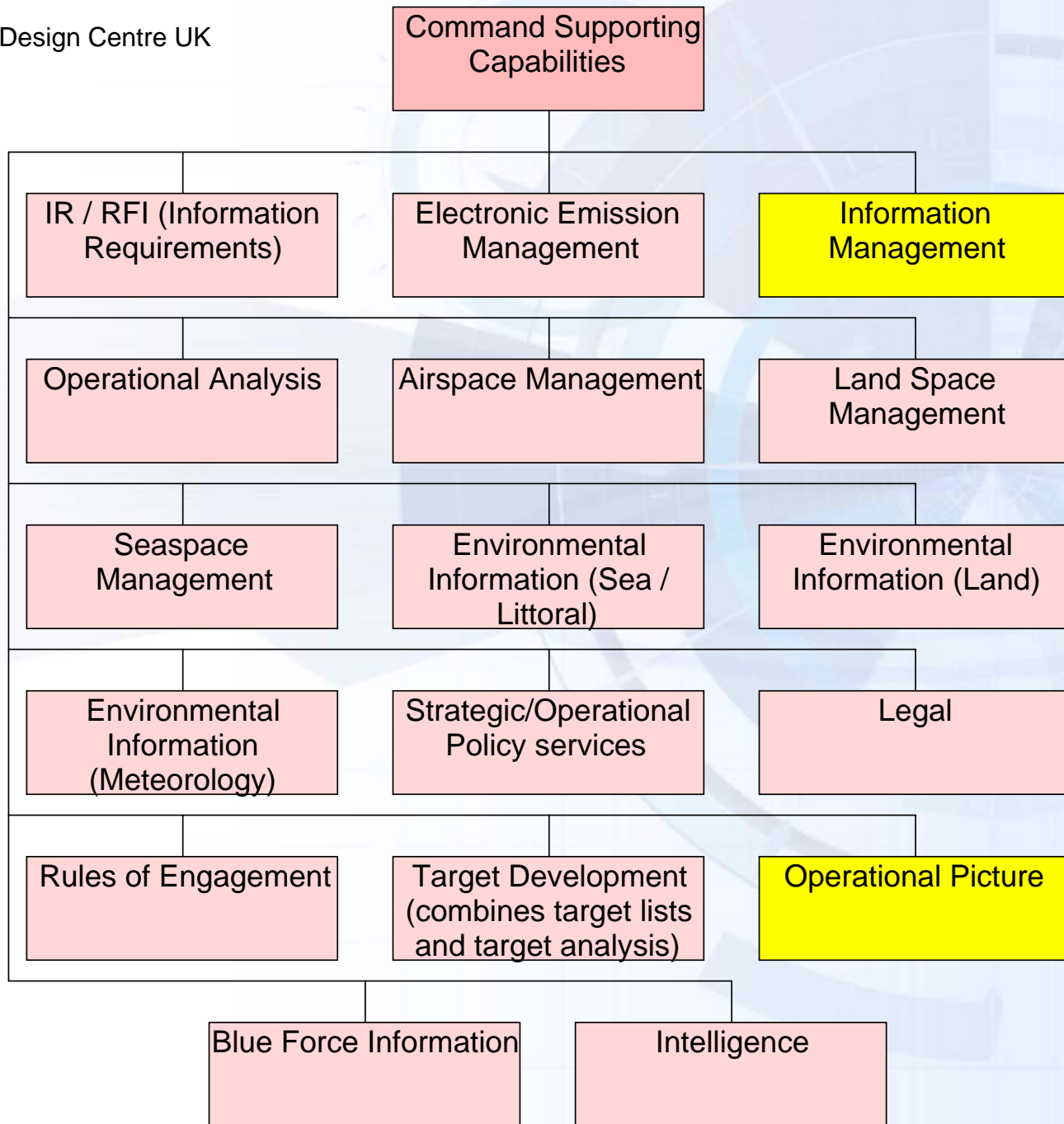
System Design Centre UK

StV2 Capability Taxonomy



CIBM (StV-2 Capability Taxonomy)
System Architect
Tue Jan 19, 2010 11:08
Comment





OV5 Operational Activity Model

A0 1 Vignette (Phases) (OV-05 Activity Model) System Architect Thu Jan 28, 2010 17:41 Comment
--

A0 2 Harrier Crash (OV-05 Activity Model) System Architect Tue Feb 02, 2010 14:59 Comment
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Harrier Crash A0

Recovery A6

Take Up Defensive Positions A1

Find and Watch Routes A1

Engage Enemy A2

Manage Local Airspace A0

Prepare Joint Fires Defensive Fire Plan A3

Control BSM A4

Harrier GR9 Crashes A2

OV5 Operational Activity Model

A0 1 Vignette (Phases) (OV-05 Activity Model) System Architect Thu Jan 28, 2010 17:41 Comment
--

Harrier Crash A0

Recovery A6

A6 2 Recovery (OV-05 Activity Model) System Architect Thu Feb 04, 2010 13:58 Comment

Activate Joint Rescue Co-ordination Centre A65

Nominate Mission Coordinator A66

Coordinate Across Task Force A61

Perform Assessments A62

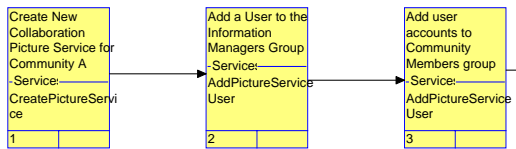
Plan Missions A63

Select Recovery Method, Resources and Command Arrangements A64

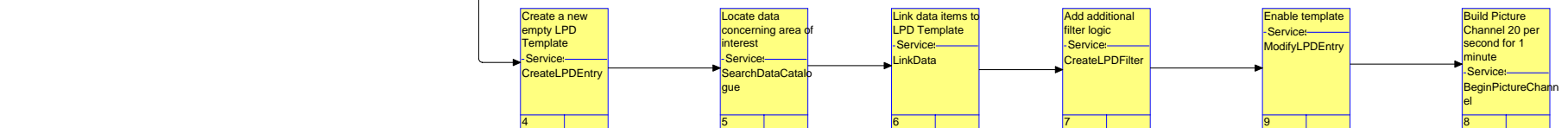
OV6a Operational Rules Model

- Sequence of operational processes, showing sequence of who uses which services to perform what task

Picture Service Manager

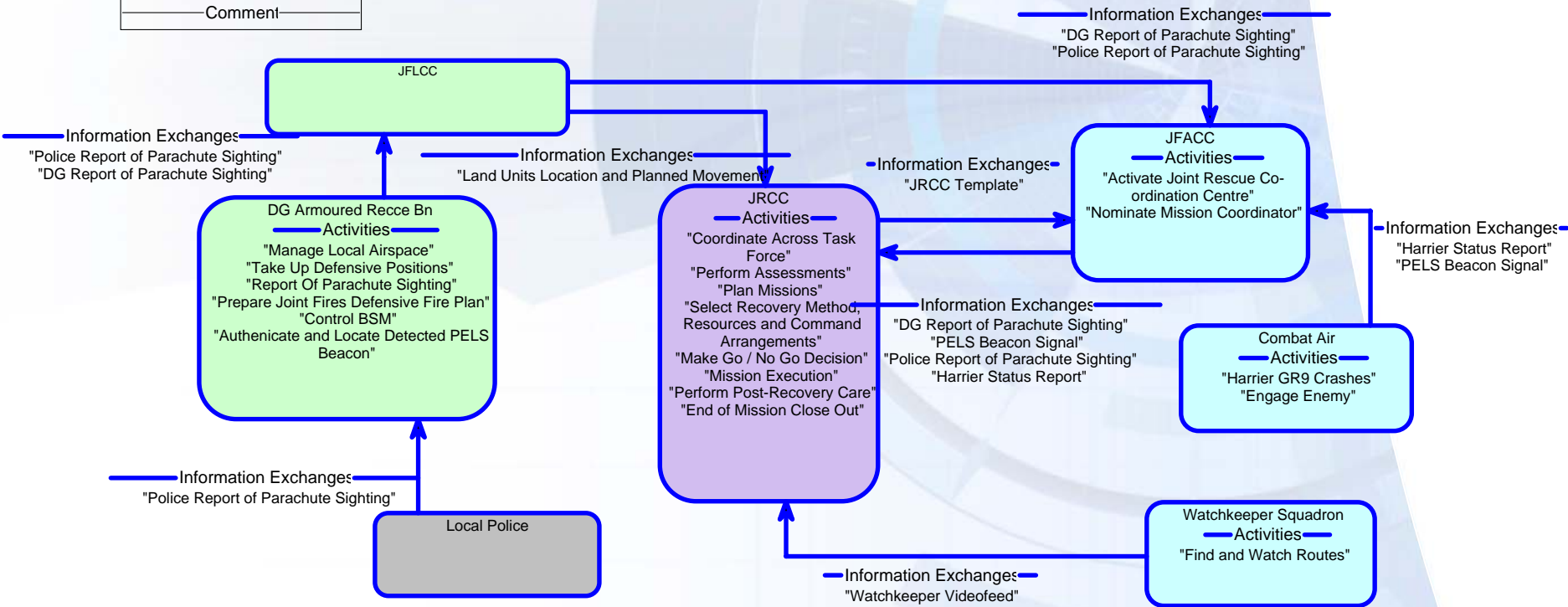


Information Manager



OV2 Operational Node Connectivity

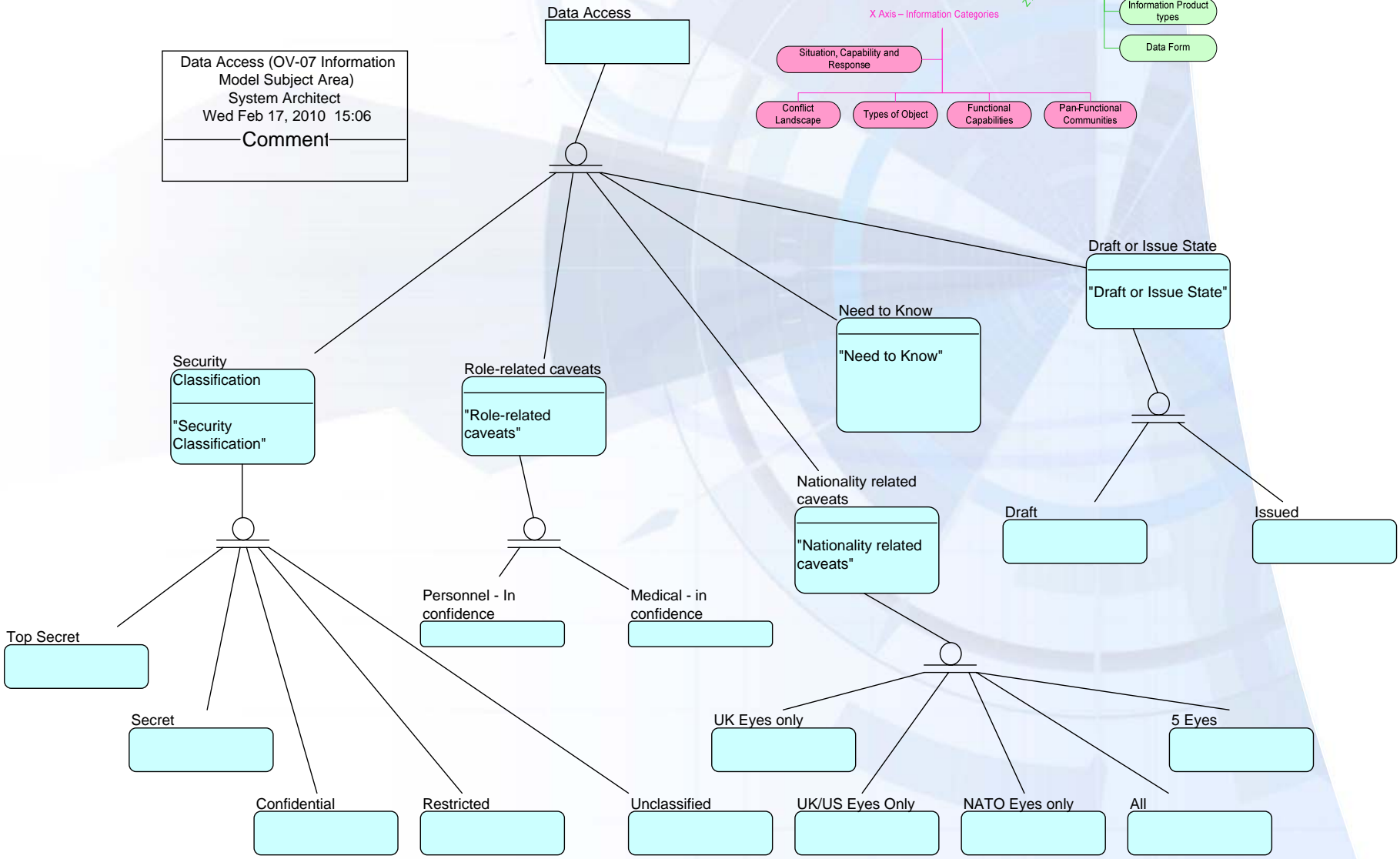
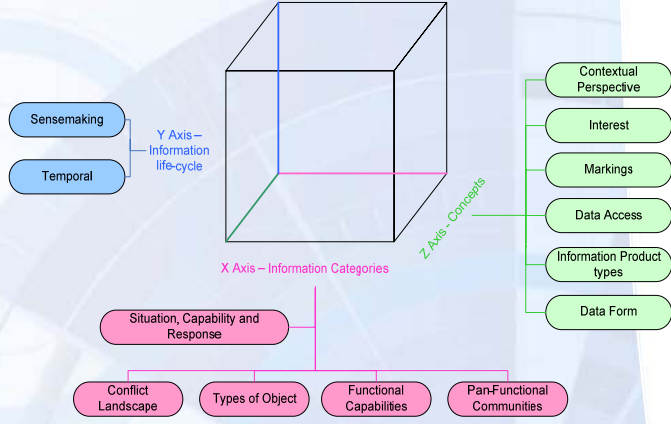
CIBM (OV-02 Op. Node Relationships)
 System Architect
 Thu Jul 01, 2010 15:56
 Comment



OV7 Information Model



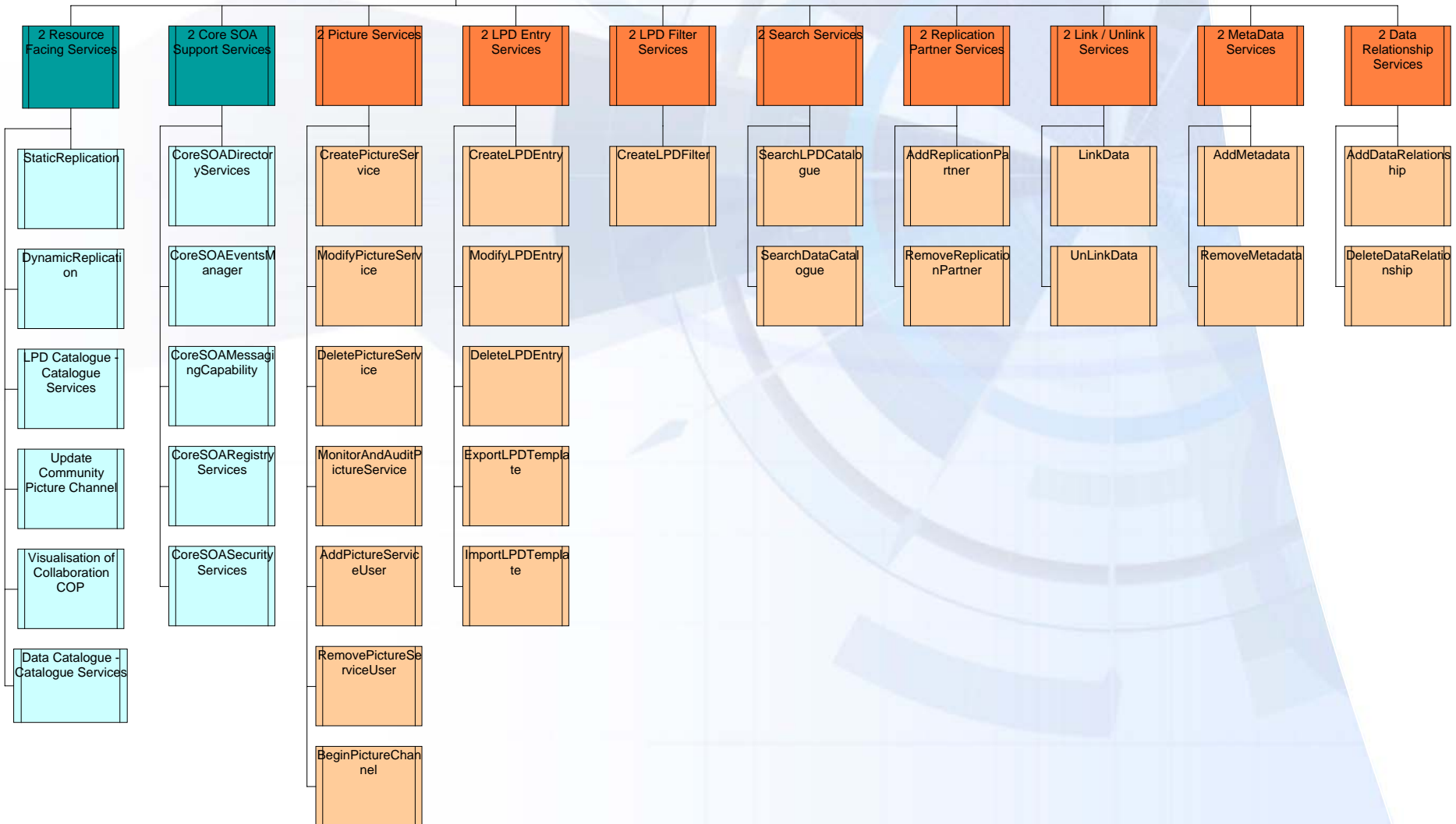
Data Access (OV-07 Information Model Subject Area)
 System Architect
 Wed Feb 17, 2010 15:06
 Comment



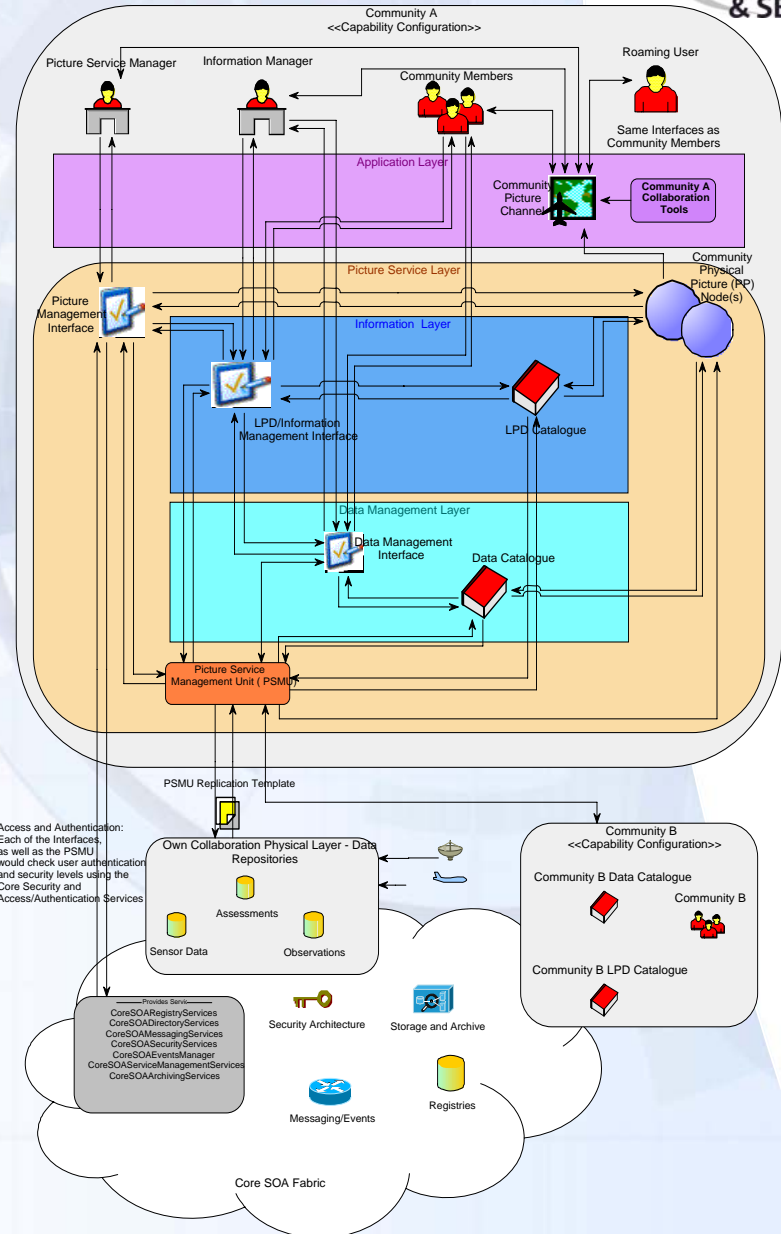
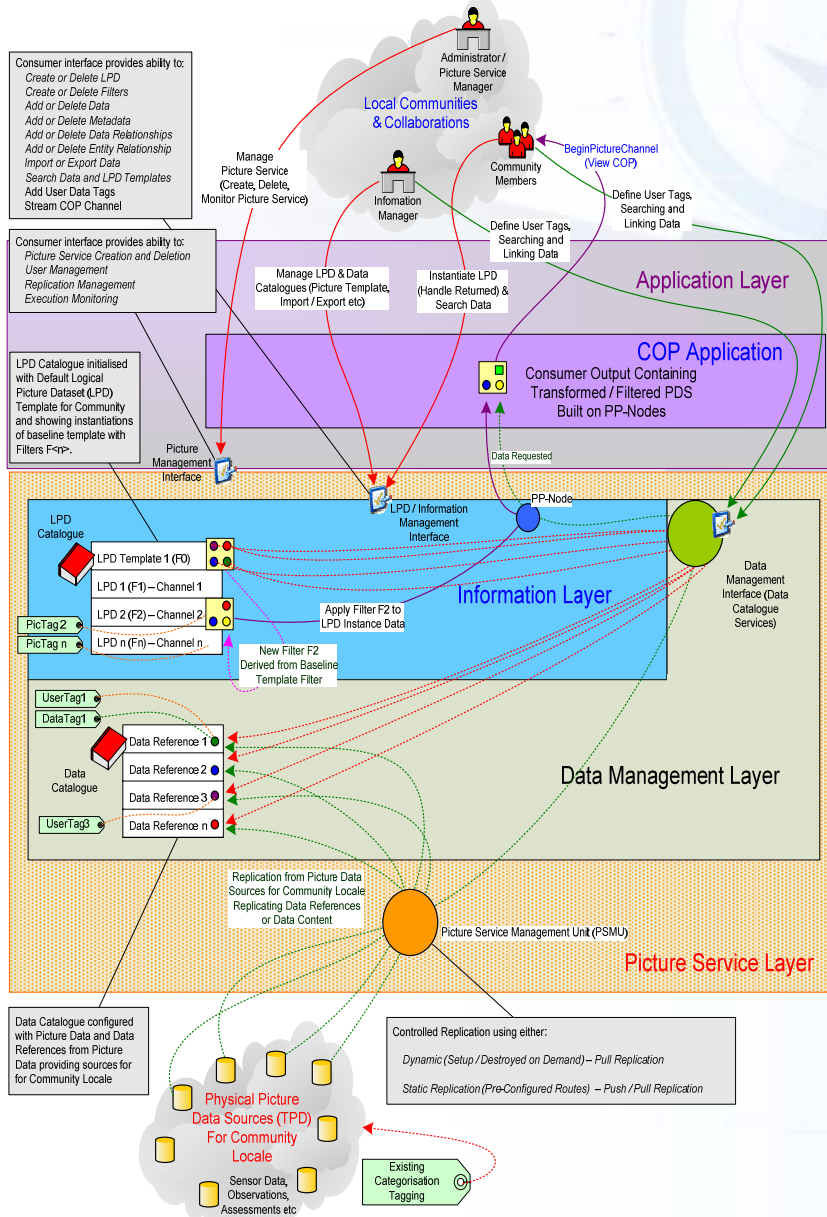
CIBM (SOV-01 Service Taxonomy)
 System Architect
 Mon Feb 22, 2010 10:56
 Comment

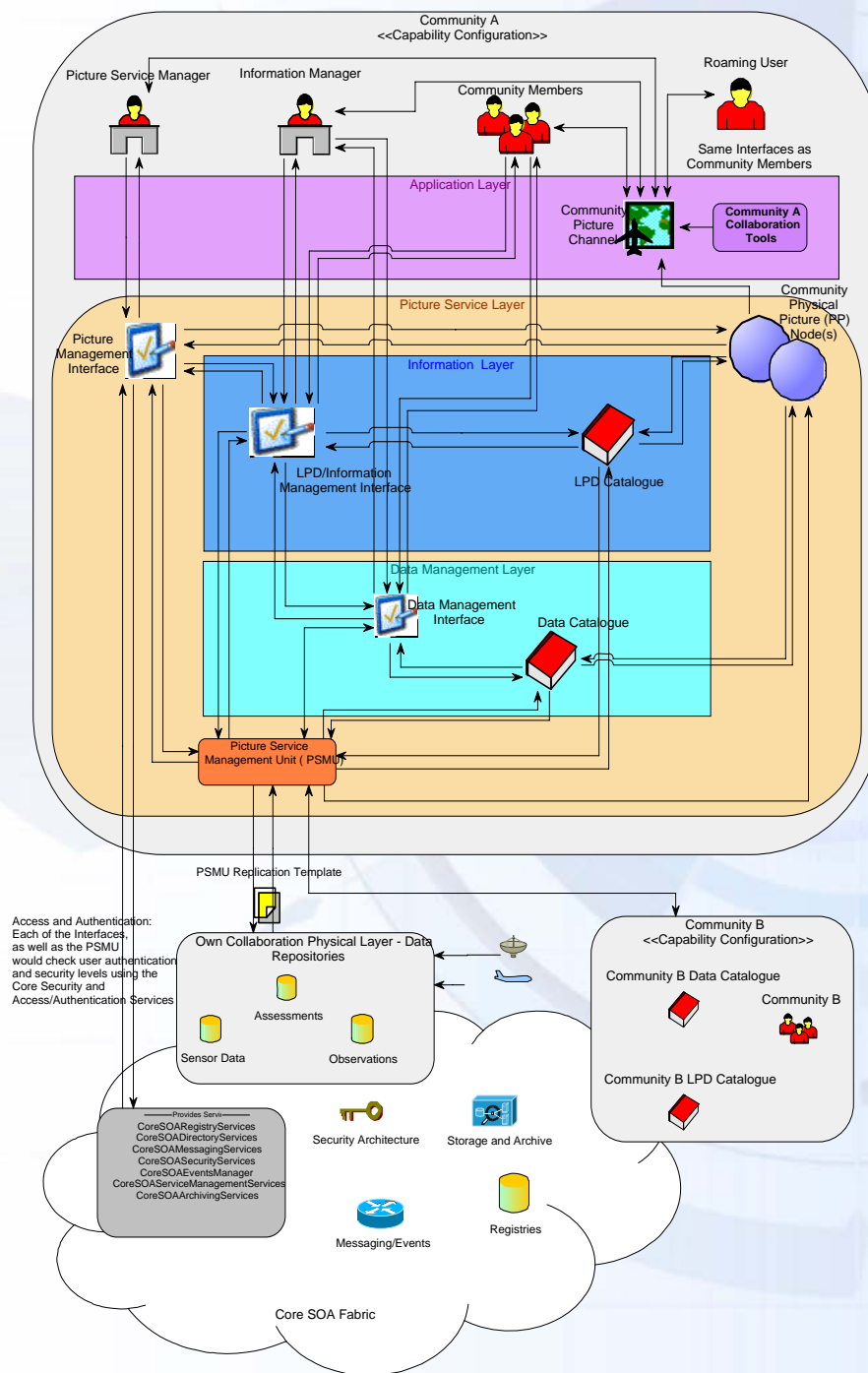
SOV1 Service Taxonomy

0 CIBM Services



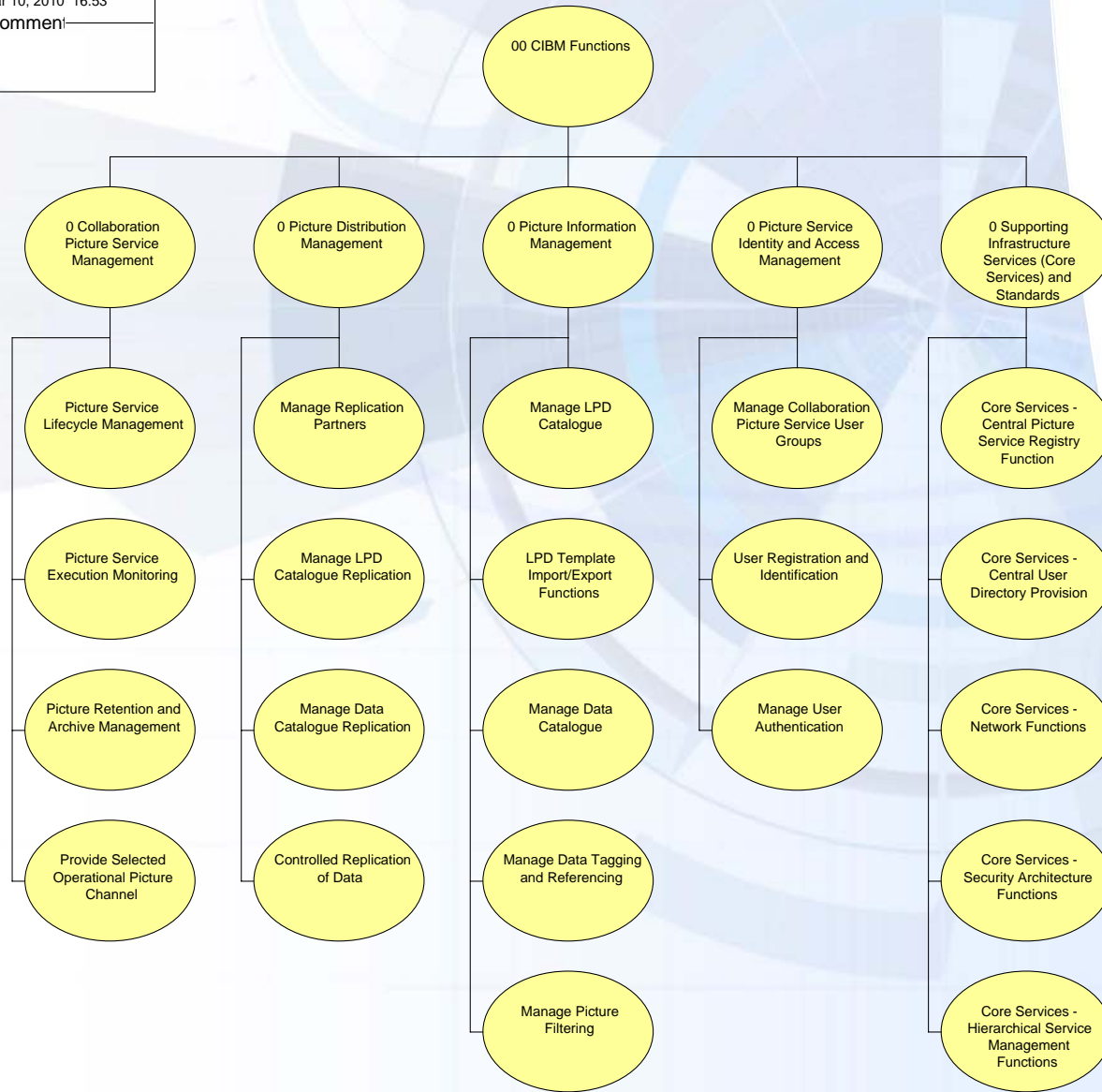
From Concept to SV1 Resource Interaction Model





SV4 System Function Decomposition

0 CIBM Top Level (SV-04 Functional Decomposition) System Architect Wed Mar 10, 2010 16:53 <hr/> Comment:



System Design Centre UK

SV12 Service Provision

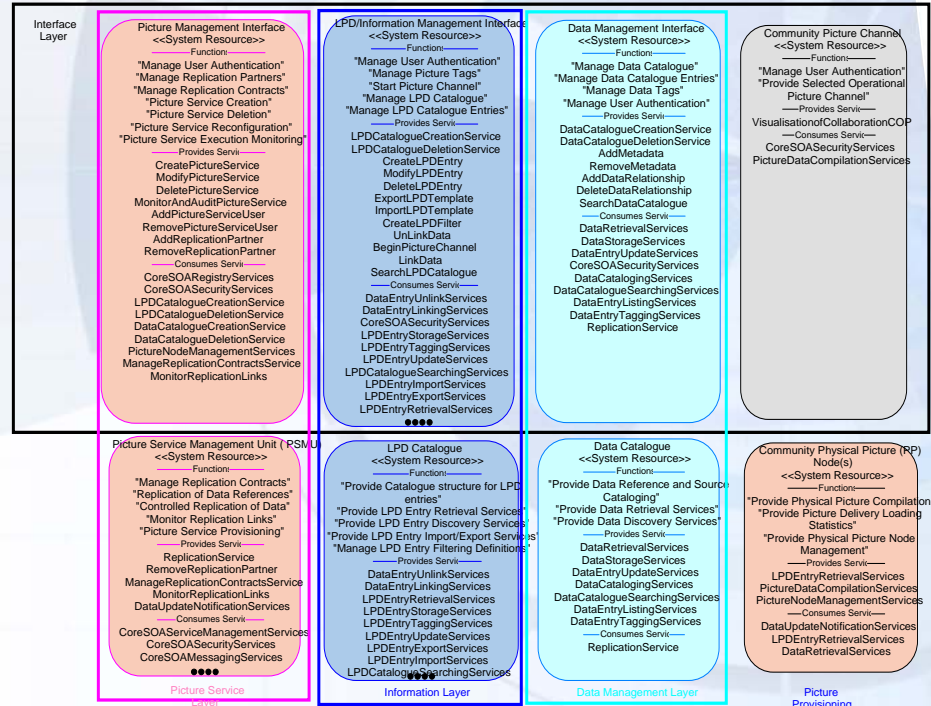


Picture Service Manager
 <<Role Type>>
 —Function—
 "Picture Service Creation"
 "Manage Collaboration Roles"
 "User Registration and Identification"
 "ManageCollaborationPictureServiceUserGroups"
 "Manage LPD Entry Access Permissions"
 "Picture Service Reconfiguration"
 "Picture Service Deletion"
 "Manage Replication Partners"
 "Manage Replication Contracts"
 "Start Picture Channel"
 "Manage Picture Service Levels"
 —Consumes Service—
 AddReplicationPartner
 RemoveReplicationPartner
 CreatePictureService
 ModifyPictureService
 DeletePictureService
 AddPictureServiceUser
 RemovePictureServiceUser
 MonitorAndAuditPictureService
 BeginPictureChannel
 VisualisationofCollaborationCOP

Information Manager
 <<Role Type>>
 —Function—
 "Manage Data Tagging and Referencing"
 "Manage Data Catalogue Replication"
 "Manage LPD Catalogue Replication"
 "Manage Replication Contracts"
 "Manage Replication Partners"
 "Manage LPD Catalogue"
 "Manage Data Catalogue"
 "Manage LPD Catalogue Entries"
 "Manage LPD Entry Access Permissions"
 "Manage Data Catalogue Entries"
 "Manage Picture Filter Definitions"
 "Manage LPD Template Import"
 "Manage LPD Template Export"
 "Start Picture Channel"
 —Consumes Service—
 CreateLPDEntry
 ModifyLPDEntry
 DeleteLPDEntry
 SearchLPDCatalogue
 SearchDataCatalogue
 AddReplicationPartner
 RemoveReplicationPartner
 CreateLPDFilter
 UnLinkData
 LinkData
 AddMetadata
 AddDataRelationship
 BeginPictureChannel
 VisualisationofCollaborationCOP

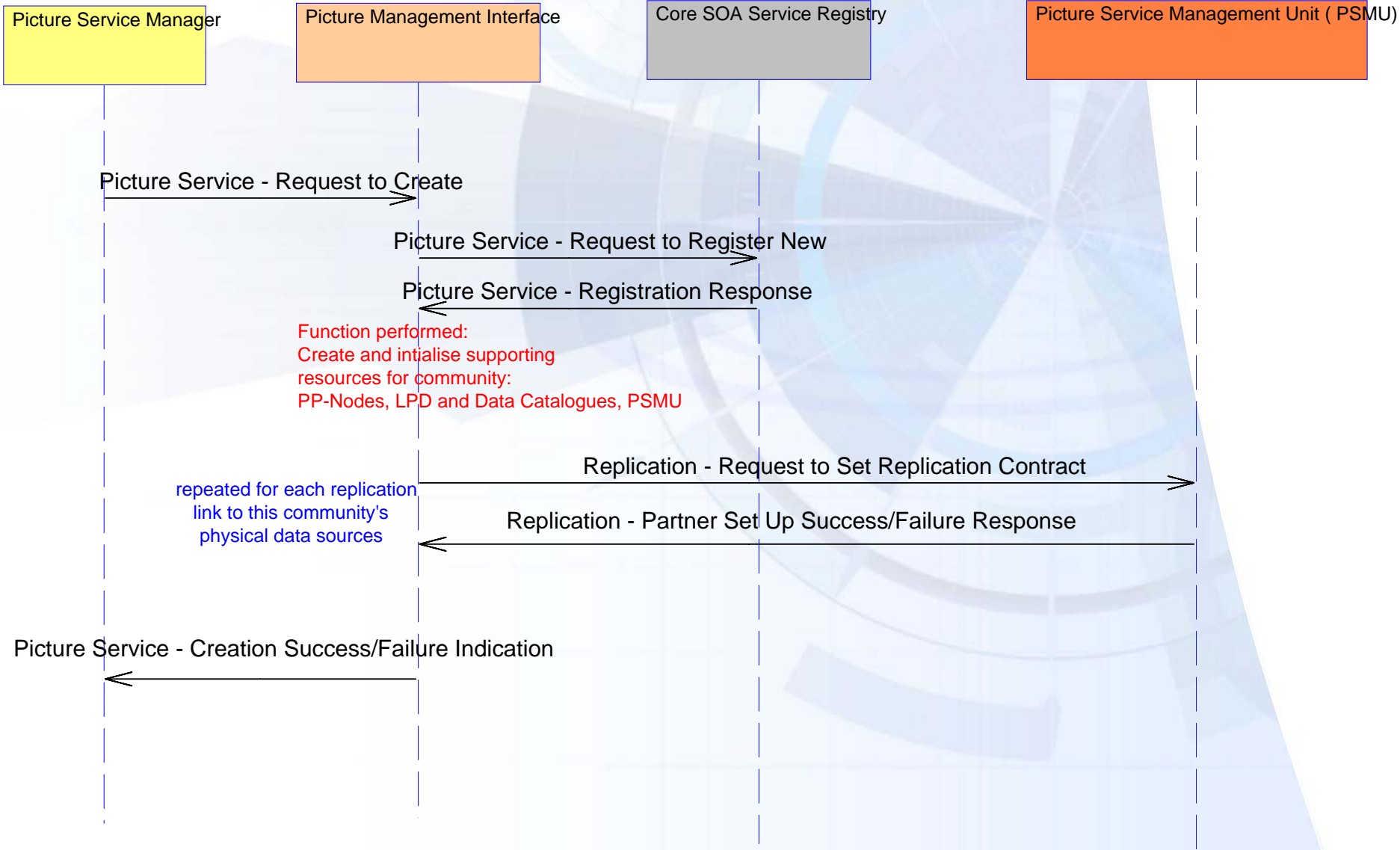
Community Manager
 <<Role Type>>
 —Function—
 "Manage Data Tagging and Referencing"
 "Manage LPD Catalogue Entries"
 "Manage LPD Catalogue Entries"
 "Manage Picture Filter Definitions"
 "Manage LPD Entry Access Permissions"
 "Start Picture Channel"
 —Consumes Service—
 SearchLPDCatalogue
 SearchDataCatalogue
 CreateLPDEntry
 ModifyLPDEntry
 DeleteLPDEntry
 CreateLPDFilter
 LinkData
 UnLinkData
 AddMetadata
 RemoveMetadata
 BeginPictureChannel
 AddDataRelationship
 VisualisationofCollaborationCOP

Roaming User
 <<Role Type>>
 —Function—
 "View Collaboration Picture at other HO"
 "Manage LPD Catalogue Entries"
 "Manage Data Catalogue Entries"
 "Manage Picture Filter Definitions"
 "Manage LPD Entry Access Permissions"
 "Manage Data Tags"
 "Start Picture Channel"
 —Consumes Service—
 SearchLPDCatalogue
 SearchDataCatalogue
 CreateLPDEntry
 ModifyLPDEntry
 DeleteLPDEntry
 LinkData
 UnLinkData
 AddMetadata
 RemoveMetadata
 AddDataRelationship
 BeginPictureChannel
 VisualisationofCollaborationCOP



Core SOA Fabric
 <<System Resource>>
 —Function—
 "Core Services - Central Picture Service Registry Function"
 "Core Services - Central Picture Archive Management Function"
 "Core Services - Central User Directory Provision"
 "Core Services - Authentication and Authorisation Functions"
 "Core Services - Central User Directory Search Functions"
 "Core Services - Network Functions"
 "Core Services - Network Management Functions"
 "Core Services - Event Management Functions"
 "Core Services - Security Architecture Functions"
 "Core Services - Hierarchical Service Management Functions"
 —Provides Service—
 CoreSOARegistryServices
 CoreSOADirectoryServices
 CoreSOAMessagingServices
 CoreSOASecurityServices
 CoreSOAEventManager
 CoreSOAServiceManagementServices

Resource Event Trace – SV10c



Questions



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