ECS Internal Interfaces

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ECS Release A SDPS/CSMS Critical Design Review
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ECS Internal Interfaces Agenda

DID 313 Contents

Interface Modelling Approach

Key Mechanisms

Level 0 Ingest Scenario

External Interface Mapping

DID 313 Internal ICD

Documented in DID-313 [313-CD-004-001]

- **Release A CSMS/SDPS Internal Interface Control Document for the ECS Project**
  - **Interface Design Scenarios**
  - **Public Class Descriptions**
  - **Key Mechanisms**
  - **External Interface to Internal Object/Method Mapping**
  - **Public Interface Frequency Matrix**
  - **Failure Scenarios**
- **Increased scope to include mapping of internal objects to external interfaces, failure scenarios, and key mechanisms**

Interface Modeling Approach

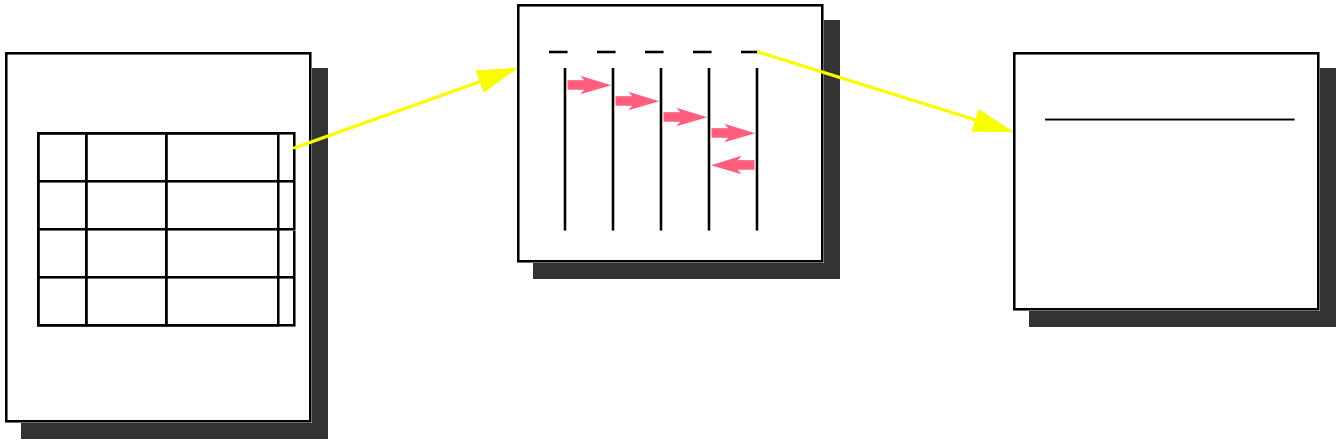
High Level Interface Design Scenarios (or use cases)

- **Capture major system threads that drive inter-CSCI interfaces, based on SDPS Scenarios in PDR SDPS DID 305 Appendix D .**
- **Consist of reusable *scenario primitives and key mechanisms***

Scenario Primitives

- **Documented as Event Traces in STP-OMT tool**
- **Provide specific Class-to-Class interactions involved in the inter-CSCI interfaces**
- **Include calling sequences (signatures) of classes being called**

Interface Modeling Approach
(continued)



Interface Design Scenarios

Shows high level steps and context for interface use

Scenario Primitives

Shows specific object interactions with signatures

Class Descriptions

Detailed descriptions of Public Class Methods & Attributes

Public Classes

Public classes represent the inter-CI interfaces

Public classes are exported by each CSCI and made visible to other CSCIs

- **Classes exported by a CSCI can be**
  - **Distributed classes (OODCE), e.g. SDSRV Query class**
  - **Simple classes (non-distributed), e.g. local object in caller process accessed via library call**

Interface Design Scenarios
- Benefits

Focuses design teams on CSCI interfaces.

Exercise Release A internal interfaces.

Validate key architectural interfaces and key mechanisms.

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Key Mechanism Review

A key mechanism is a replicated design pattern in the software architecture.

A key mechanism illustrates an architectural function required by all applications.

Key mechanisms include architectural functions such as:

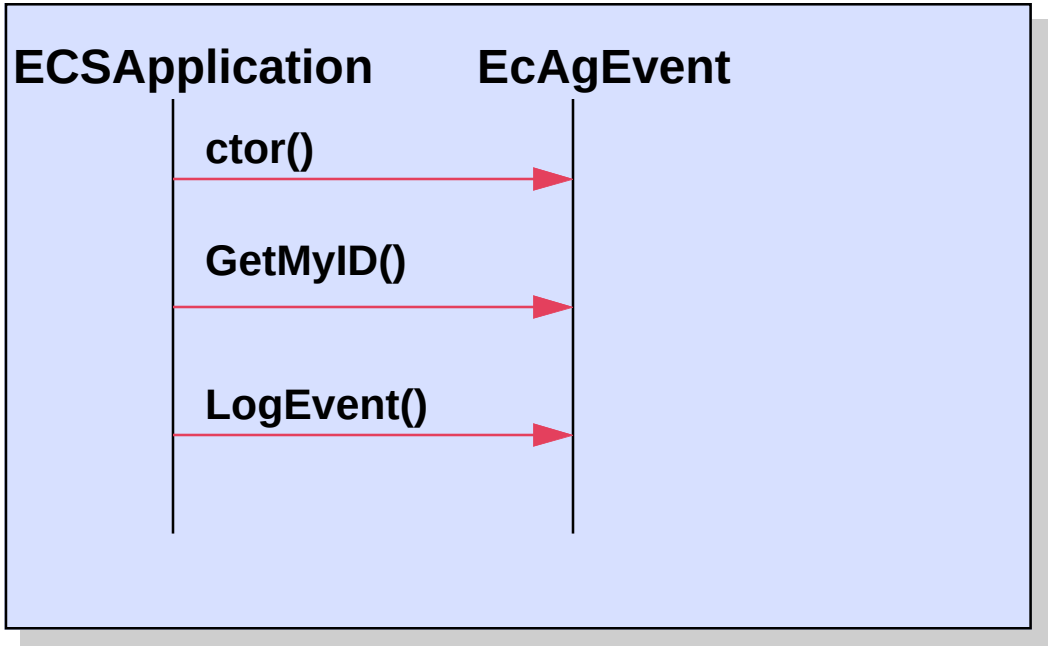
- **Life-cycle Services (Startup, Shutdown)**
- **Distributed Object Framework**
- **Error Detection and Reporting**
- **Universal References**

Documented using text descriptions and event traces in DID 313.

DID 313 Key Mechanism Descriptions

Each key mechanism described using generic set of application classes that make use of the infrastructure services.

For example, the KM_Event_Logging key mechanism illustrates the use of the EcAgEvent class by a *generic* ECSApplication.

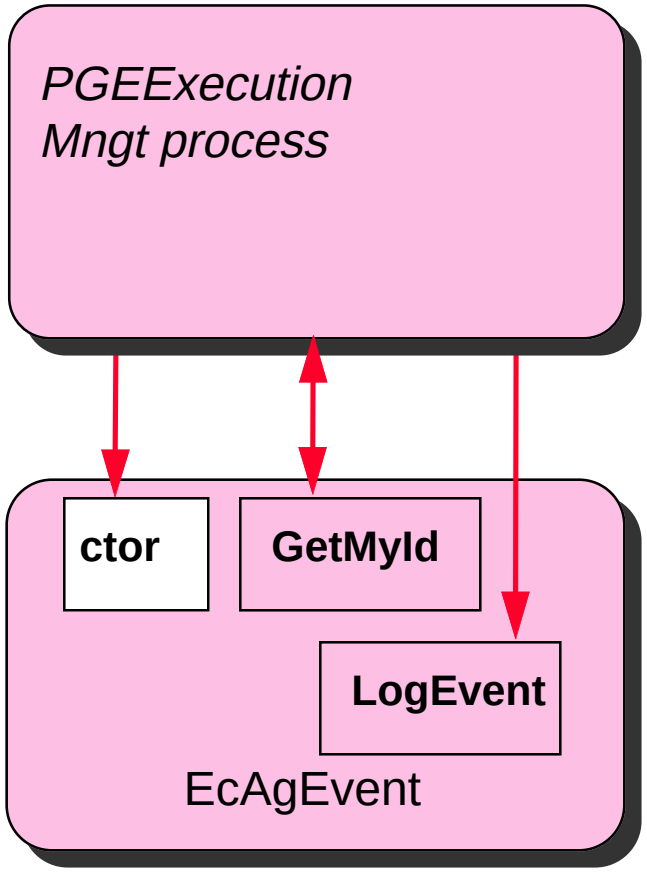


Use of Event Logging KM

- *PGEExecutionMngt process constructs an event*

- *PGEExecutionMngt process call GetMyId to get UUID of this event.*

- *PGEExecutionMngt process calls LogEvent and supplies Parent UUID, Event Type, Severity, Disposition, and message*



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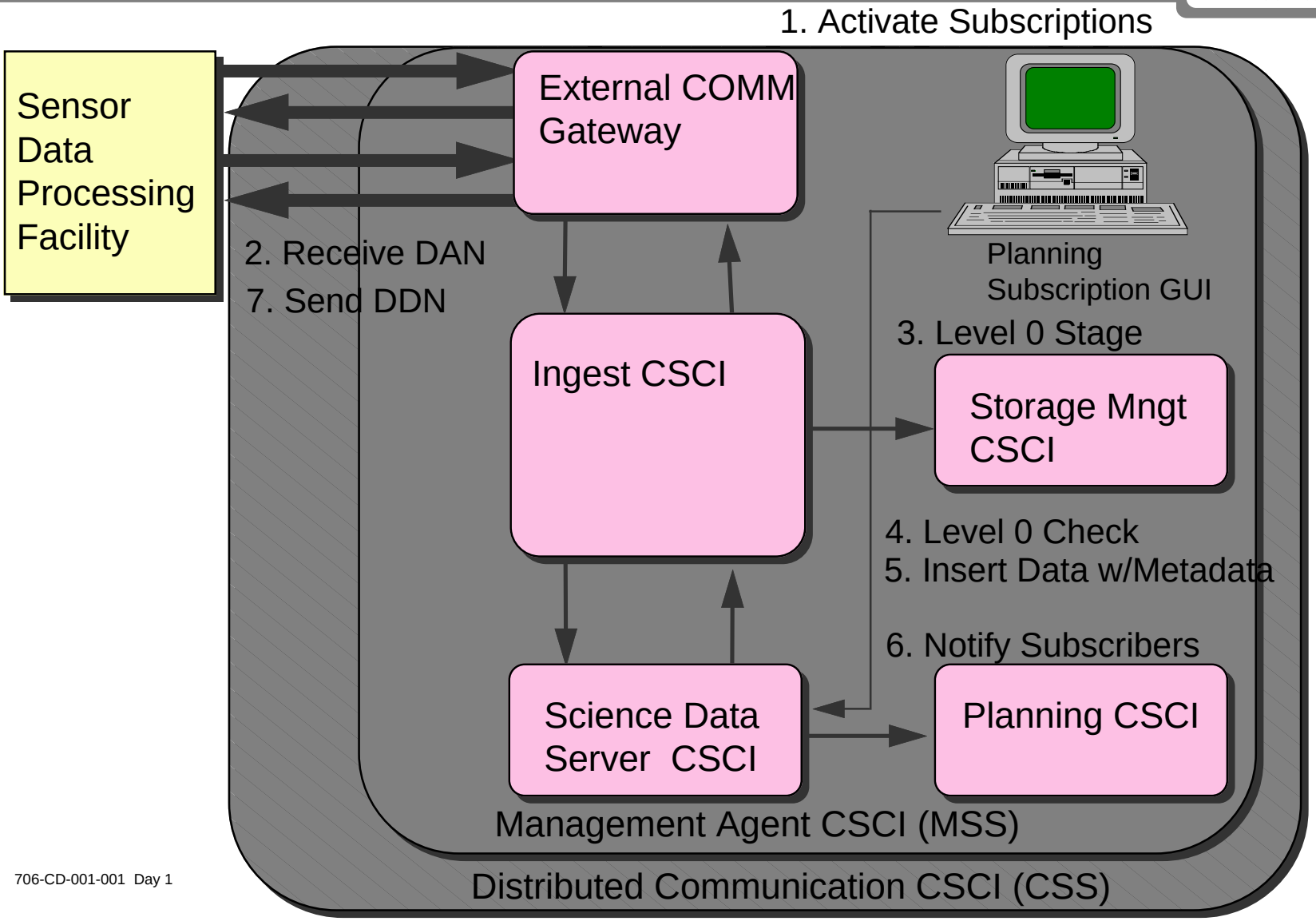
Interface Design Scenario 1 - Level 0 Ingest



Scenario 1 - Level 0 Ingest (1 of 2)

1. Activate Subscriptions -

- ***Operator submits subscription via Planning Subscription Submission Editor GUI, subscription sent to Science Data Server***

2. Receive Data Availability Notice -

- ***SDPF authenticates and sends DAN to External COMM Gateway, Ingest accepts DAN causing DAA to be sent to SDPF***

3. Level 0 Stage -

- **Ingest allocates staging disk and uses FTP to transfer file from SDPF**

Scenario 1 - Level 0 Ingest (2 of 2)

4. Level 0 Check

- **Ingest validates L0 against metadata to ensure values are valid and data is in correct format**

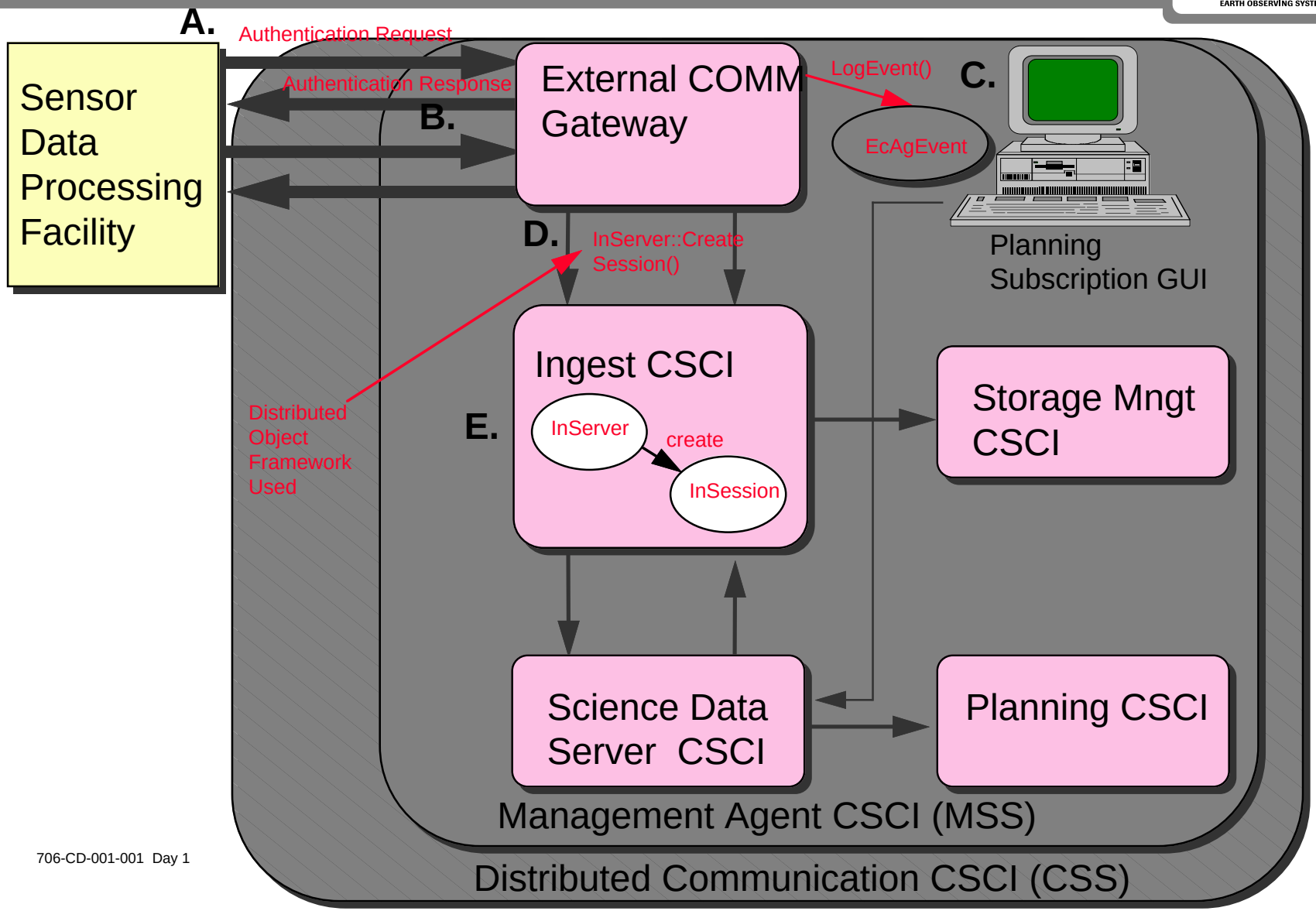
5. Insert Data w/Metadata

- **Ingest inserts dataset into Science Data Server which in turn stores data in archive using storage management store**

6. Notify Subscribers

- **Science Data Server notifies Planning of L0 arrival.**

Scenario 1 - Level 0 Ingest
Step 2 Receive DAN



Step 2 Receive DAN Details (1 of 3)

At system startup External COMM Gateway starts up proxy (client of distributed object) of Ingest's InServer.

A. SDPF sends Authentication Request to External COMM Gateway

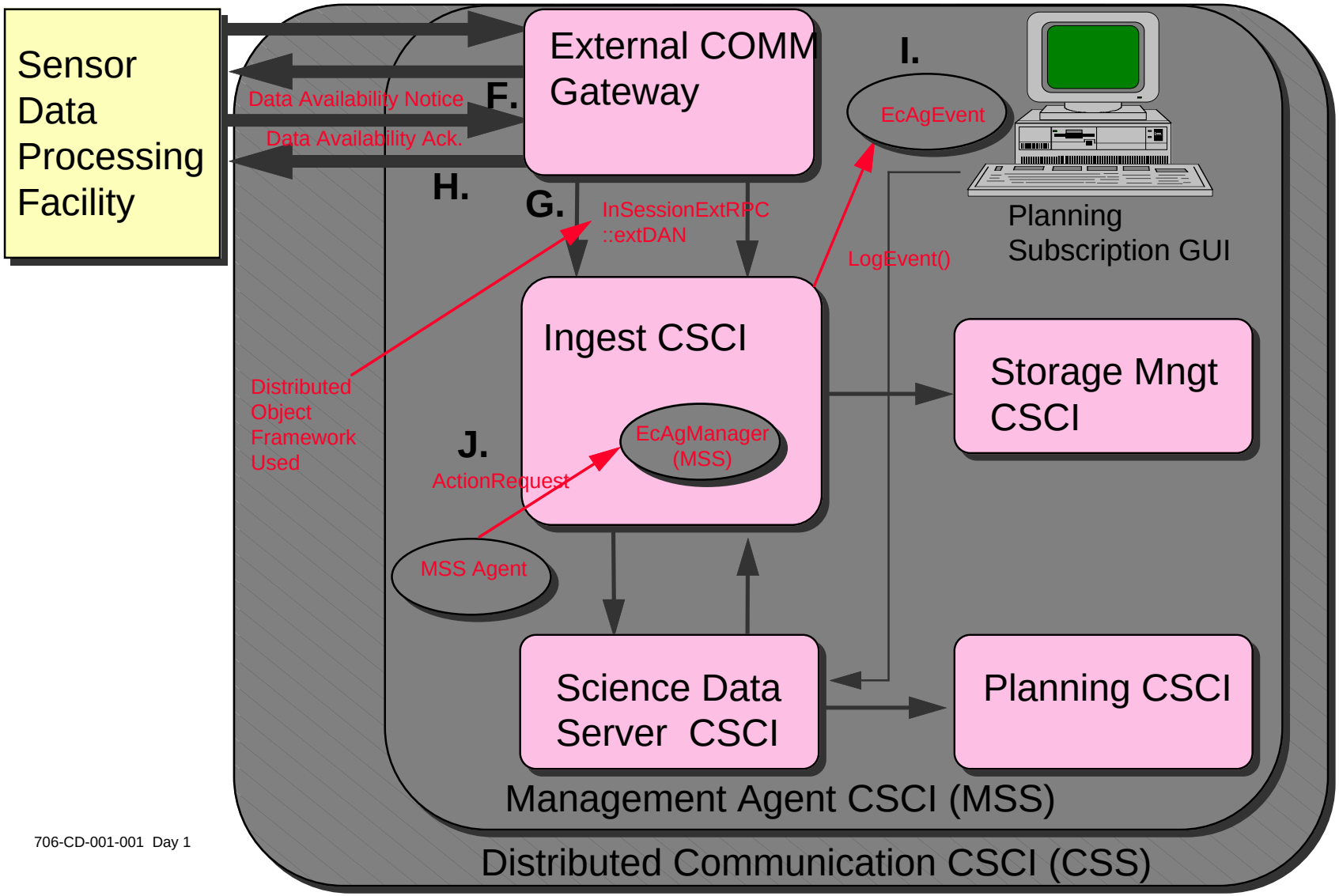
B. External COMM Gateway uses ISS/CSS security services to perform authentication and then sends Authentication Response to SDPF

C. External COMM Gateway logs Authentication event to MSS event log using EcAgEvent. (See Key Mechanism: KM_Event_Logging in Section 6.3.1 [313-CD-004-001])

D. Gateway uses Distributed Object Framework (Distributed Communications CSCI) to send *CreateSession* message to InServer (See Key Mechanism: Distributed_Object_Framework in Section 6.3.6 [313-CD-004-001])

E. Ingest's InServer creates InSession.

Scenario 1 - Level 0 Ingest
Step 2 Receive DAN



Step 2 Receive DAN Details (2 of 3)

F. SDPF sends Data Availability Notice (DAN) to External COMM Gateway

G. External COMM Gateway calls InSessionExtRPC::extDAN using Distributed Object Framework

(See Key Mechanism: Distributed_Object_Framework Section 6.3.6 [313-CD-004-001])

H. extDAN returns and causes External COMM Gateway to send Data Availability Acknowledgment

I. Ingest logs DAN receipt event to MSS event log using EcAgEvent.

(See Key Mechanism: KM_Event_Logging Section 6.3.1 [313-CD-004-001])

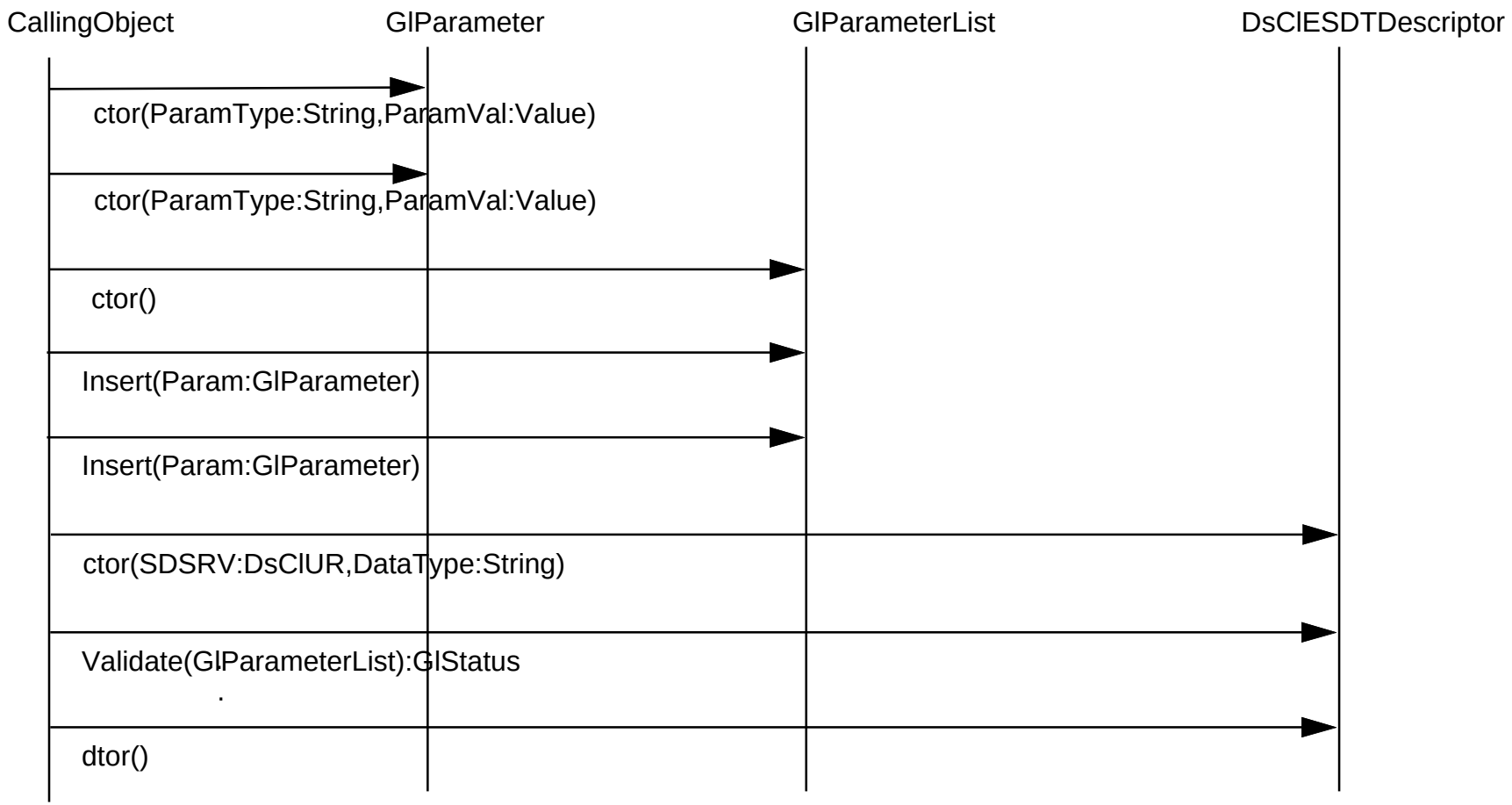
Step 2 Receive DAN Details (3 of 3)

Periodically during the lifetime of an ECS application, MSS, using HP OpenView, queries for Application Performance Metrics by calling EcAgManager resident in each ECS application.

J. MSS Agent calls EcAgManager ::ActionRequest using Distributed Object Framework to access Application Performance Metrics

See Key Mechanism: KM_Retrieve_Application_Performance_Metric in Section 6.3.4 [313-CD-004-001]

L0_Check_SP2 Scenario Primitive



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External Interface Mapping

External Interface Mapping

Mapped each external ICD flow to internal object or COTS (214 external flows)

ICD	Interface	From	To	ECS Object	Object Method	Data Volume	Frequency
SDPF	LIS quicklook data	SDPF	ECS	FTP to Ingest CSCI- InFile	Transfer	medium	3 times a day
SDPF	Spacecraft Ephemeris	SDPF	ECS	FTP to Ingest CSCI- InFile	Transfer	medium	daily
SDPF	TRMM Definitive Attitude	SDPF	ECS	FTP to Ingest CSCI- InFile	Transfer	medium	as required
SDPF	TRMM Housekeeping data	SDPF	ECS	FTP to Ingest CSCI- InFile	Transfer	medium	daily
SDPF	Authentication Request	SDPF	ECS	External COMM Gateway to Ingest CSCI -InServer	CreateSession	low	at least once daily
SDPF	Authentication Response	ECS	SDPF	External COMM Gateway to Ingest CSCI -InServer	CreateSession	low	at least once daily
SDPF	Data Availability Notice	SDPF	ECS	External COMM Gateway to Ingest CSCI -InSessionExtRPC	extDAN	low	at least once daily
SDPF	Data Availability Ack	ECS	SDPF	External COMM Gateway to Ingest CSCI -InSessionExtRPC	extDAN	low	at least once daily
SDPF	Data Delivery Notice	ECS	SDPF	External COMM Gateway to Ingest CSCI -InSessionEcsRPC	ecsDDN	low	at least once daily

Excerpt from External Interface Mapping Table

See Section 7. [313-CD-004-001]