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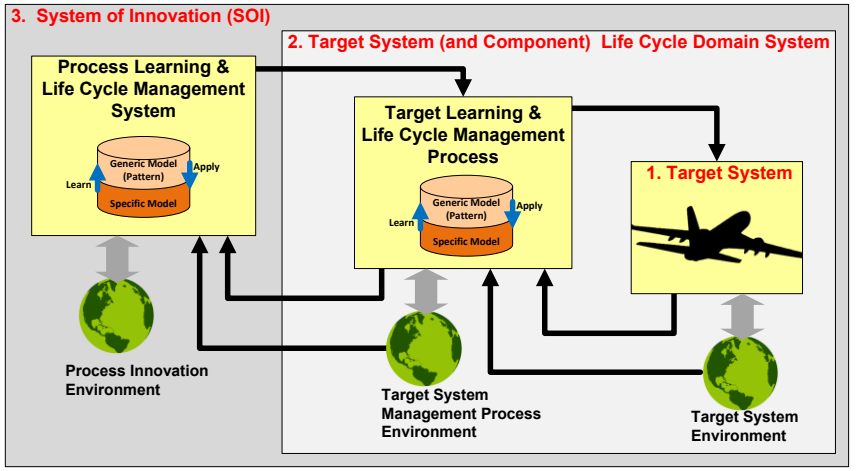
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- Globally replace items identified in arrows as shown: <<XYZ>>
  - includes company-specific names, logos, and homework pattern file names and locations

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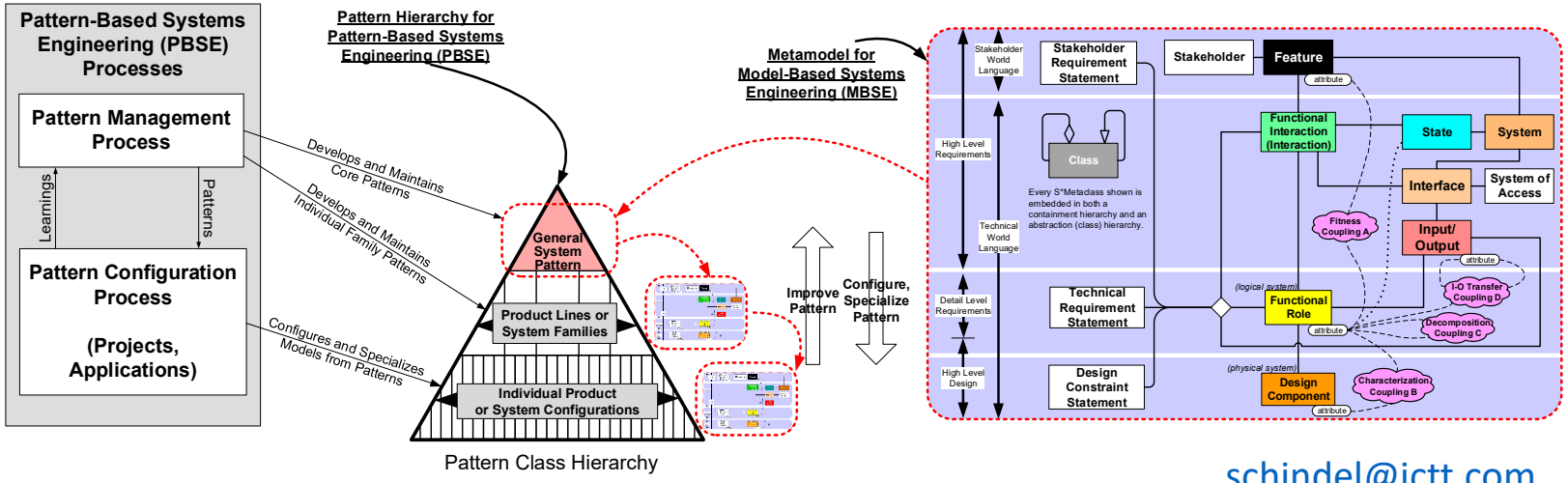
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Phase II Session 2

Introduction to S*Models, S*Metamodel, S*Patterns, Mappings to Languages & Tools, S*Configuration Wizard, ASELCM S*Pattern



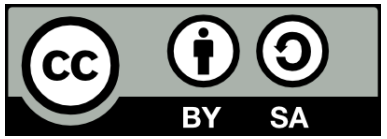
Level 0 View, INCOSE ASELCM Pattern



Pattern Class Hierarchy

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Contents

- Recap of previous session:
  - Previous session take-aways, discussion, questions
- Phase II Session 2 Class Content
- References

Recap of Previous Session:
Take-aways impacting actual practices

.

1. Innovation Ecosystem Pattern
   - Descriptive, not prescriptive
   - Modeled as an S* Pattern, but related enterprise processes and information do not have to be.
   - Systems 1, 2, and 3
2. Consistency Management
3. Digital Threads/Twins
4. Model Characterization Pattern
5. Validation, Verification and Uncertainty Quantification (VVUQ) of models
6. Credibility of Models



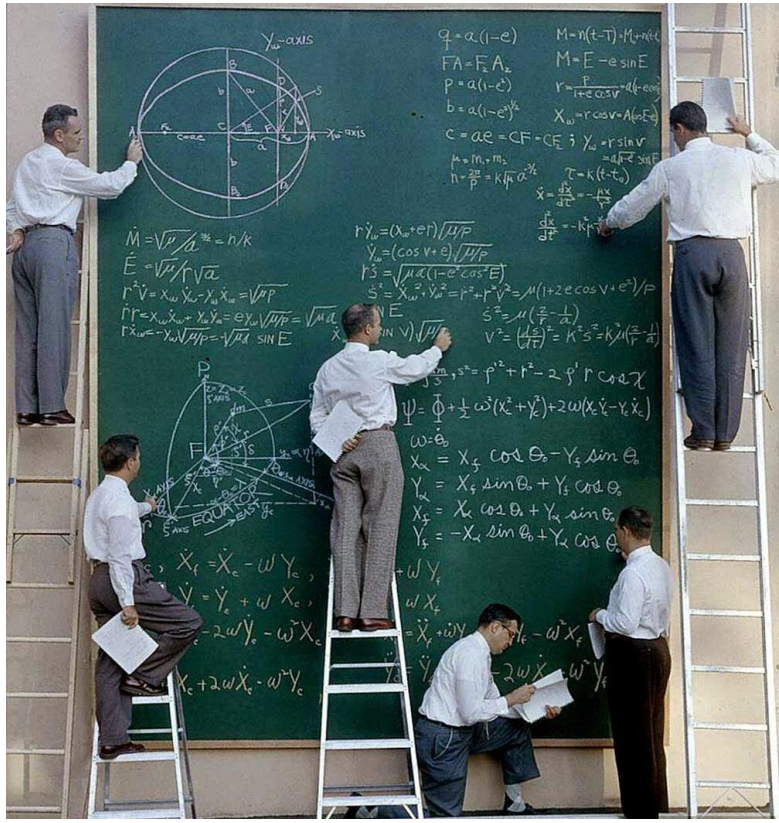
- Can a creative, talented team *align* its work?
- What should be *standard* about this, in your customer work?
- What should be *configurable* about this, in your customer work?



Previous Session Homework Discussion

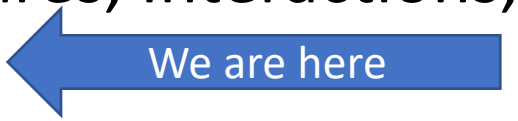
<u>Homework assignment was</u>:

1. List the most important “System 1 consistency management” cases for a specific project you are working or have worked.
2. List the most important “System 2 consistency management” cases for a specific project you are working or have worked.
3. List the most important “System 1 Variant” aspects of two engineering projects you are working or have worked.
4. List the most important “System 2 Variant” aspects of two engineering projects you are working or have worked.



What happened when you tried this?

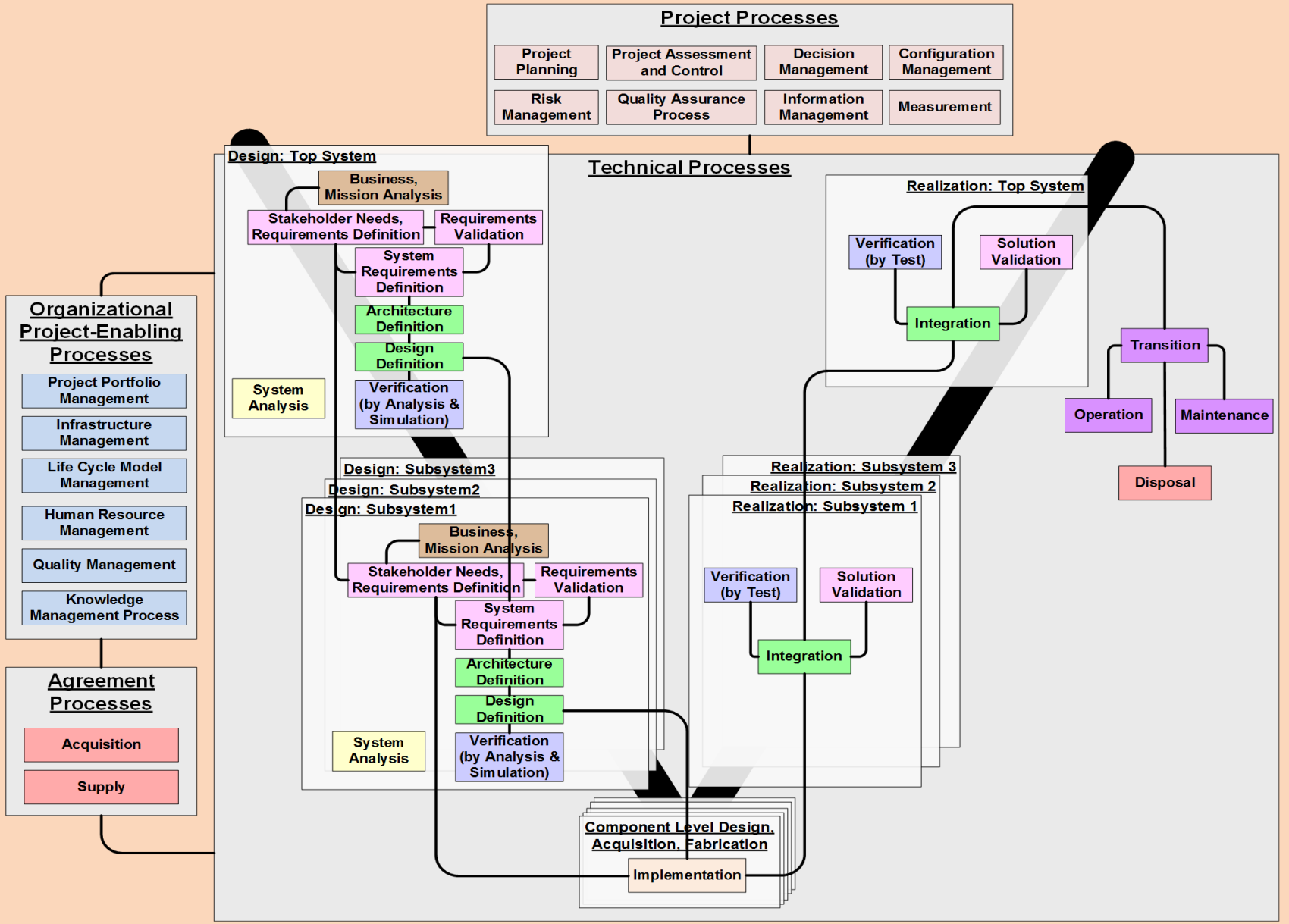
Phase II Class Sessions: Accountability, Macrostructure of Model-Based Ecosystem (4 Sessions, 3 hours each)

- ASELCM Ecosystem S*Pattern: Nature, Intended Uses, Levels 0-4 Logical Arch
  - Session 1
- ASELCM Features, Interactions, Roles, Resources, Use in Consistency Mgmt.
  - Sessions 2-3 

- ASELCM Configuration Stages and Accountability
  - Session 4
- Homework Presentation and Feedback
  - Distributed over above sessions

System of Innovation (SOI) Pattern Logical Architecture

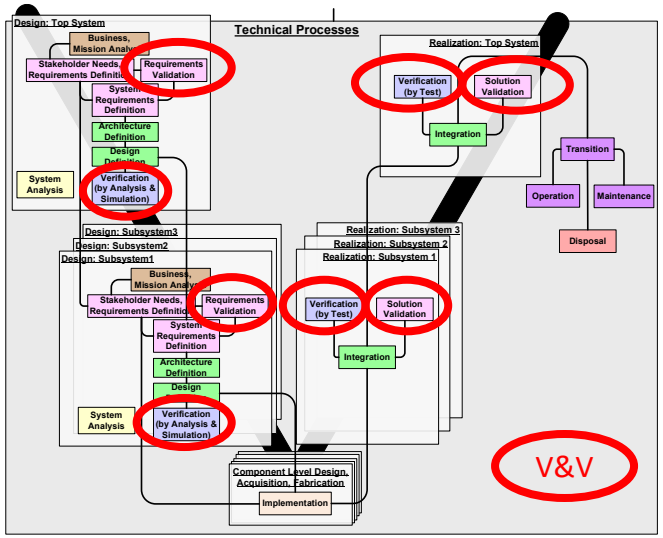
(Adapted from ISO/IEC 15288:2015)



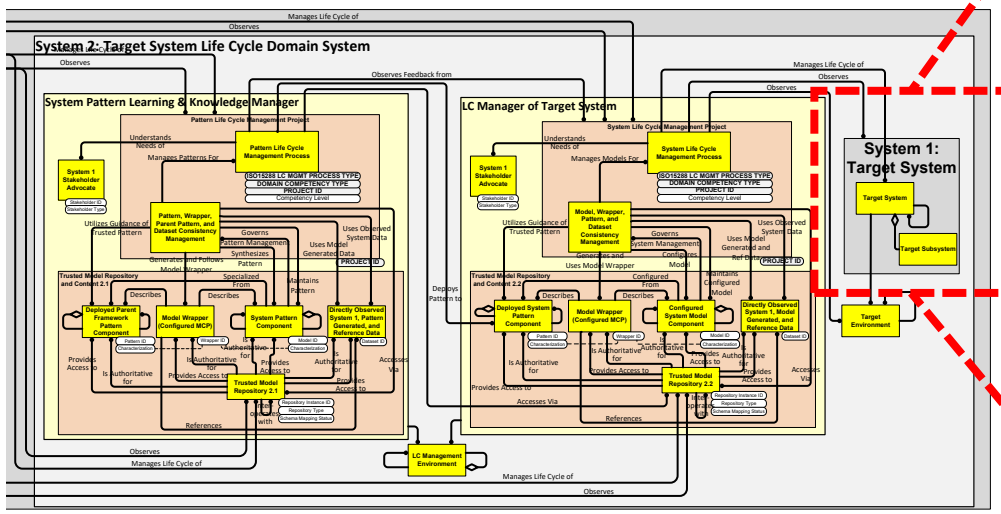
ASELCM Interactions and Roles: How the ASELCM Pattern Content, Its Applications, and Use of Configuration Wizard Are Evolving

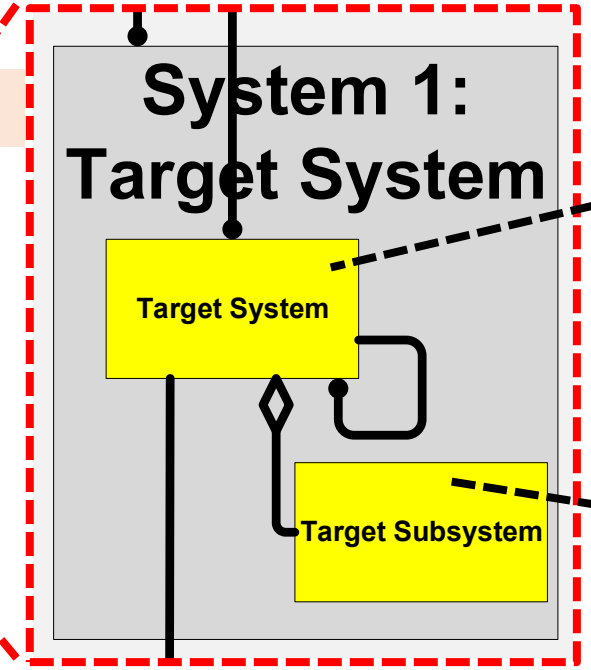
- Current ASELCM Pattern evolution underway:
  - Extension of the Consistency Management paradigm to full synthesis, not just V&V.
  - Representation of multiple decomposition cycles, and proliferating artifacts.
  - Bulk loading of instances to Configuration Wizard.

"Vee" Diagram

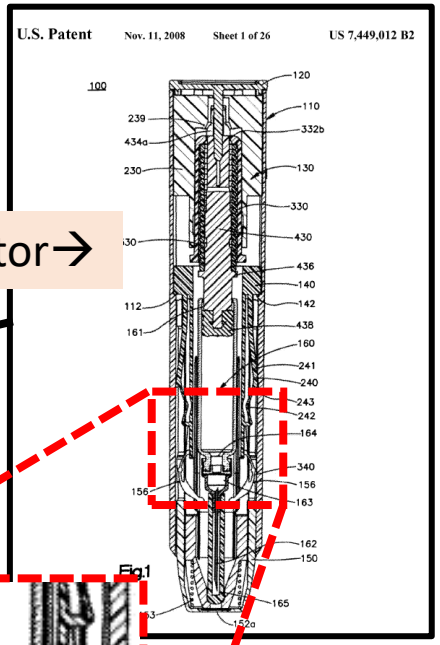


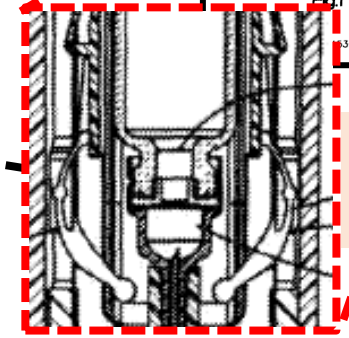
ASELCM Pattern





Auto Injector→

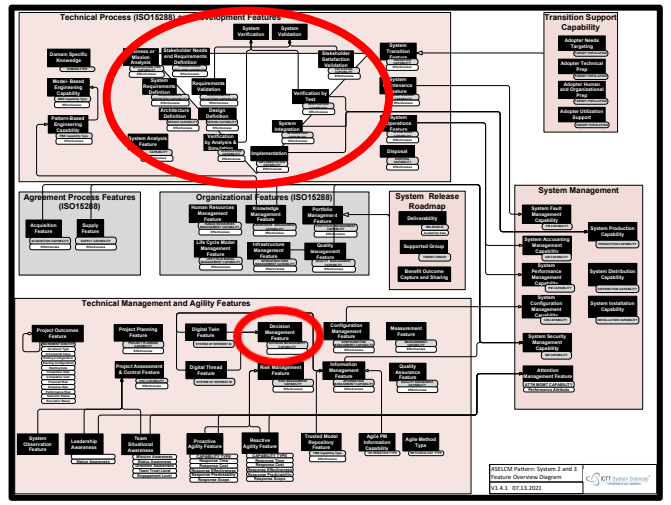




Subsystem Components

Extension of the Consistency Management paradigm

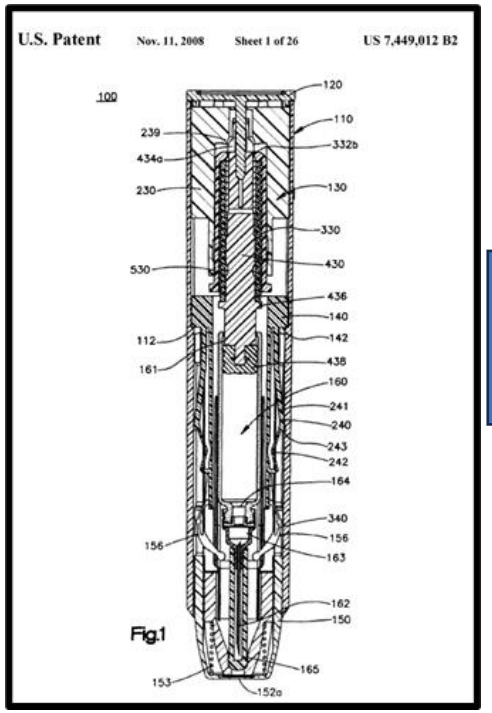
ASELCM Features (Capabilities)



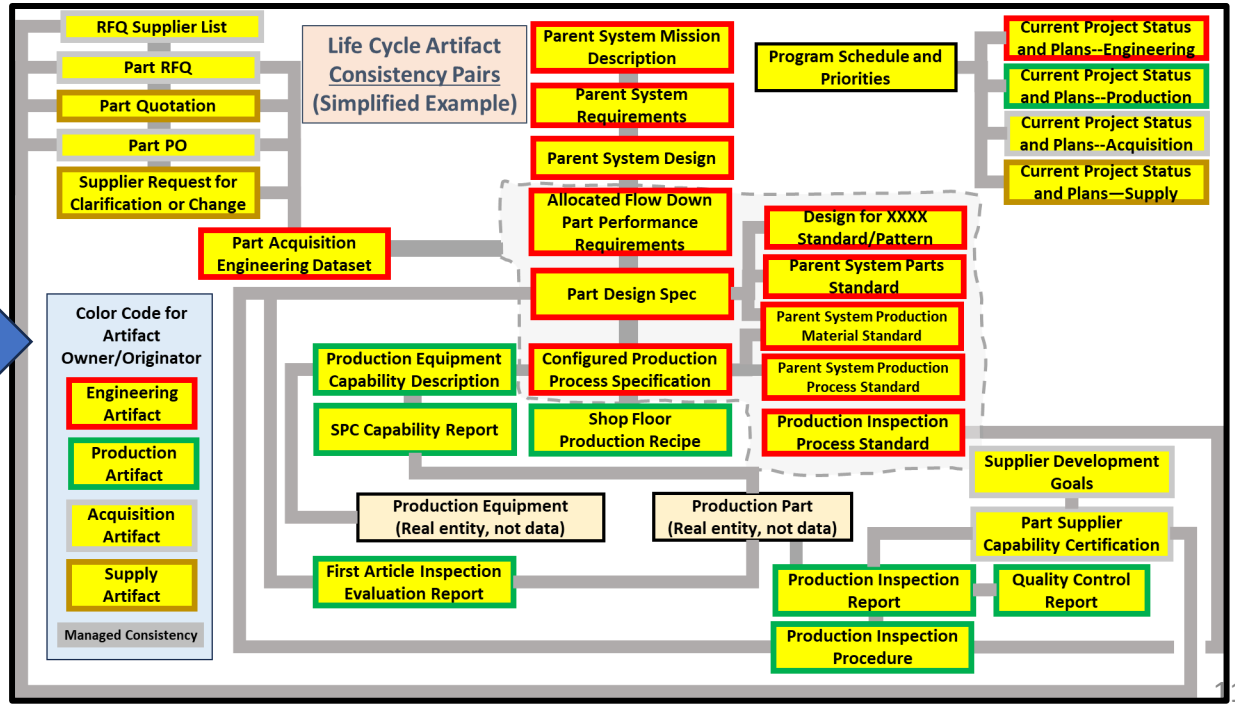
- Already present in earlier ASELCM Features, Interactions, Roles.
- Expansion to Decision Management Features and their descendants.
- Recognition that Consistency Management can represent more than just "V&V" checking of "other work":
  - The actual synthesis of content (not just checking of content) can be seen in an extended Consistency Management paradigm's reconciliations.
  - In that case, this paradigm becomes the main structure of the *entire Engineering and Life Cycle Management framework*, seen as learning, and consistency with past learning.
  - Major implications for incorporation of AI, but also for an integrated view of *what human-dominated organizations were already doing*—and so, a framework for the transition to hybrid cases and digital engineering in general.

Representation of multiple design cycles and their proliferating architecture-driven artifacts

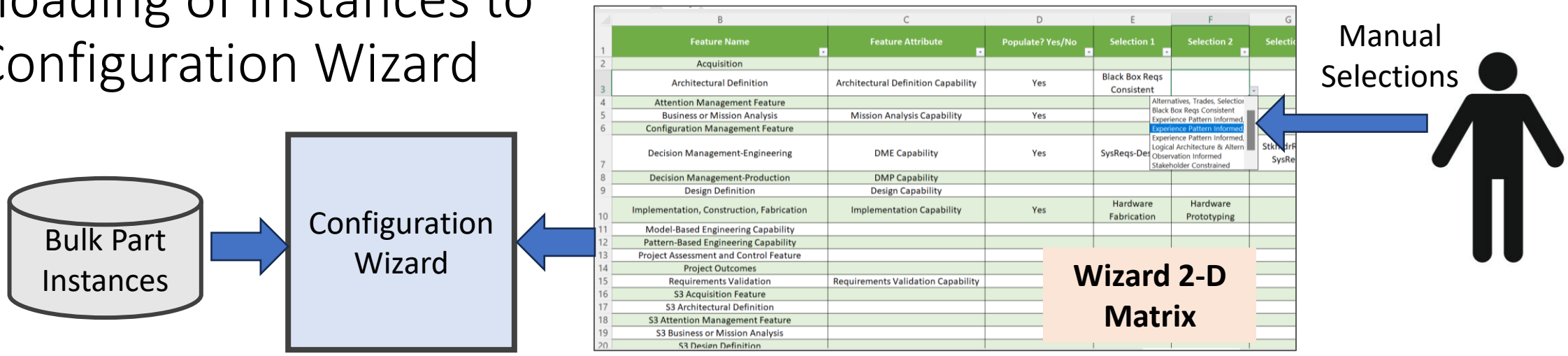
- A familiar fact about engineering cycles and Work Breakdown Structure (WBS):
  - The first level decomposition of the initial high level design cycle determines the structure / population of the subsequent detail design WBS and "tree" of artifacts found in a SEMP.
  - So, the populated high level design discovered decomposition can be fed back into the ASELCM Pattern population process for the next level set of processes and information artifacts.
  - The emerging design structure populates the web of artifacts whose consistency relationships define the consistency management checks:



Population of Device Architecture Drives Population of Managed Information Artifact Consistency Pairs



Bulk loading of instances to the Configuration Wizard



	Feature Name	Feature Attribute	Populate? Yes/No	Selection 1	Selection 2
2	Acquisition				
3	Architectural Definition	Architectural Definition Capability	Yes	Black Box Reqs Consistent	
4	Attention Management Feature				
5	Business or Mission Analysis	Mission Analysis Capability	Yes		
6	Configuration Management Feature				
7	Decision Management-Engineering	DME Capability	Yes	SysReqs-Des	
8	Decision Management-Production	DMP Capability			
9	Design Definition	Design Capability			
10	Implementation, Construction, Fabrication	Implementation Capability	Yes	Hardware Fabrication	Hardware Prototyping
11	Model-Based Engineering Capability				
12	Pattern-Based Engineering Capability				
13	Project Assessment and Control Feature				
14	Project Outcomes				
15	Requirements Validation	Requirements Validation Capability			
16	S3 Acquisition Feature				
17	S3 Architectural Definition				
18	S3 Attention Management Feature				
19	S3 Business or Mission Analysis				
20	S3 Design Definition				

Alternatives, Trades, Selection
Black Box Reqs Consistent
Experience Pattern Informed
Experience Pattern Informed
Experience Pattern Informed, Logical Architecture & Altern
Observation Informed
Stakeholder Constrained

- The Configuration Wizard already supports pattern user input of feature selection, via the Wizard's 2-D matrix of feature and FPK value selections:
  - This input mode is reasonable for human input during the first (high level design) cycle.
  - Selection of consistency management pairs appears in feature capabilities population step.
- The second (detail design) cycle, implied by the high level design, can involve larger numbers of artifacts, whose combinatorial consistency checks is larger still:
  - This second cycle suggests adding a Configuration Wizard option for "bulk load" of such instances, in addition to the 2-D manual selection matrix.
  - That newer Configuration Wizard addition is being tested.

Today's and next class sessions show both the previously established and emerging forms of Consistency Management:

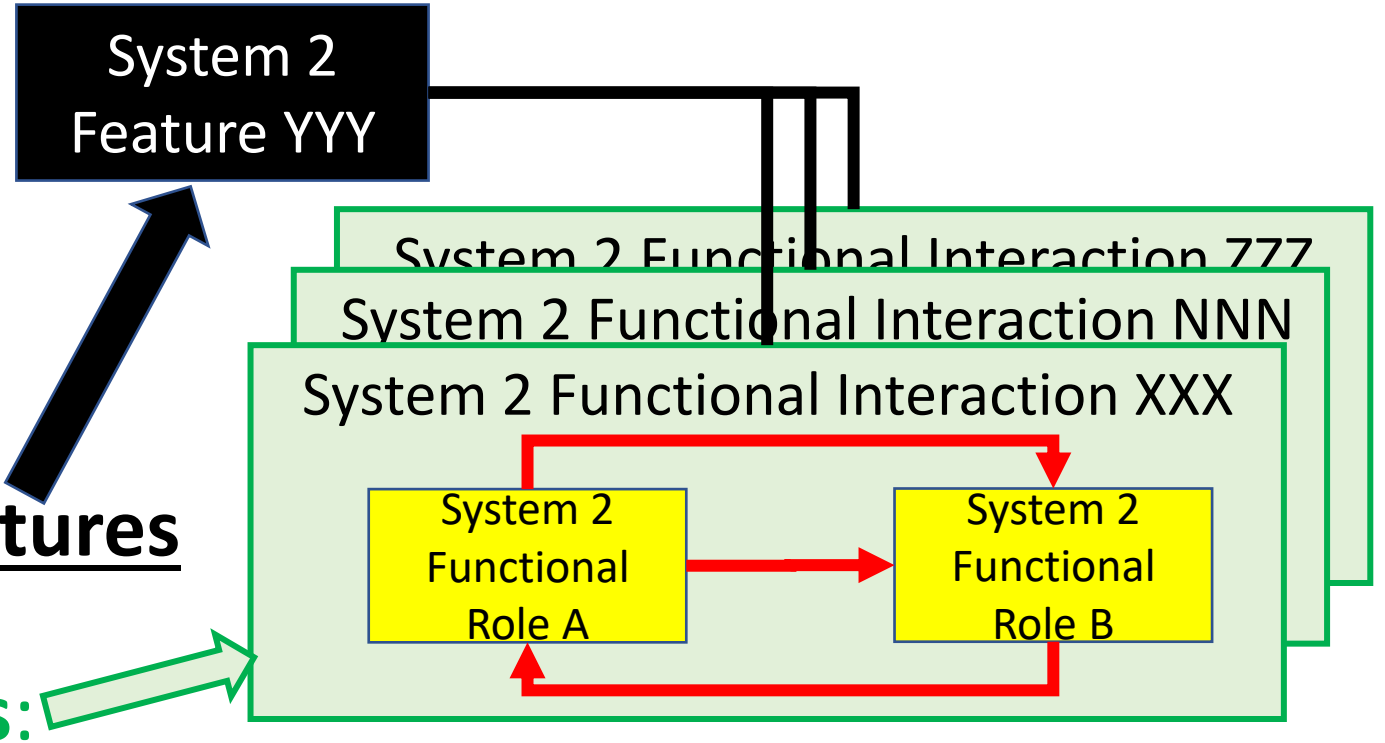
- The previous established basic Consistency Management (this class):
  - Features – especially engineering technical features "across the Vee"
  - Interactions—driven by those features, including content synthesis and V&V
  - Roles—both processes and information artifacts
  - For simpler, basic V&V at system level

- The emerging extensions to Consistency Management (next class):
  - Extension of the Consistency Management paradigm
  - Features--Extension to Decision Management Features
  - Representation of multiple design cycles and their proliferating artifacts
  - Bulk loading of instances to the Configuration Wizard
  - For larger, detailed V&V / consistency management of decomposed system.

ASELCM Features, Interactions, Roles, Resources, Use in Consistency Management

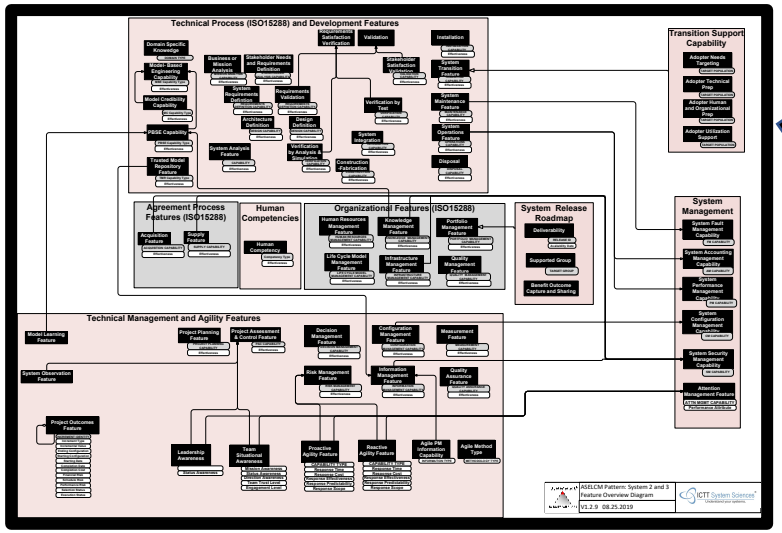
- ASELCM Features: System 2 and 3 Features
- ASELCM Interactions: System 2 and 3 Interactions of those features
- ASELCM Roles of those interactions
- Configurations of ASELCM Features, Interactions
- Homework assignment
- Discussion, Q&A.

What kinds of model components make up the ASELCM Pattern?

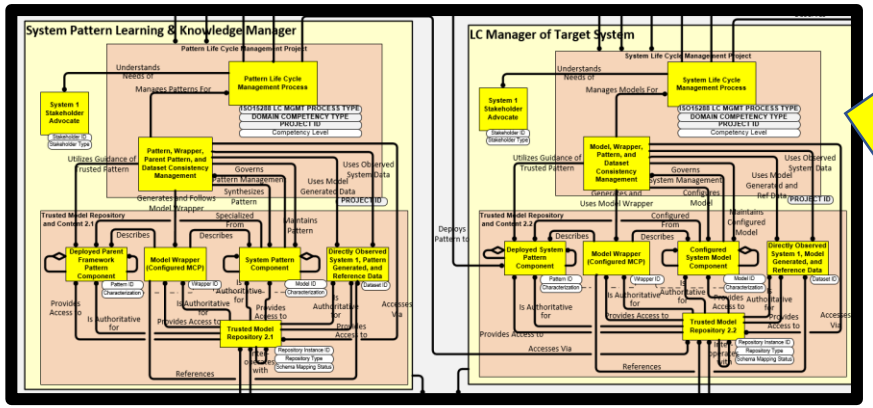


- Today's session will focus on introduction to the ASELCM **Features** (capabilities) and their implied ASELCM **Functional Interactions**:
  - These are the Interactions between Functional Roles we saw in the previous session's introduction of the Logical Architecture.
- Additionally, we will see how the allocation of the Functional Roles to the System 2 **Design Components** leads to enterprise's System 2 **Information Artifacts**, **Organizational Units**, **IT Hardware**, **IT Software**, **Facilities**, and other System 2 Design Components.

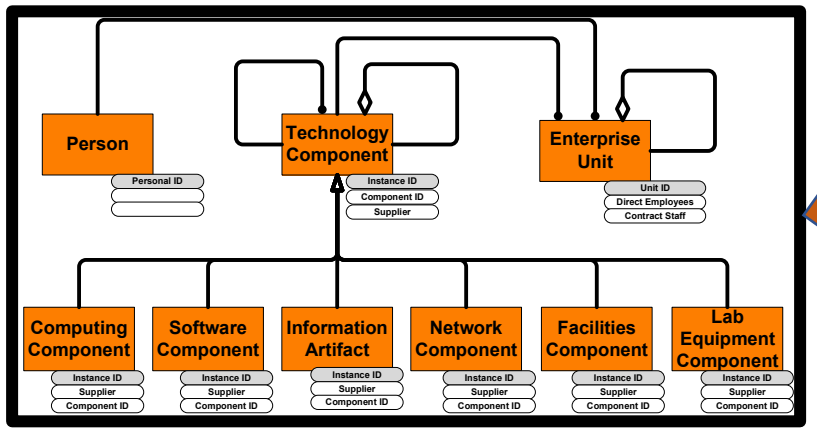
Model Component of the S*Pattern of System 2 & 3 (the Ecosystem Pattern)



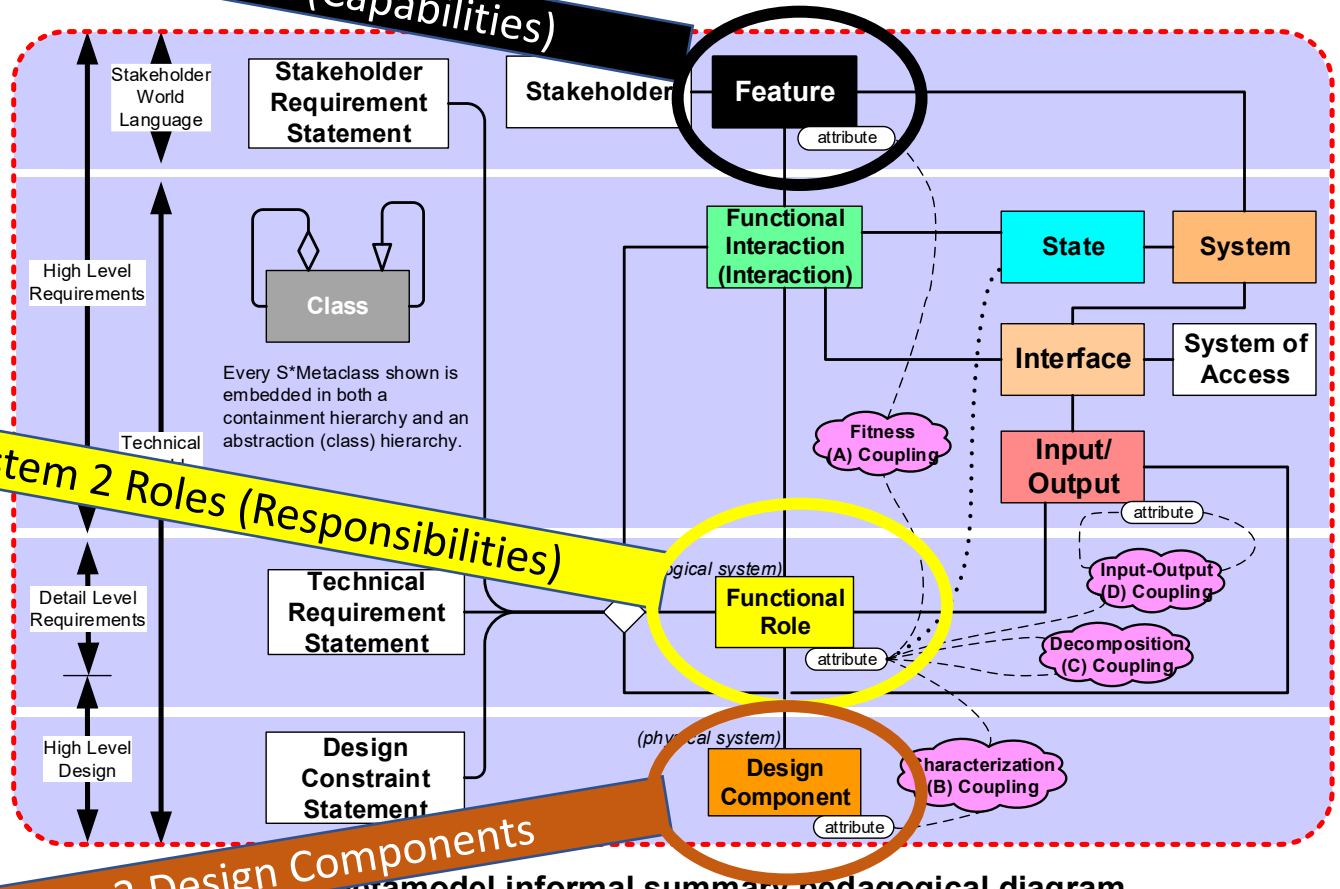
System 2 Features (Capabilities)



System 2 Roles (Responsibilities)



System 2 Design Components

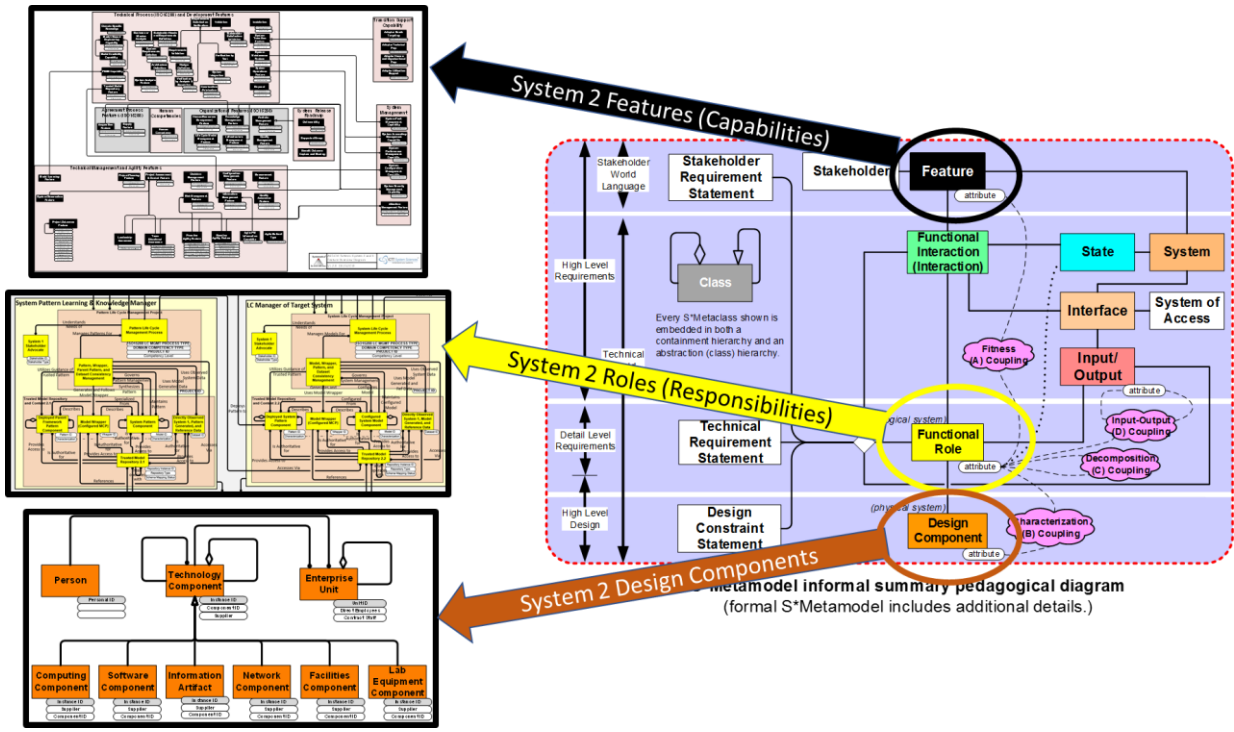


Metamodel informal summary pedagogical diagram
(formal S*Metamodel includes additional details.)

Does not assume the Ecosystem players make any use of S*Models, or even MBSE!

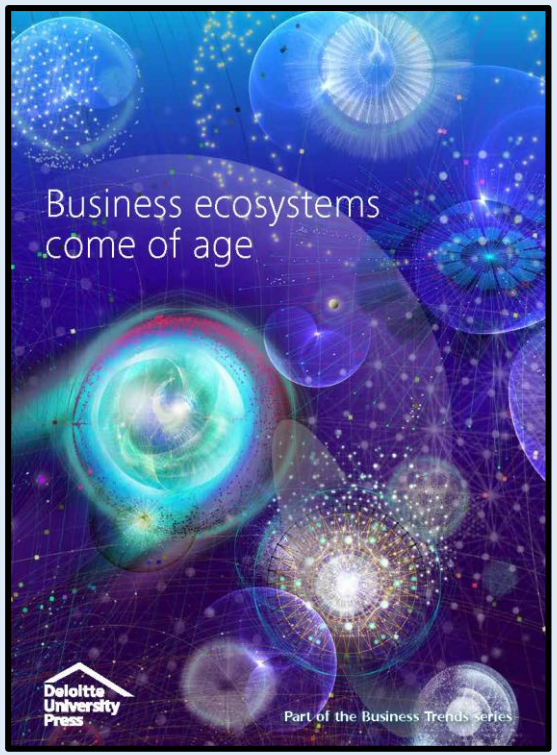
Ecosystem level capabilities' connections to underlying interactions

- Innovation Ecosystem "capabilities" are described for both System 2 and System 3 using selectable (configurable) "Stakeholder Features".
- Not all of these will apply to all ecosystems: A reason for configuring the pattern to a specific configured model!
- By populating or depopulating them, and setting their attribute values, we "configure" the Ecosystem Pattern to represent a particular (real or desired, current or future improving) Innovation Ecosystem.
- This is analogous to a "configurable product line of ecosystems". . .
- . . . and to an "agile release train" of System 2 capability releases, as configurations.

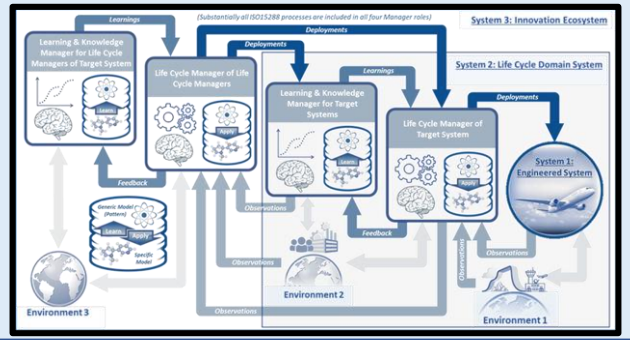


Two Different Kinds of Use of the Ecosystem Pattern: Both Essential!

1. Thinking and communicating like a **consultant on business models, strategies, and transformations**, using the high level ASELCM blocks.



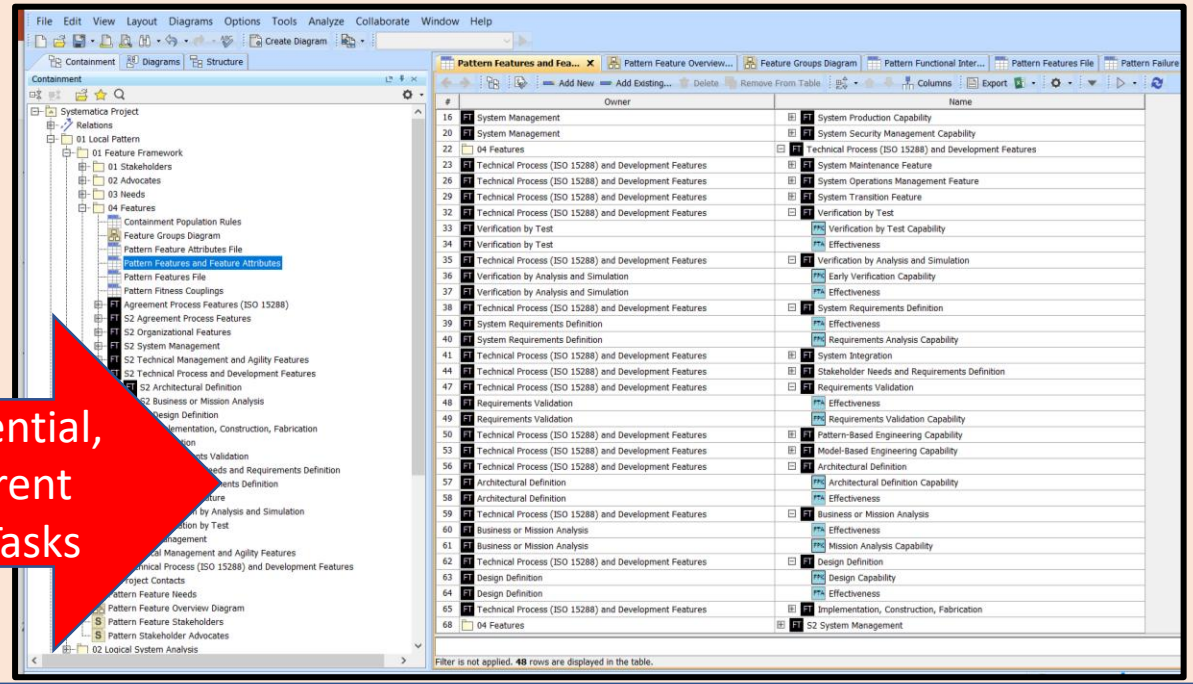




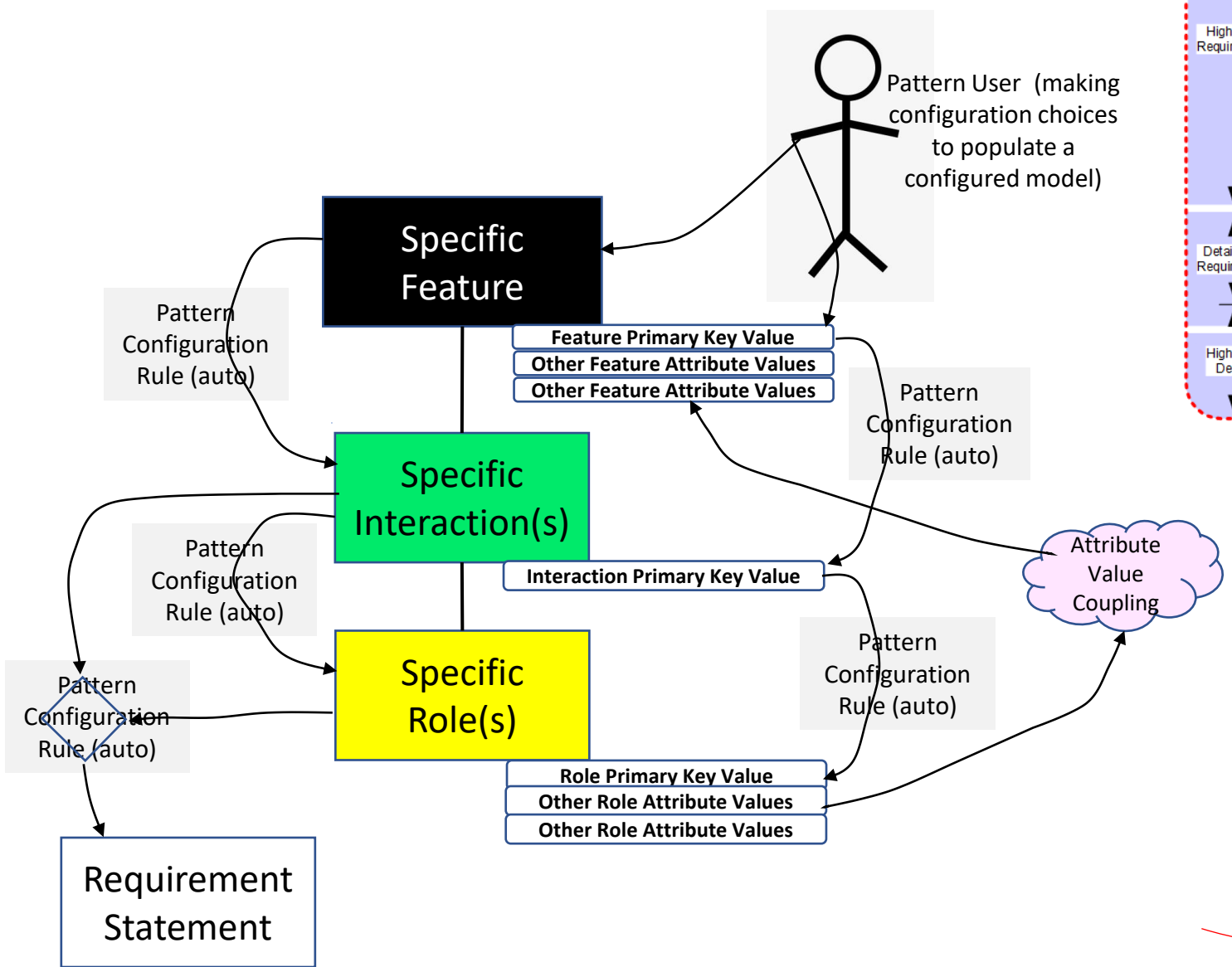
Both Are Essential, But to Different Audiences/Tasks

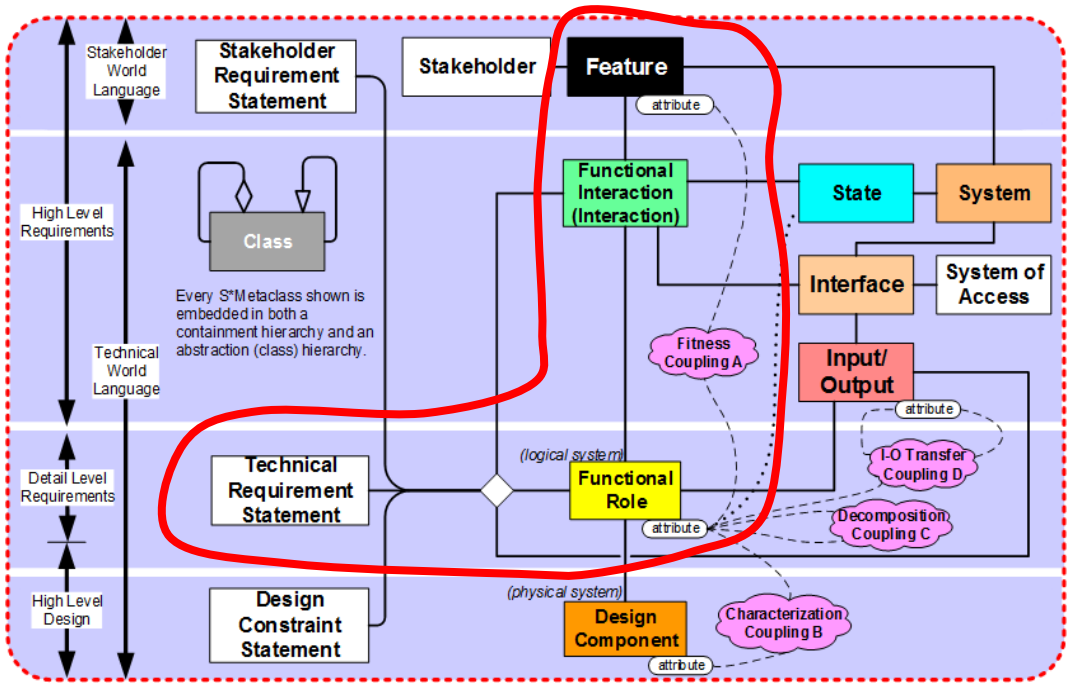
2. Thinking and communicating like a **consultant on detailed SysML Model of ASELCM**, using S3 tools to configure detail models of S2: Artifacts, People, Computers, Labs, etc.:





Model Pattern "Slice" (Applies to both S1 Product and S2 Life Cycle Management System)





S*Metamodel informal summary pedagogical diagram
(formal S*Metamodel includes additional details.)

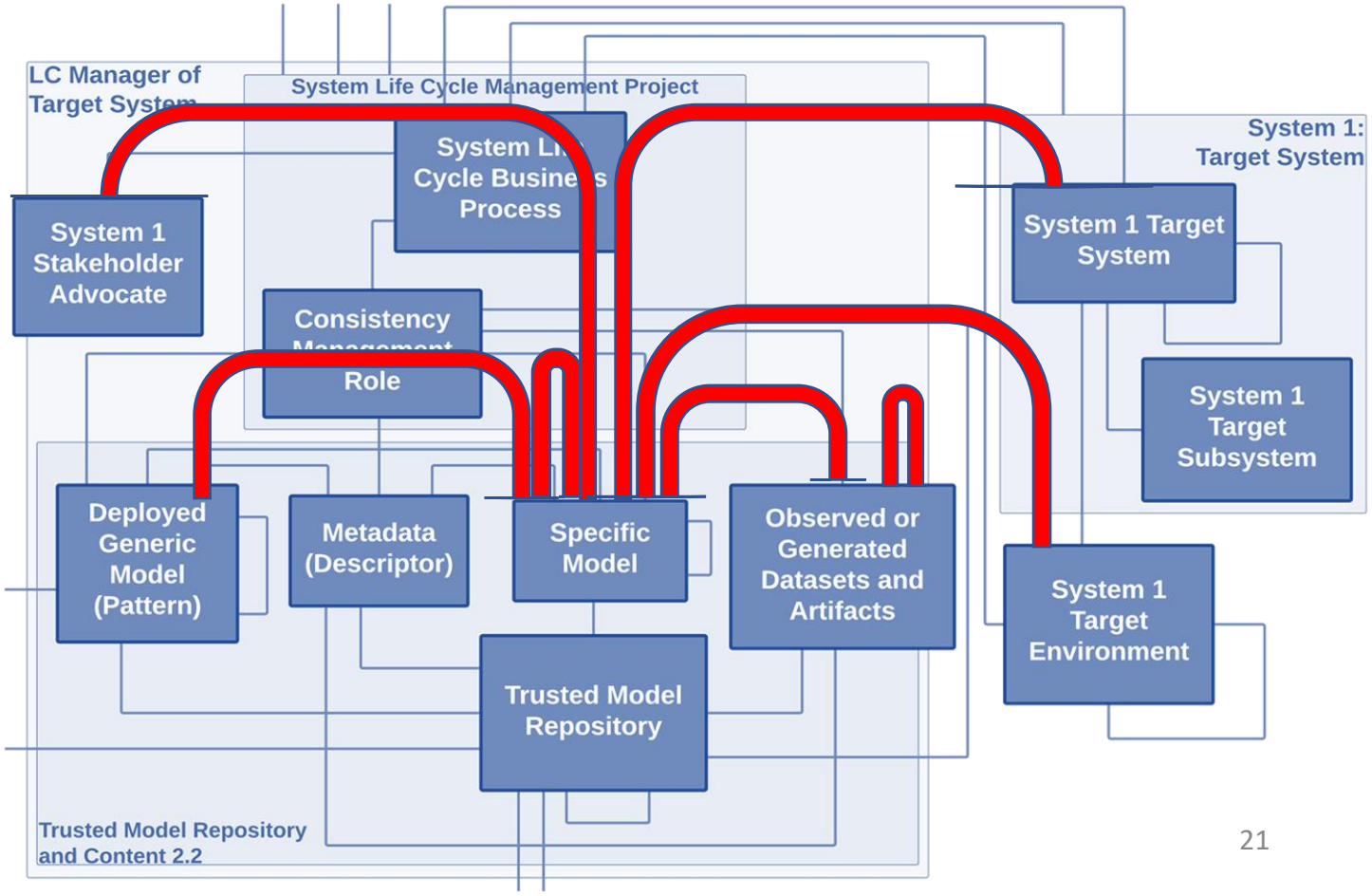
Populating an S1 model or an S2 model

Consistency Management Paradigm Details

- Because there are many “managed consistencies” across the digital thread, Vee diagram, or life cycle of a system, a “consistency management pattern” is applied to all of them.
- Some details of that consistency management pattern (a part of the ASELCM Pattern) are summarized by the following common framework, across multiple Features and Interactions involved in Consistency Management . . .

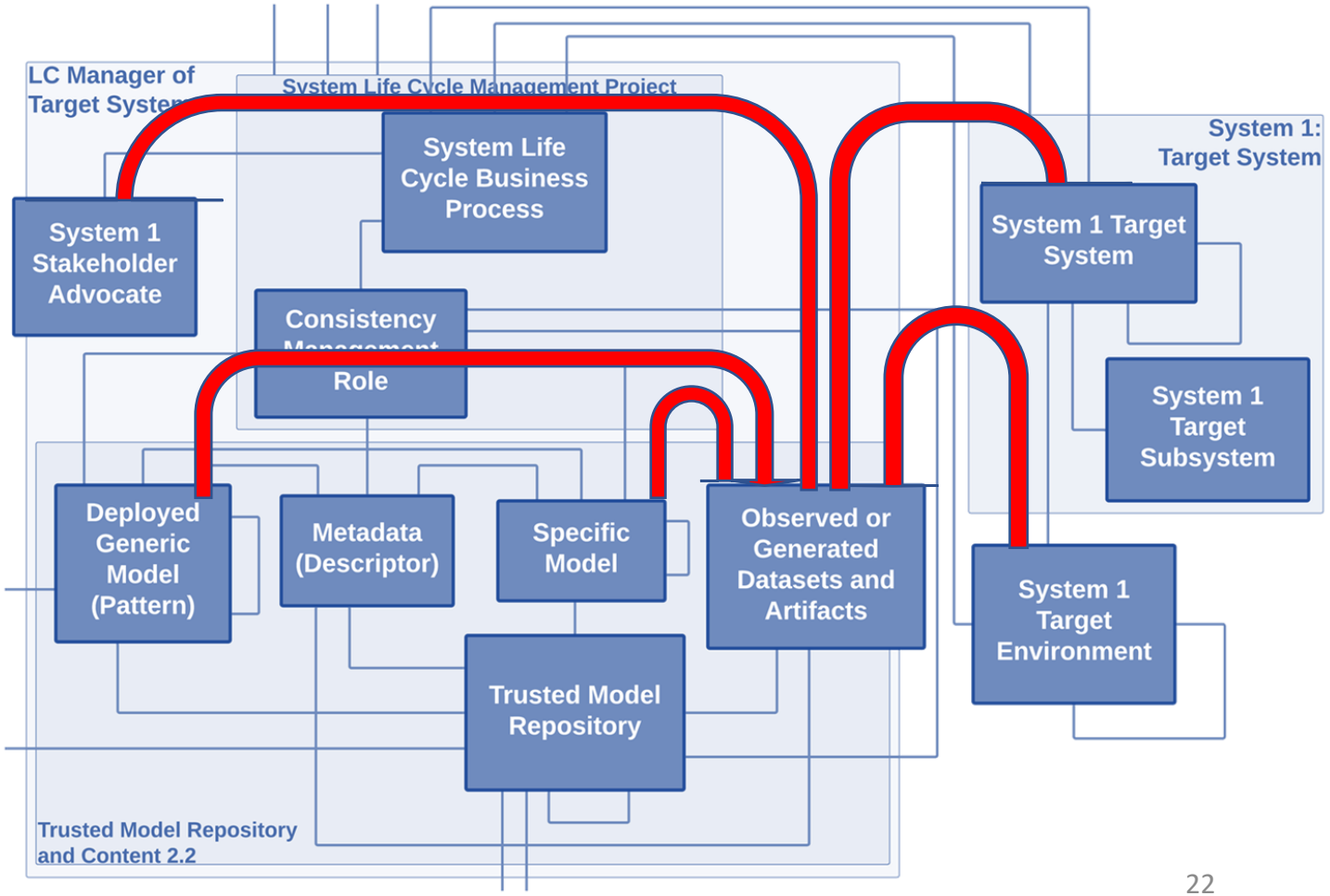
Consistency checks between (1) Specific Model “information segment” (InfoSeg; AKA “Subject”) being managed, and (2) something else to which it is compared.

- The “something else” (“comparand”; AKA “referent”) might seem to be any of the following:
  - Another Specific Model infoseg (e.g., Requirements versus Design)
  - An empirical measurement of System being Engineered, or its Environment
  - A simulation based on another Specific Model infoseg
  - An experience-based pattern
  - Stakeholder inputs
- The comparison is always based on a Specific Model because we will make that comparison in “model space”, because of its descriptive power.
- This may be preceded by a transformation of a non-model artifact into a “proxy model” representing it.

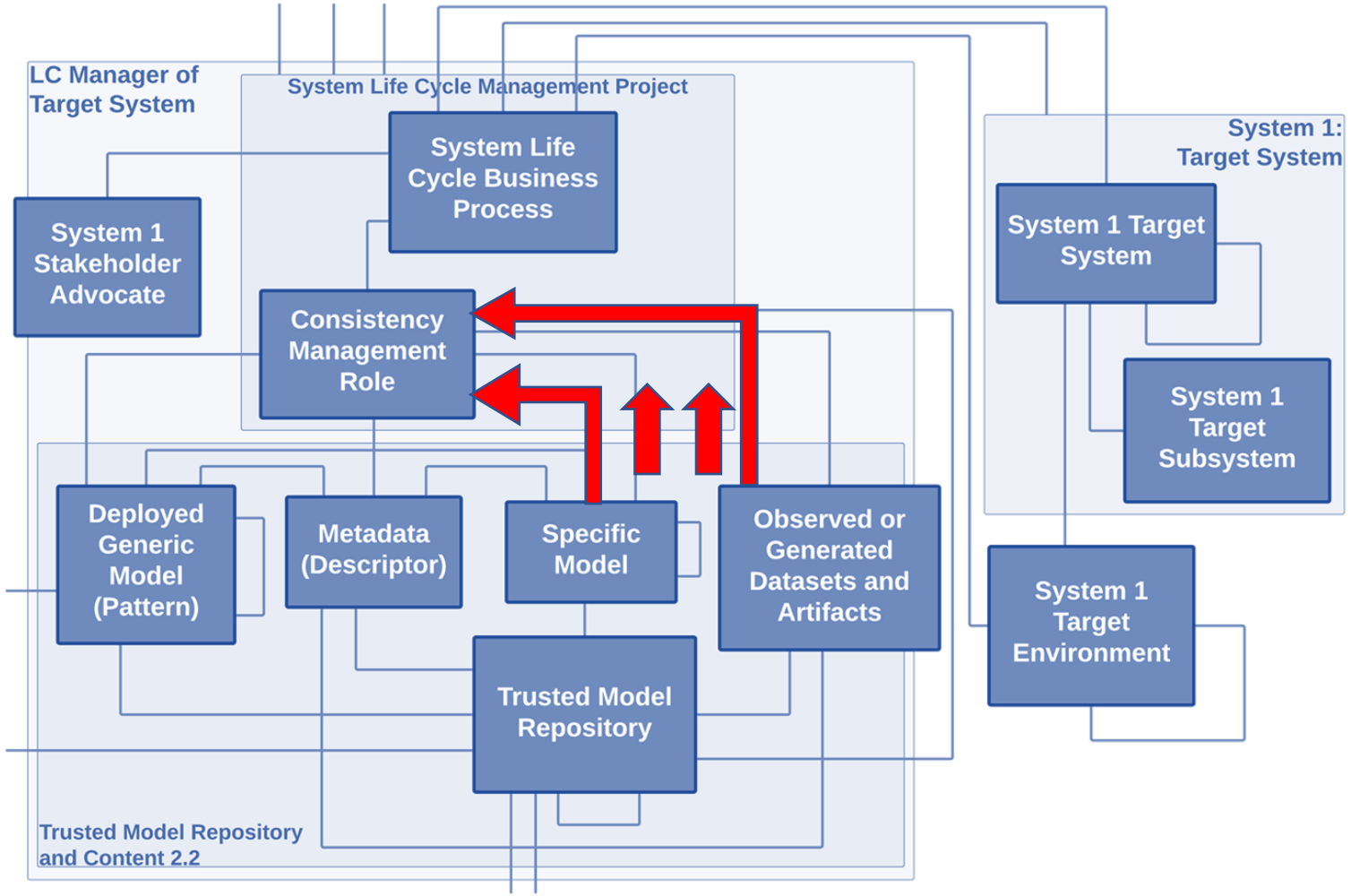


- Before the comparison, the thing the model is to be compared to is always used to generate a model-based “proxy” reference of some kind, appropriate to compare to the Specific Model, also providing a potential record of that comparison (in Digital Thread).

Consistency Thread Reference:
Ideally, always “placed in”
Dataset (really a logical role,
not an implementation).

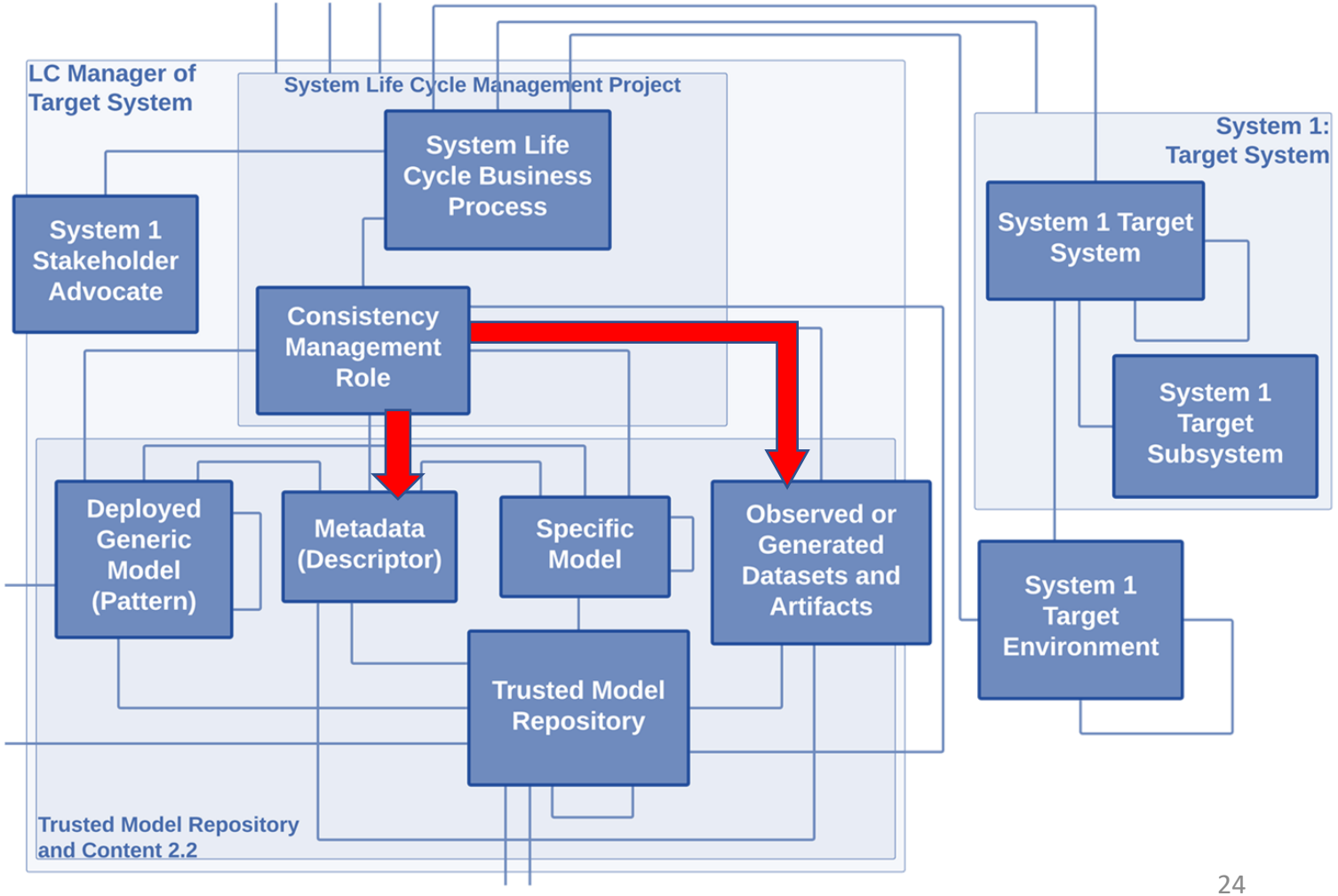


- The comparison is therefore could always be between the Specific Model and a Dataset comparand—but can be implemented as pairs of Proxy Models.
- Metadata for both items is also consulted, so they are correctly interpreted.



- The comparison leads to a “Consistency View” that is a (potentially saved) record of the comparison.
- Metadata is created for that saved information.

Result of Comparison:
Consistency View

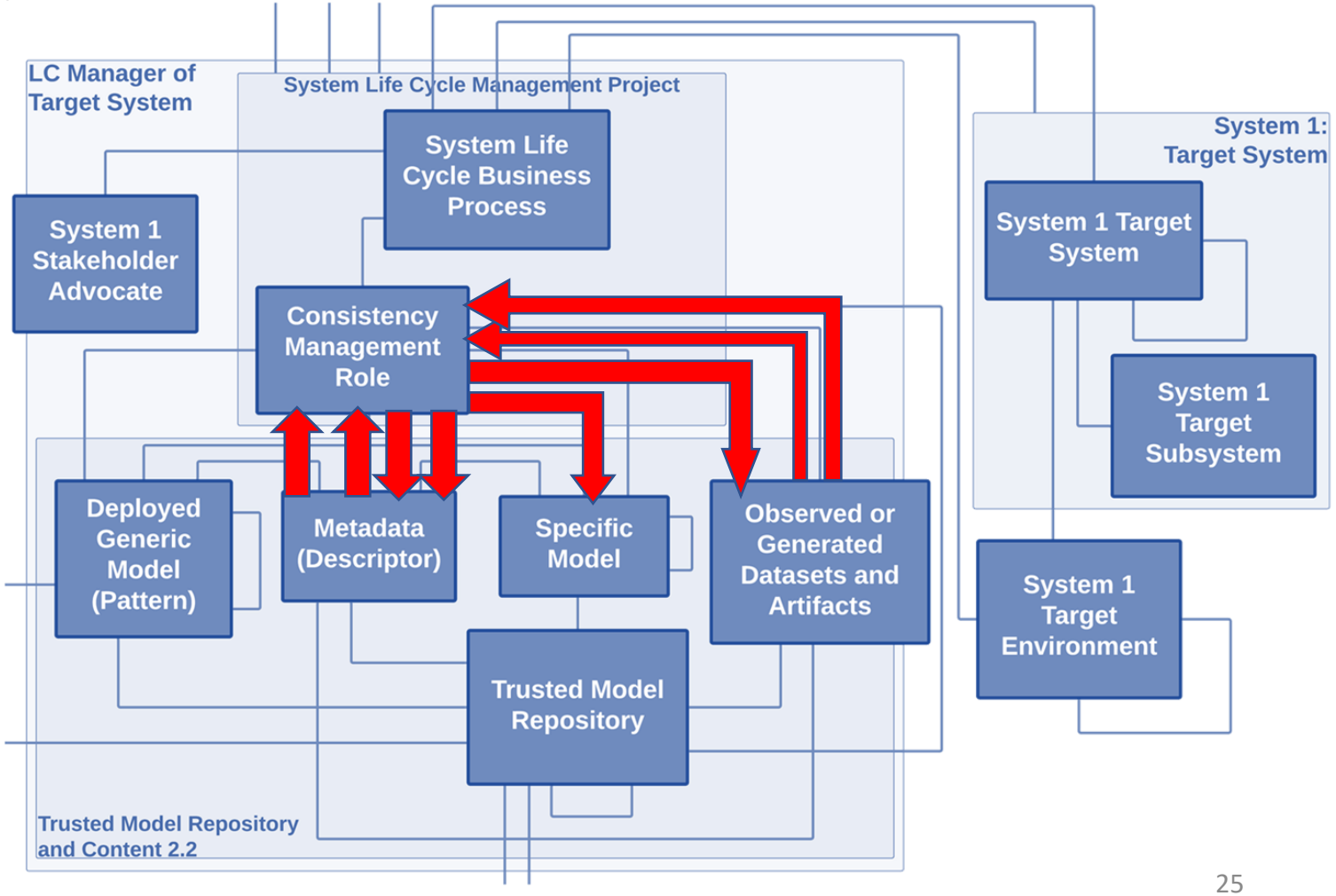


- After a series of one or more such comparisons, the resulting collection of Consistency Views is “reconciled” by the Consistency Manager, resulting in an update to the Specific Model, and a saved Reconciliation Report.
- Metadata for all is referenced, and created.

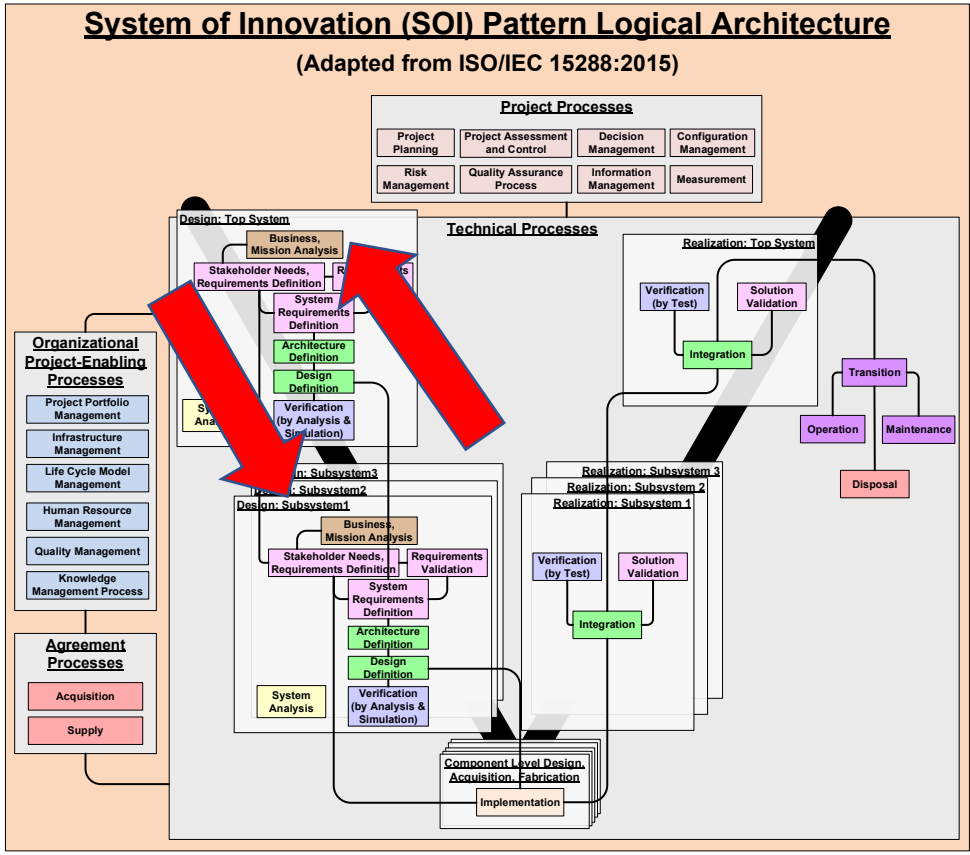
Possible results of Comparisons:

1. Update to Specific Model
2. Update to Artifact
3. Reconciliation Report

Notice that “Reconciliation” equivalent to a Decision about the managed system.



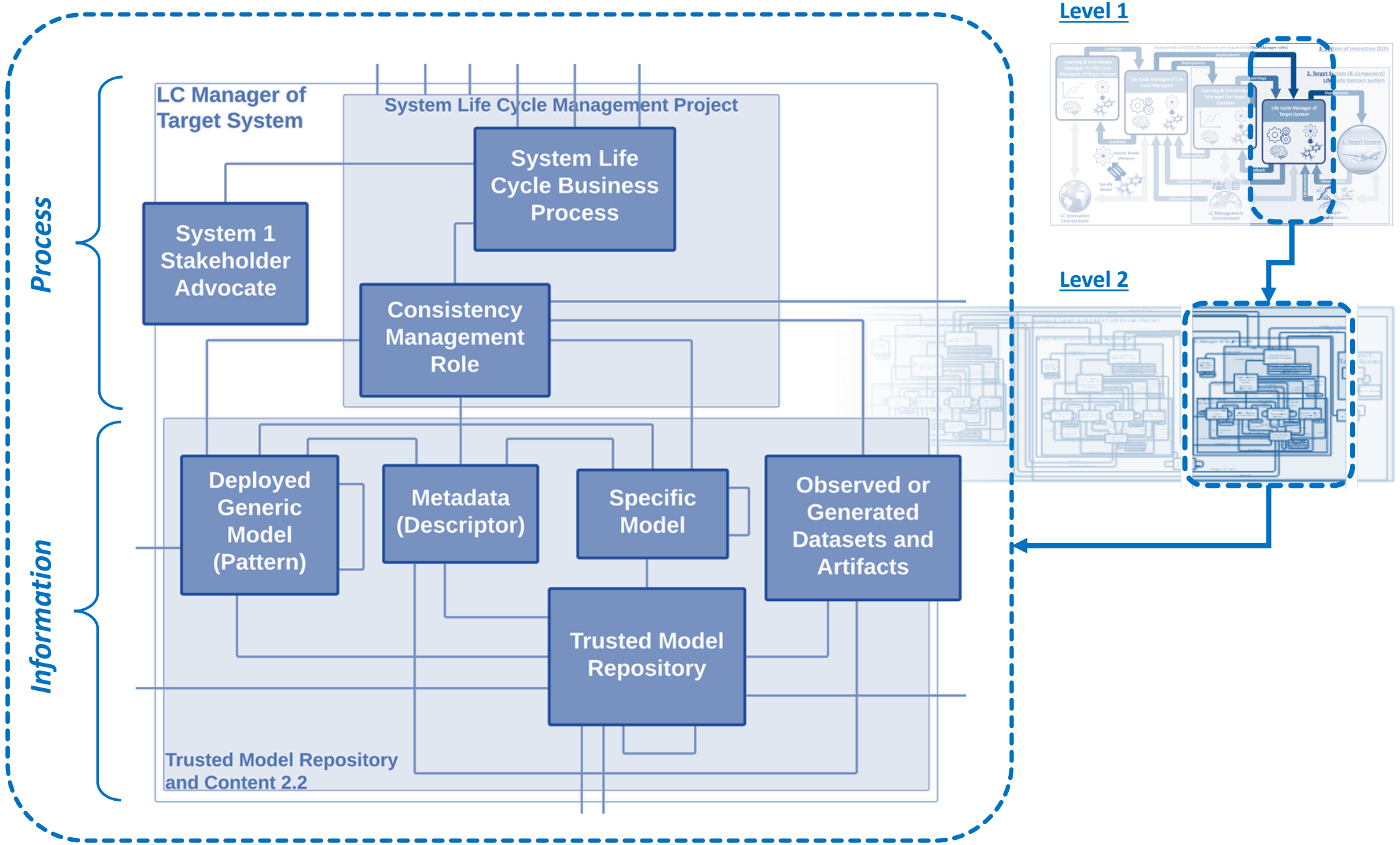
Directionality of consistency management



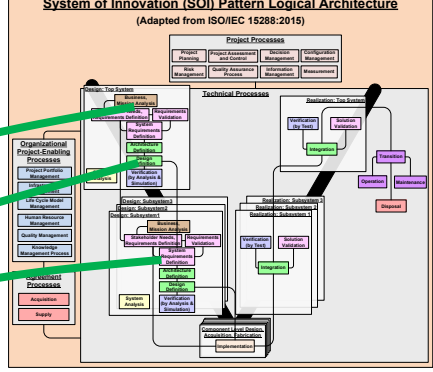
- Consistency relationships generally have a “governance” or “causality” direction; for example:
  - Requirements govern Designs
  - Designs govern Production
- The above tells us which of the two compared things is most prominently impacted by the other:
  - These are the “informed by” directions that we think of most naturally--as in “flow down”.
  - In the main, “Referents” drive “Subjects”.
- ***However***, in certain cases, the “backflow” direction is also subject to consistency management changes flow “backwards” to the “upstream” entity, as a form of “feedback”; for example:
  - Designers may find some requirements hard to meet for reasonable expense, time, risk, etc. and seek relief in the form of requirements relaxation.
  - Production may similarly request design changes for manufacturability.
  - Service or Users may request or imply changes for maintainability, usability, or other value.
  - Customer agreement to change their expectations (whether looser or tighter).
- In those cases, there are (optional) FPK values that allow an “upstream” model to be “informed by” a “downstream” comparand—as in a “feedback report”.
- See the Feature Primary Key option values for Design Feedback, etc.

Consistency Management Thread

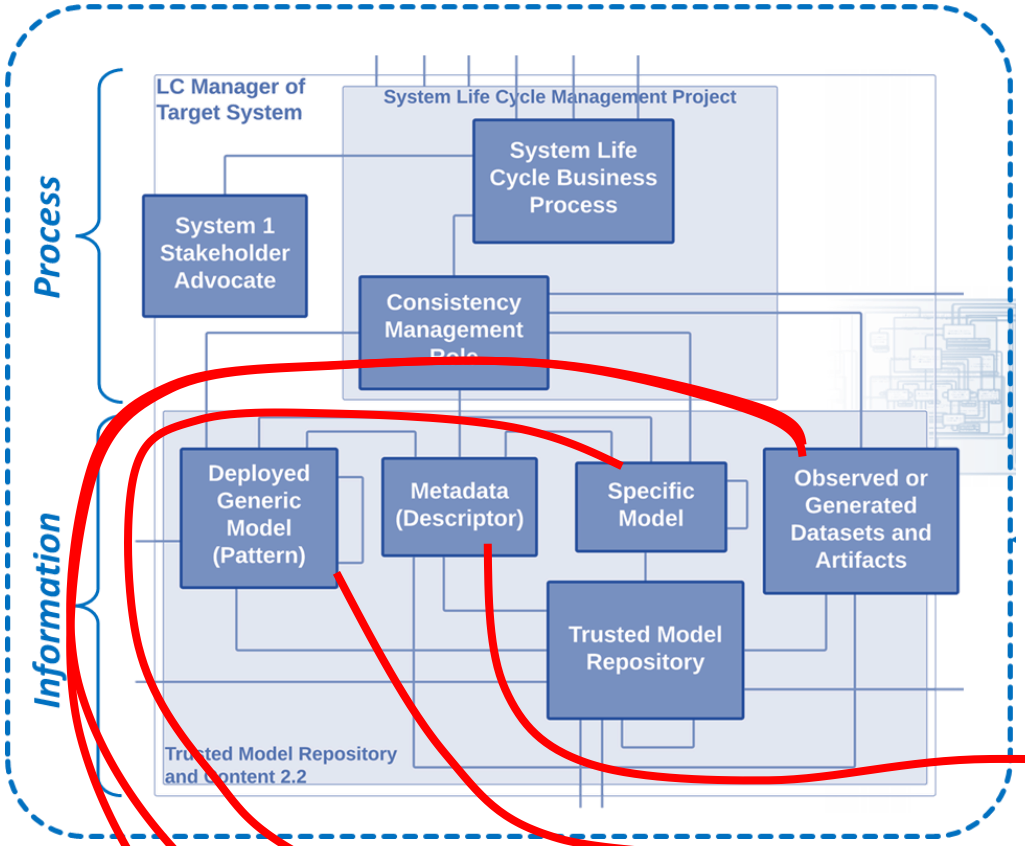
- The underlying information model of project or life cycle instance information that results . . . applicable to all consistency management—both formal and informal.
- The emergent “Digital Thread” is a special case of this more universal and long-standing Consistency Management Thread.



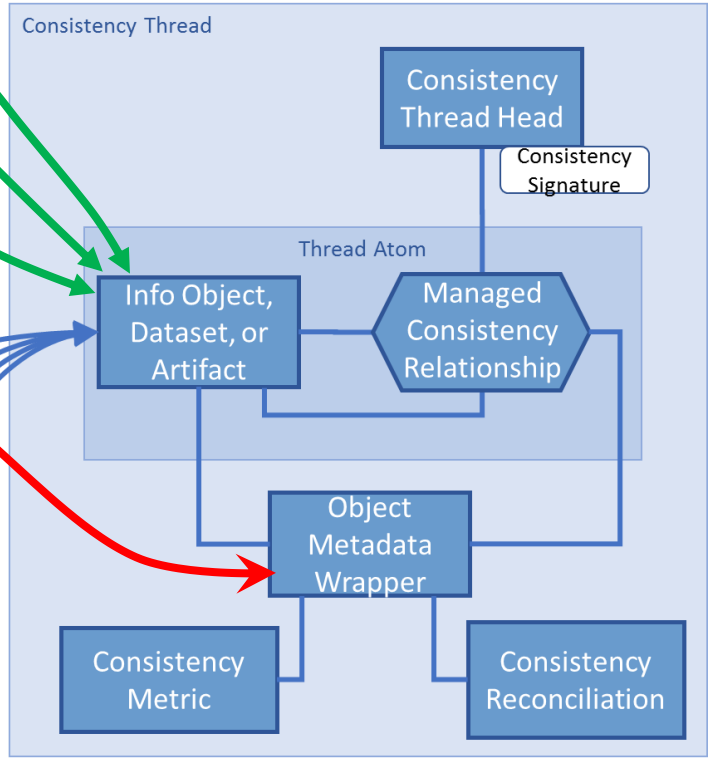
INCOSE ASELCM Level 2 Reference Model

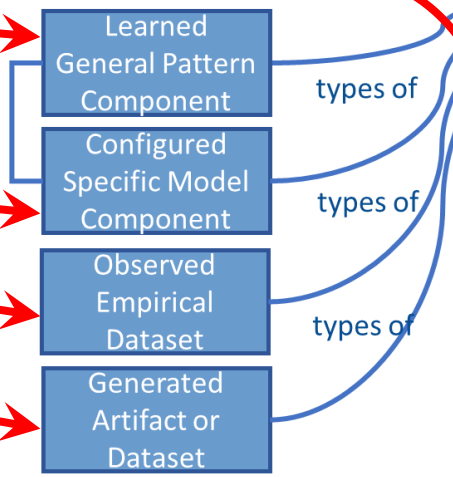


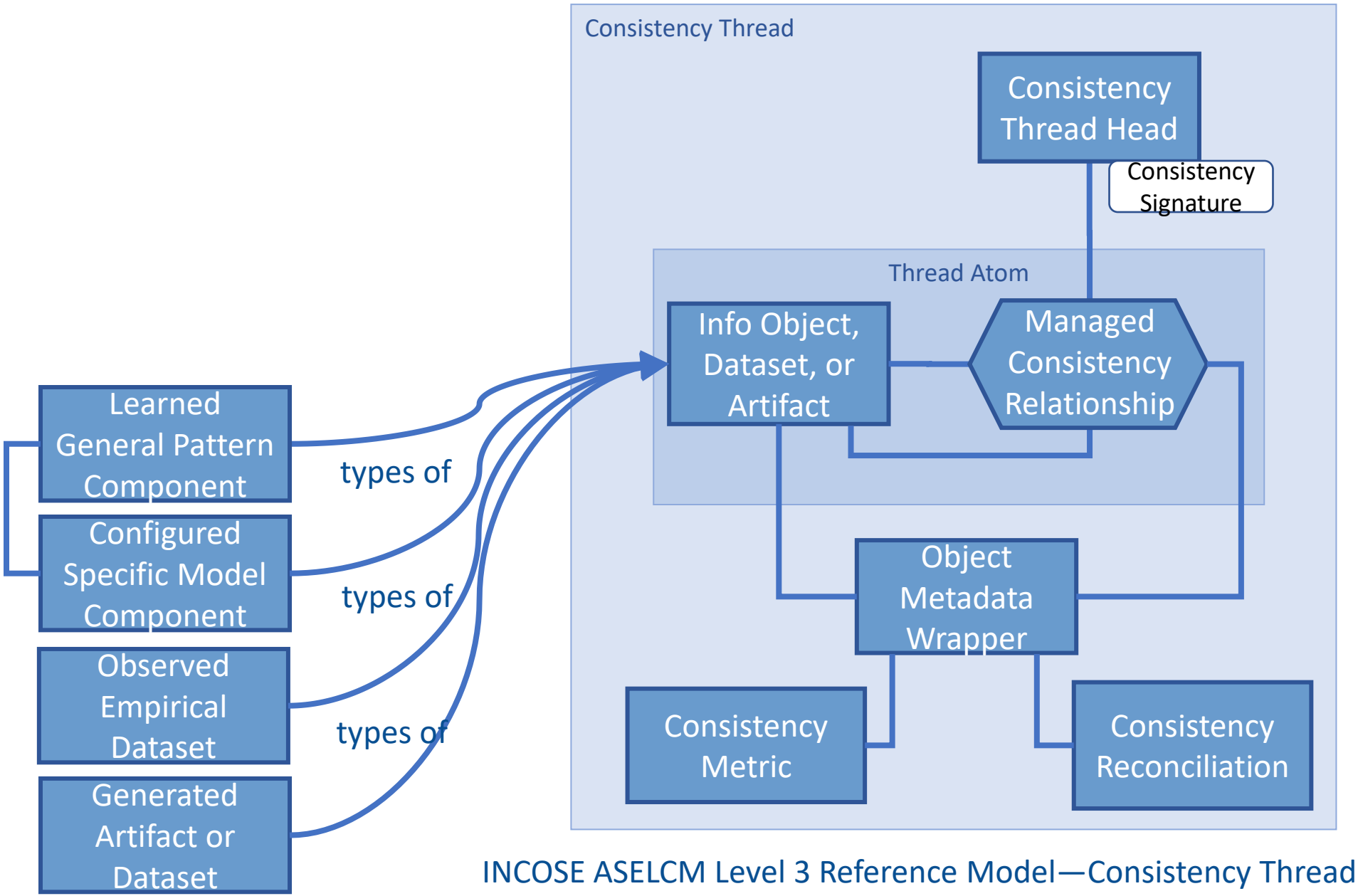
INCOSE ASELCM Level 2 Reference Model



INCOSE ASELCM Level 3 Reference Model—Consistency Thread Section







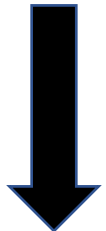
INCOSE ASELCM Level 3 Reference Model—Consistency Thread Section

Introduction to ASELCM System 2 Features (Capabilities) and Interactions

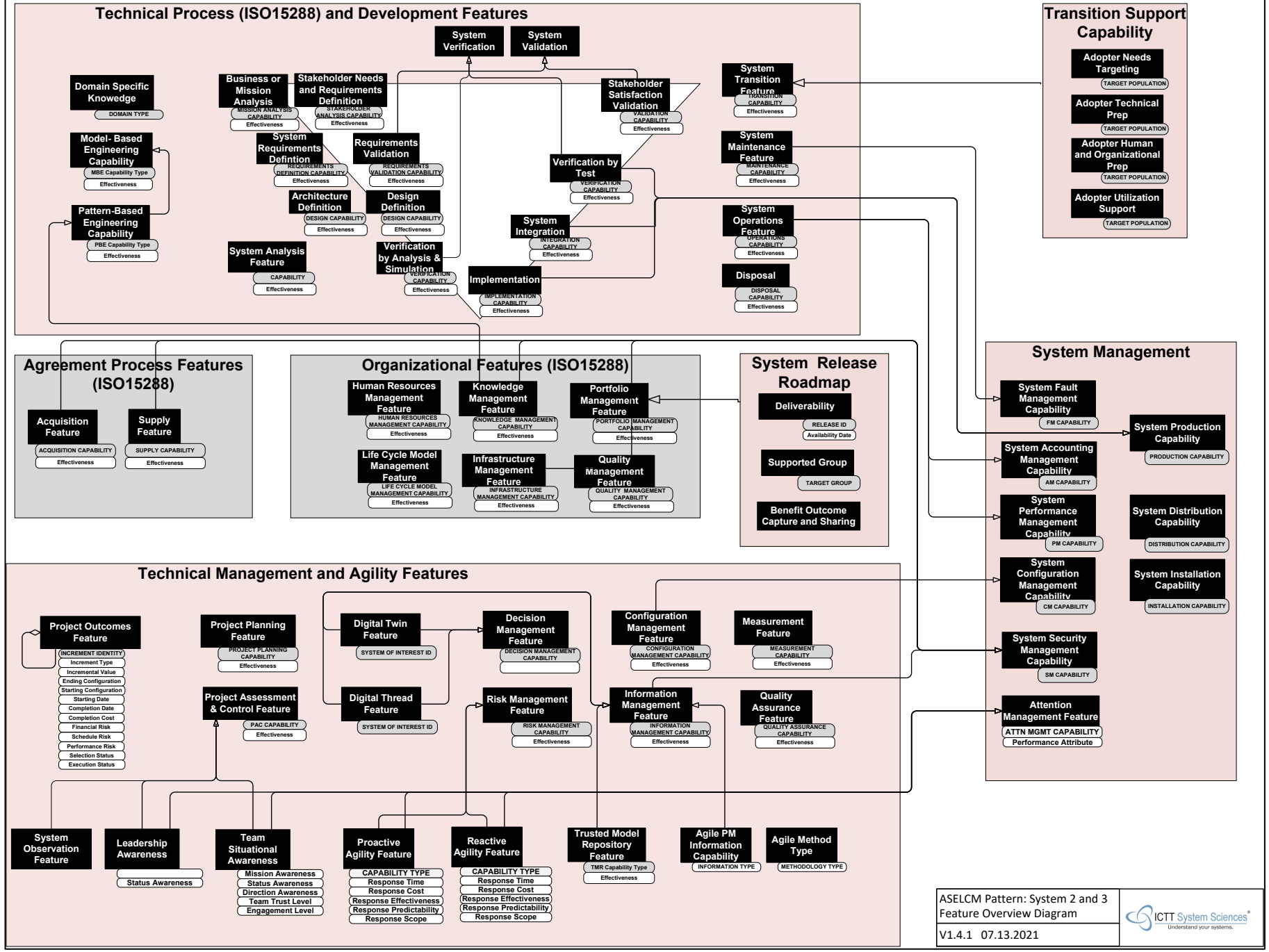
Who are the ASELCM Stakeholders for System 2 Features (capabilities)?

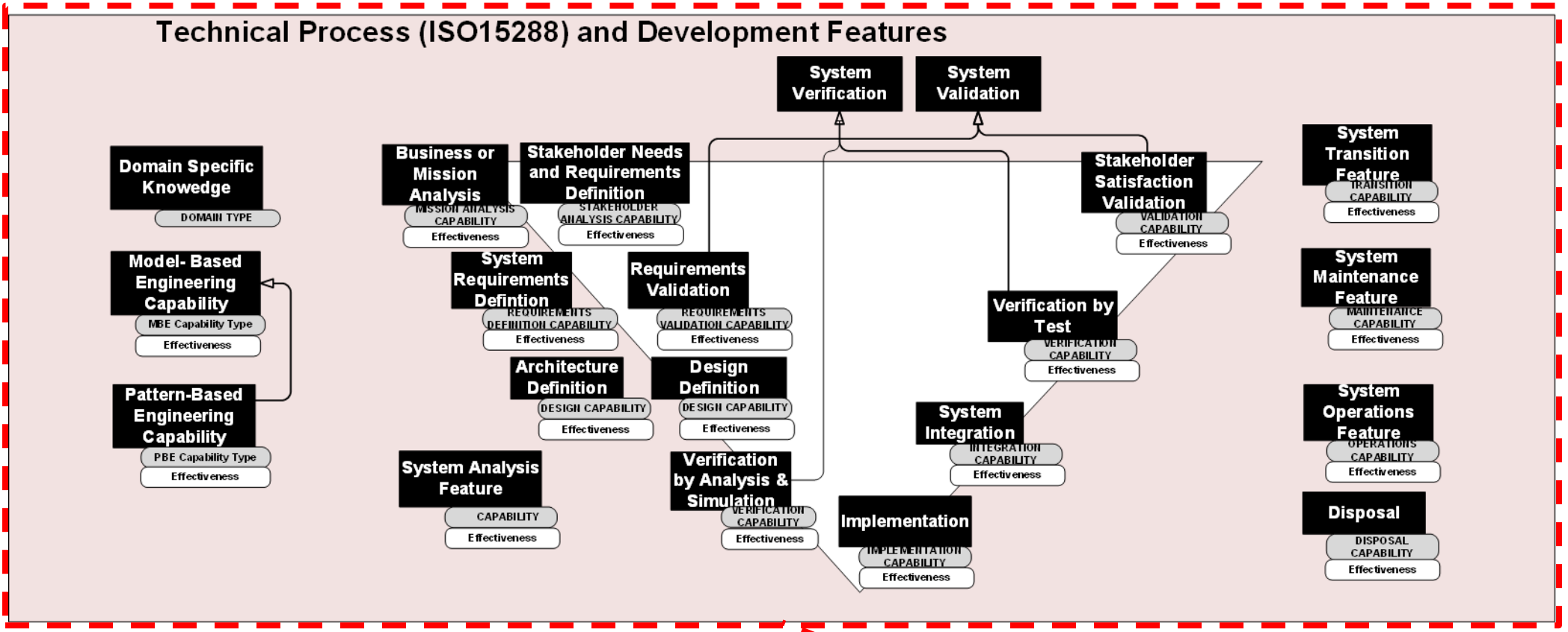
- Customers
- Employees
- Shareholders
- Suppliers
- Market Partners
- Society
- Defended Homeland
- Profession

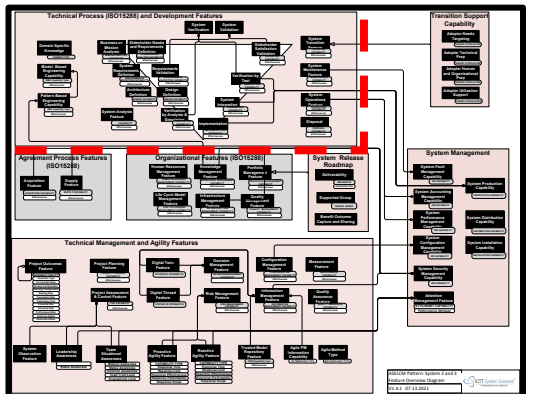
- What are the ASELCM System 2 Features?



Selectable Stakeholder Features (Capabilities) of System 2




Technical Process (ISO15288) and Development Features
System Verification
System Validation
Domain Specific Knowedge
DOMAIN TYPE
Business or Mission Analysis
MISSION ANALYSIS CAPABILITY
Effectiveness
Stakeholder Needs and Requirements Definition
STAKEHOLDER ANALYSIS CAPABILITY
Effectiveness
Stakeholder Satisfaction Validation
VALIDATION CAPABILITY
Effectiveness
System Transition Feature
TRANSITION CAPABILITY
Effectiveness
Model- Based Engineering Capability
MBE Capability Type
Effectiveness
System Requirements Defintion
REQUIREMENTS DEFINITION CAPABILITY
Effectiveness
Requirements Validation
REQUIREMENTS VALIDATION CAPABILITY
Effectiveness
Verification by Test
VERIFICATION CAPABILITY
Effectiveness
System Maintenance Feature
MAINTENANCE CAPABILITY
Effectiveness
Pattern-Based Engineering Capability
PBE Capability Type
Effectiveness
Architecture Definition
DESIGN CAPABILITY
Effectiveness
Design Definition
DESIGN CAPABILITY
Effectiveness
System Integration
INTEGRATION CAPABILITY
Effectiveness
System Operations Feature
OPERATIONS CAPABILITY
Effectiveness
System Analysis Feature
CAPABILITY
Effectiveness
Verification by Analysis & Simulation
VERIFICATION CAPABILITY
Effectiveness
Implementation
IMPLEMENTATION CAPABILITY
Effectiveness
Disposal
DISPOSAL CAPABILITY
Effectiveness



Agreement Process Features (ISO15288)

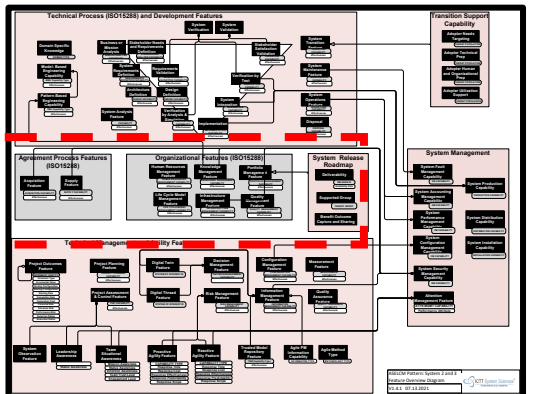
- **Acquisition Feature**
  - ACQUISITION CAPABILITY
    - Effectiveness
- **Supply Feature**
  - SUPPLY CAPABILITY
    - Effectiveness

Organizational Features (ISO15288)

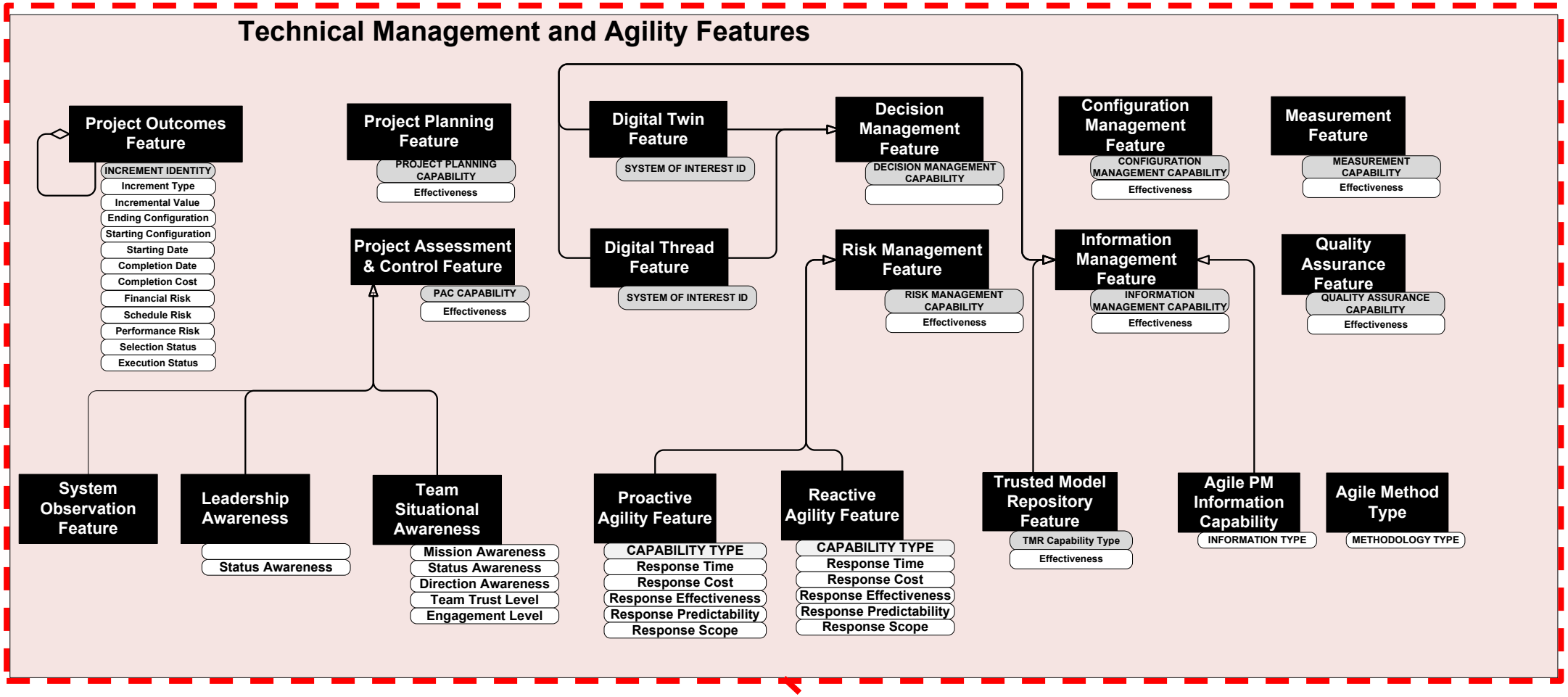
- **Human Resources Management Feature**
  - HUMAN RESOURCES MANAGEMENT CAPABILITY
    - Effectiveness
- **Knowledge Management Feature**
  - KNOWLEDGE MANAGEMENT CAPABILITY
    - Effectiveness
- **Portfolio Management Feature**
  - PORTFOLIO MANAGEMENT CAPABILITY
    - Effectiveness
- **Life Cycle Model Management Feature**
  - LIFE CYCLE MODEL MANAGEMENT CAPABILITY
    - Effectiveness
- **Infrastructure Management Feature**
  - INFRASTRUCTURE MANAGEMENT CAPABILITY
    - Effectiveness
- **Quality Management Feature**
  - QUALITY MANAGEMENT CAPABILITY
    - Effectiveness

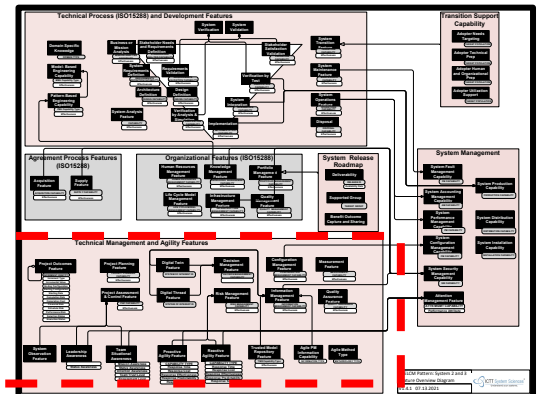
System Release Roadmap

- **Deliverability**
  - RELEASE ID
  - Availability Date
- **Supported Group**
  - TARGET GROUP
- **Benefit Outcome Capture and Sharing**



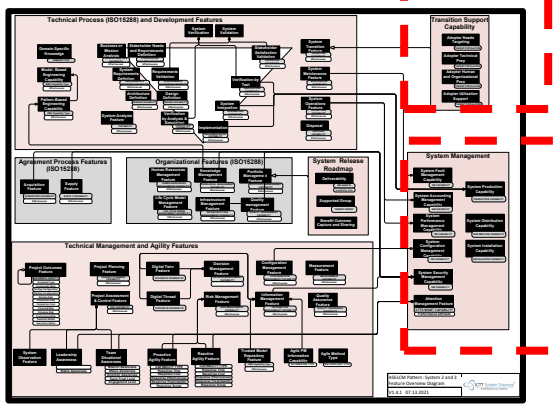
Technical Management and Agility Features





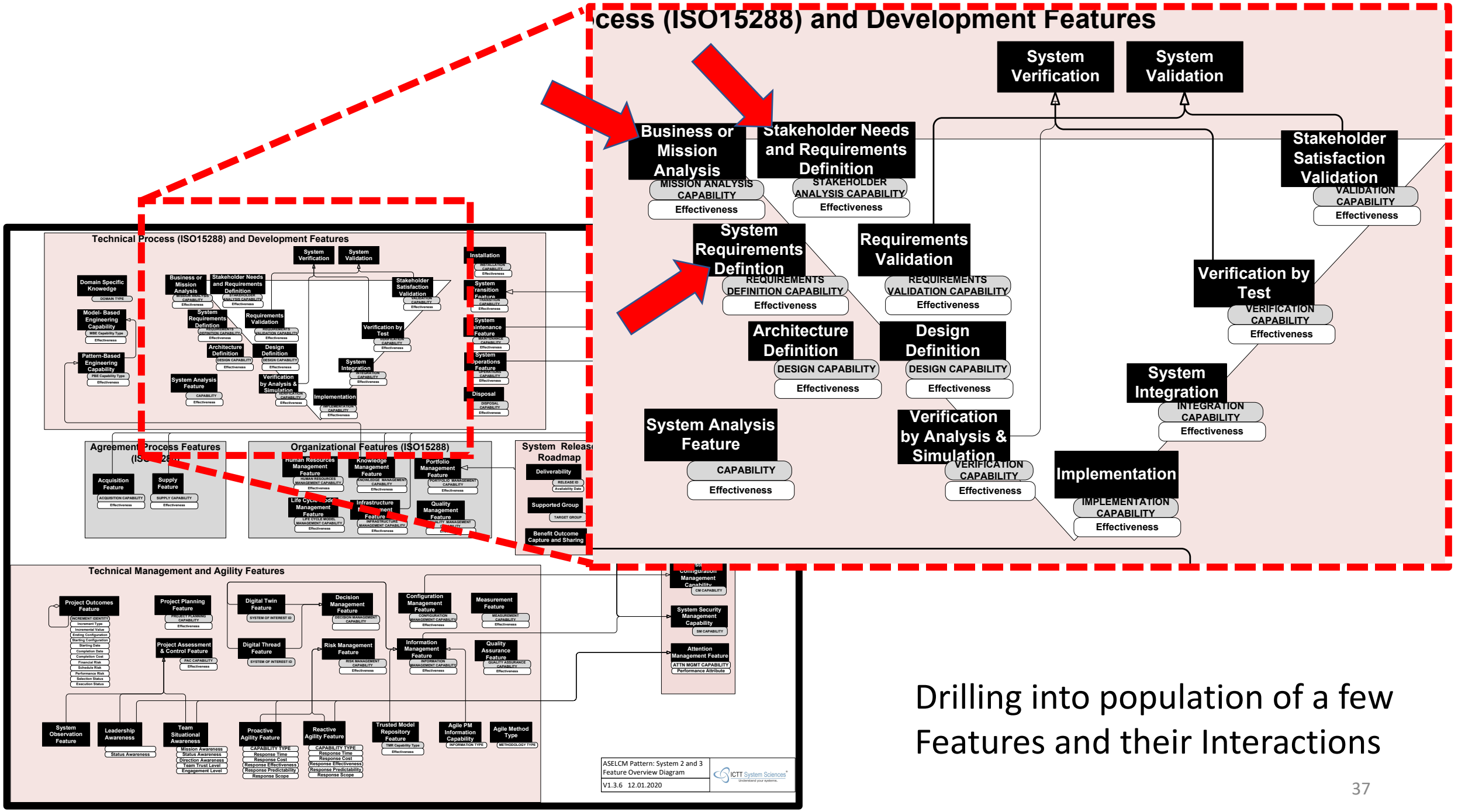
Transition Support Capability

- **Adopter Needs Targeting** — TARGET POPULATION
- **Adopter Technical Prep** — TARGET POPULATION
- **Adopter Human and Organizational Prep** — TARGET POPULATION
- **Adopter Utilization Support** — TARGET POPULATION



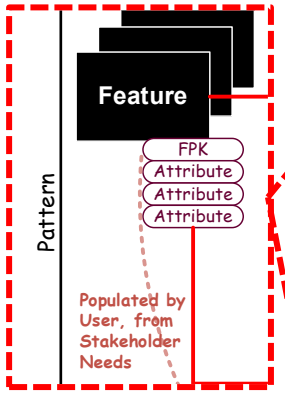
System Management

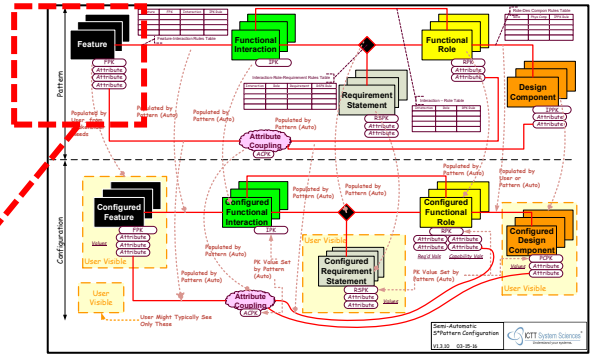
- **System Fault Management Capability** — FM CAPABILITY
- **System Accounting Management Capability** — AM CAPABILITY
- **System Performance Management Capability** — PM CAPABILITY
- **System Configuration Management Capability** — CM CAPABILITY
- **System Security Management Capability** — SM CAPABILITY
- **Attention Management Feature** — ATTN MGMT CAPABILITY; Performance Attribute
- **System Production Capability** — PRODUCTION CAPABILITY
- **System Distribution Capability** — DISTRIBUTION CAPABILITY
- **System Installation Capability** — INSTALLATION CAPABILITY



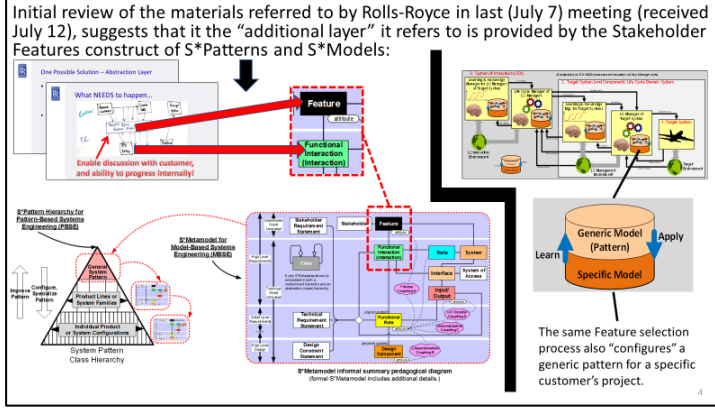
Drilling into population of a few Features and their Interactions

Pattern User: Selecting Ecosystem Pattern Feature Options to Populate a Configured Model (S*Pattern Configuration Wizard Screen Shown)





Initial review of the materials referred to by Rolls-Royce in last (July 7) meeting (received July 12), suggests that it the "additional layer" it refers to is provided by the Stakeholder Features construct of S*Patterns and S*Models:



The same Feature selection process also "configures" a generic pattern for a specific customer's project.

1. Menu of Selectable Pattern Features

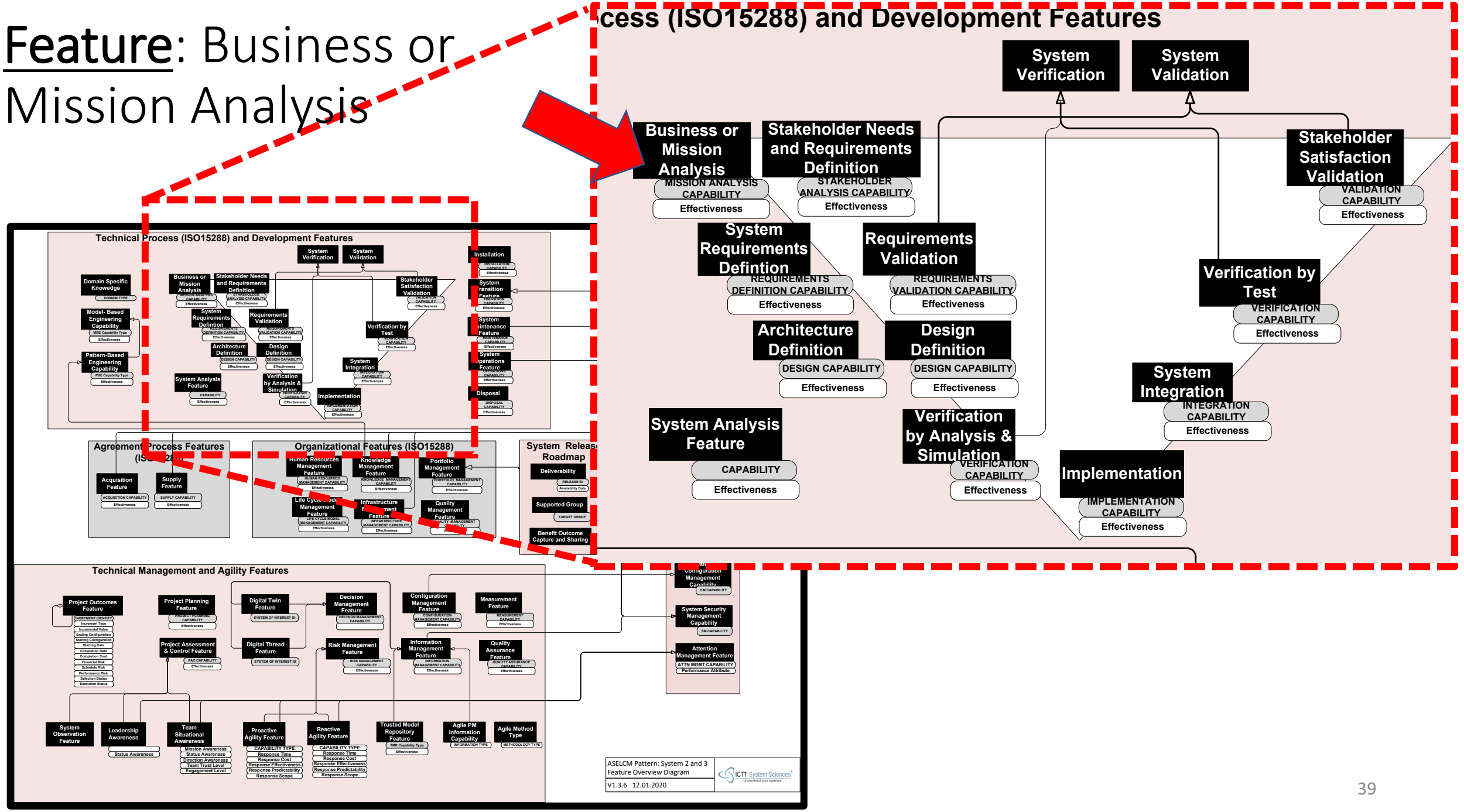
2. User Choice to Populate or Not

3. Additional User Choices for Multiply-Populated Features: Individual Feature Primary Key Values Populated

4. Pattern User Selecting Which Feature Primary Key Pull-Down Values to Populate

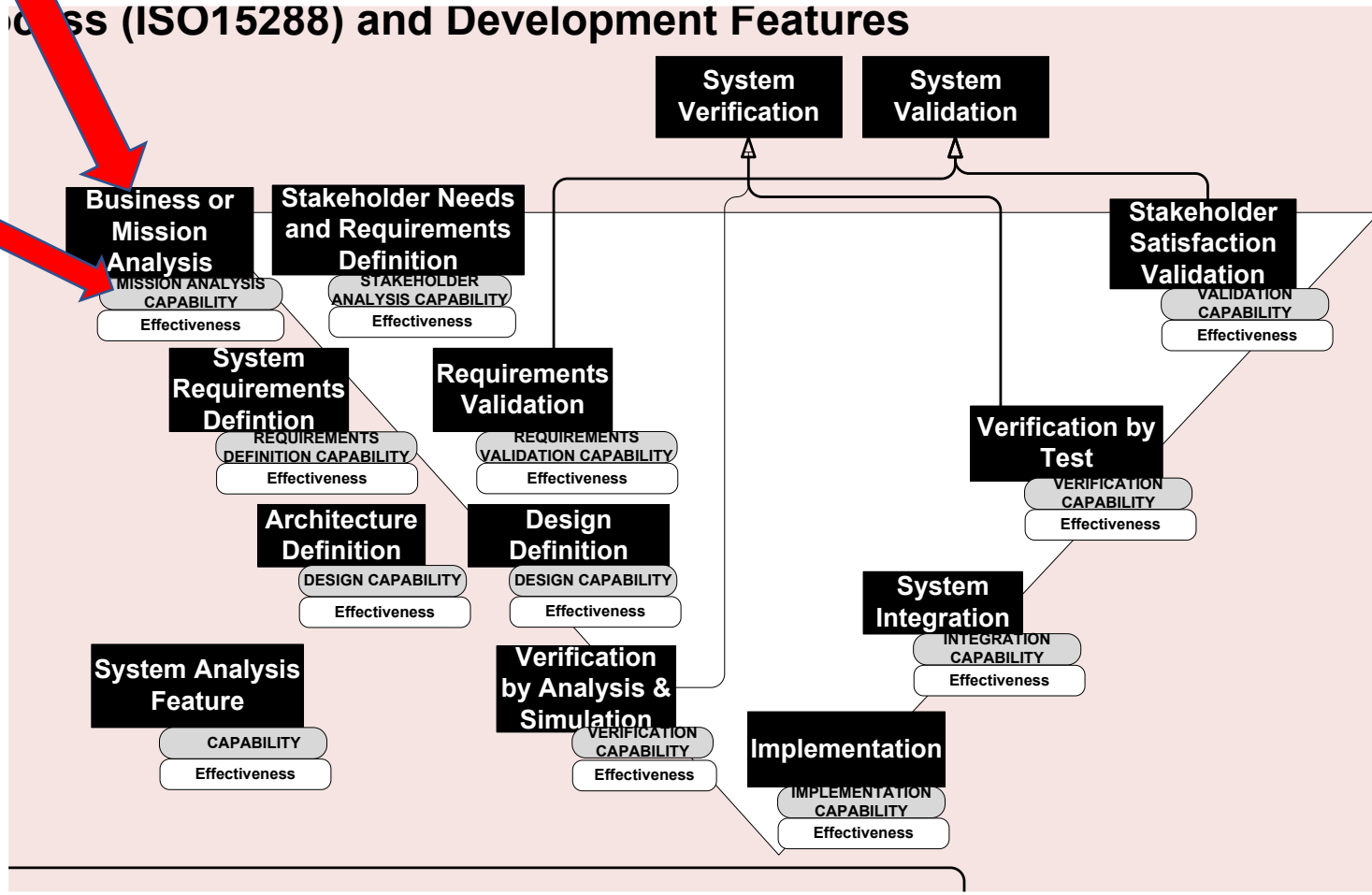
	Feature Configuratic	Feature Name	Feature Attribut	Populate? Yes/N	Selection 1	Selection 2	Selection 3	Selection 4	Selection 5	Selection 6	Selection 7	Selection 8	Selection 9	Selection 10	Selection 11	Selection 12
2	Optional	Acquisition	Acquisition Capability	Yes	Materials Acquisition Other Than for Target Systems and Component	Services Acquisition	Qualify Supplier	Incoming Acceptance Inspection	Observation Informed	Acquisition Report	Supply Agreement					
3	Optional	Architectural Definition	Architectural Definition Capability	Yes	Stakeholder Constrained	Experience Pattern Informed	Observation Informed	Logical Architecture & Alternatives	White Box Requirements, Logical Allocs	Black Box Reqs Consistent	Design Feedback to Reqs	Alternatives, Trades, Selection	Logical Architecture Report			
4	Optional	Business or Mission	Mission Analysis	Yes	Stakeholder Informed	Experience Pattern Informed	Observation Informed	Simulation Informed	Mission Features Report							
5	Optional	Design Definition	Design Capability	Yes	Observation Informed	Optimize MOEs, MOPs	Black Box Requirements Consistent	Design Feedback to Reqs	Alternatives, Trades, Selection	Physical Architecture & ign Report	Stakeholder Constrained	Experience Pattern Informed	Components and Alternatives			
6	Optional	Implementation	Implementation Capability	Yes	Software Construction	Purchased Inclusion	Personnel Assignment	Facilities Construction	Observation Informed Components and Altern Optimize MOEs, MOPs Black Box Requirement: Design Feedback to Rec Alternatives, Trades, Se Physical Architecture &	ervation rmed	Implementation Report	Hardware Fabrication				
7	Optional	Feature With		Yes												
8	Optional	MBE Capability	MBE Capability	Yes	MBSE Models	FEA Models	CFD Models	SysDyn Models		chine rning Models	VirtReality Sim Models	AugReality Sim Models	Observation Informed	Experience Informed	Stakeholder Informed	Model Integrati Informed
9	Optional	Feature With Attributes But		Yes												
10	Optional	PBE Capability	PBE Capability Type	Yes	S* Patterns	Ontologies	Schema	Standards	PLE Variants	Math and Statistical Patterns	Human Expertise	Heuristics	Parent Pattern Experience Informed	Pattern Application Feedback	Observation Informed	Pattern Library
11	Optional	Project Assessment and Control	PAC Capability Type	Yes	Basic Project Assessment and Control	CAF Informed	Consistency Signature Informed	Drives Learning	S1 Environment Driven Agility	Market & Competitor Driven Agility	Stakeholder Driven Agility	Supply Chain Driven Agility				

Feature: Business or Mission Analysis

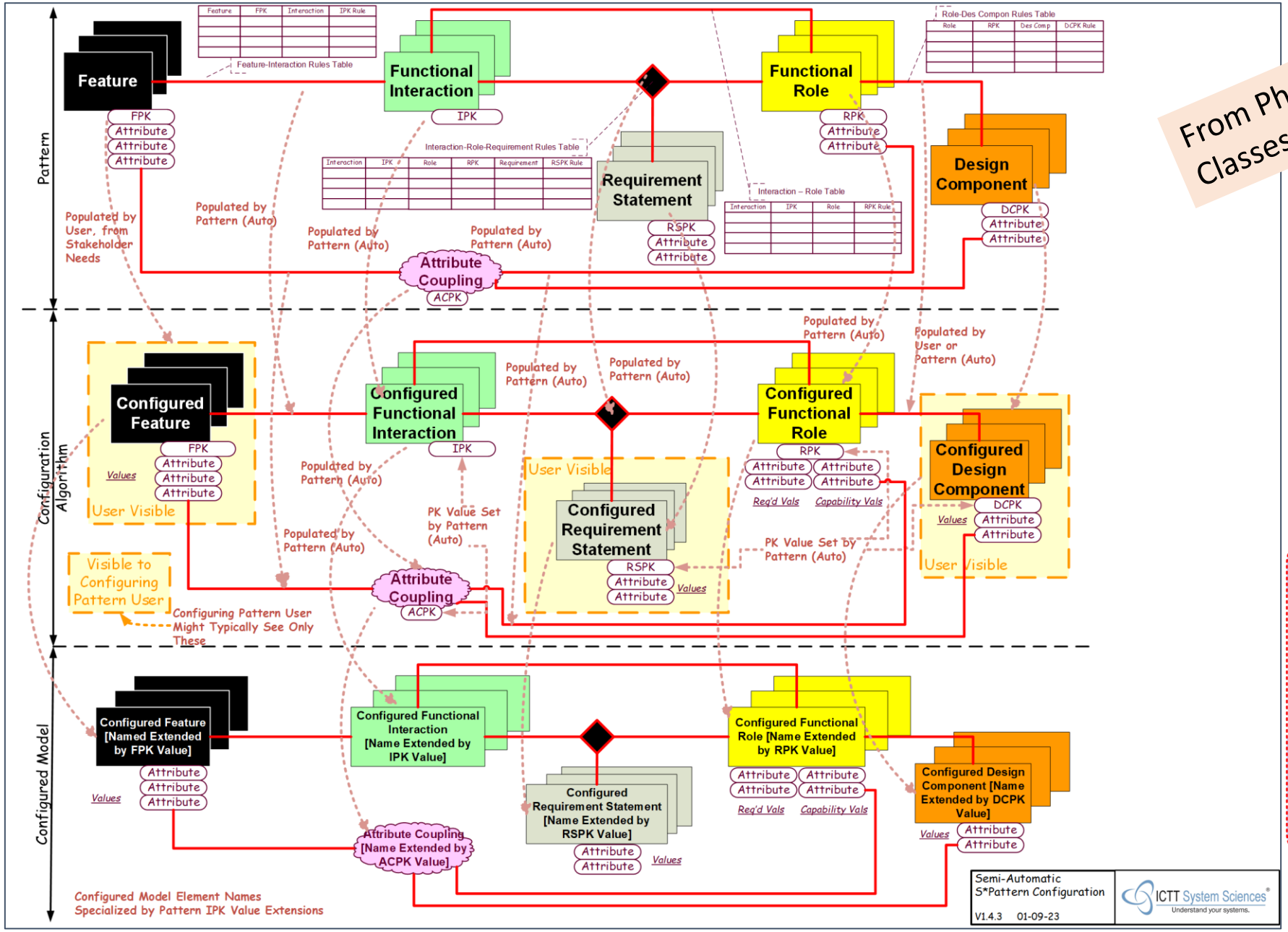


Feature: Business or Mission Analysis

- **Feature Primary Key Attribute** (capability) options--
  - Stakeholder Informed
  - Experience Pattern Informed
  - Simulation Informed
  - Observation Informed
  - Mission Features Reconciliation & Report
- Okay to populate multiple instances of same Feature, with different PK values, representing variant capabilities.
- Each differently configured) instance can cause population of different functional interactions, roles and requirements.

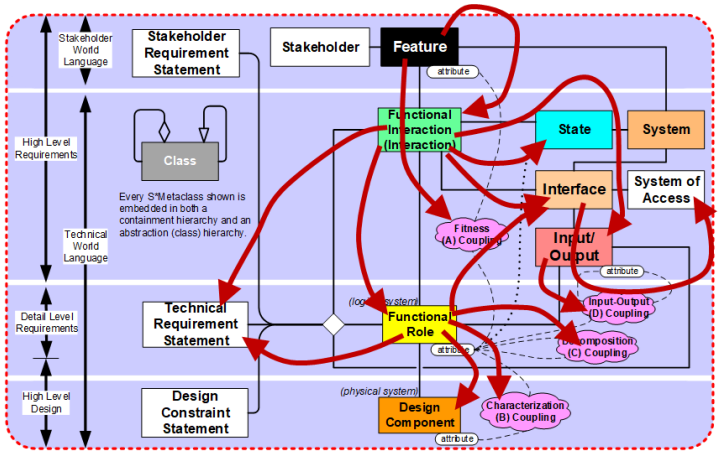


S*Pattern Configuration Algorithm: 3 Conceptual Overviews



From Phase I Classes

TRIGGERING METACLASSES ("IF") \ POPULATED METACLASSES ("THEN")	Feature	Interaction	Role	Design Component	Requirement Statement	State	Event	Transition	Interface	Architectural Relationship	Input/Output	Port	System of Access	Failure Impact	Counter Requirement Statement	Failure Mode	Feature Attribute	Role Attribute	Design Component Attribute	Input/Output Attribute	Fitness Attribute Coupling	Decomposition Attribute Coupling	Characterization Attribute Coupling	IO Attribute Coupling
Stakeholder Input	■													■			■							
Feature	■	■																						
Interaction		■	■			■	■		■	■	■	■	■											
Role			■	■	■	■			■	■	■	■	■					■						
Design Component				■											■				■					
Requirement Statement					■																			
State						■																		
Event							■																	
Transition								■																
Interface									■															
Architectural Relationship										■														
Input/Output											■									■				
Port												■												
System of Access													■											
Failure Impact														■										
Counter Requirement Statement															■									
Failure Mode																■								
Feature Attribute																	■							
Role Attribute																		■						
Design Component Attribute																			■					
Input/Output Attribute																				■				
Fitness Attribute Coupling																					■			
Decomposition Attribute Coupling																						■		
Characterization Attribute Coupling																							■	
IO Attribute Coupling																								■



Configuration Rules: Part of an S*Pattern

From Phase I Classes

Feature	FPK	Interaction	IPK Rule

Feature-Interaction Rules Table

Role	RPK	Des Comp	DCPK Rule

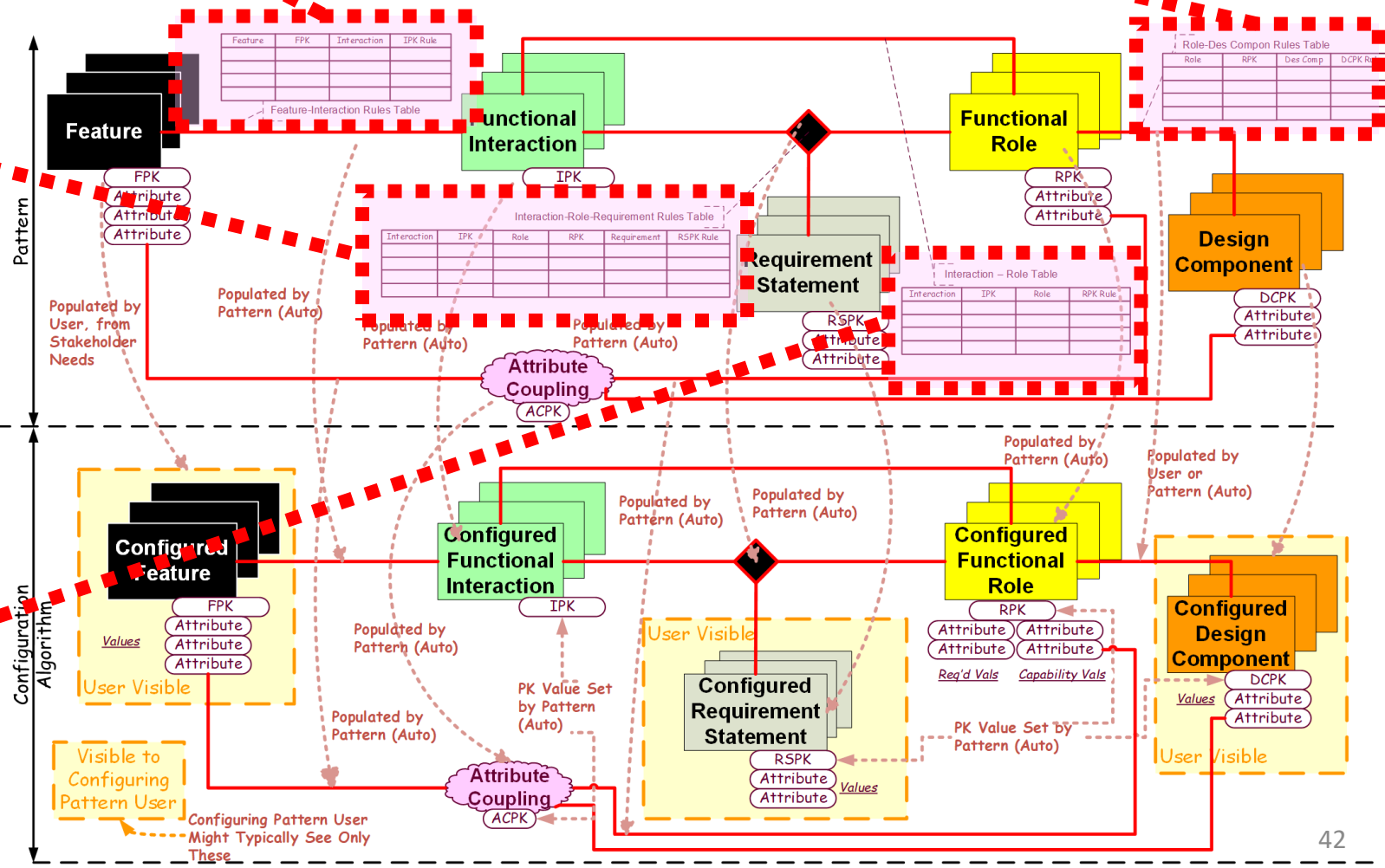
Role-Des Compon Rules Table

Interaction-Role-Requirement Rules Table

Interaction	IPK	Role	RPK	Requirement	RSPK Rule

Interaction – Role Table

Interaction	IPK	Role	RPK Rule



Configuration Rules for Populating Interactions from Selected Features (In SysML Cameo Modeler)

Feature	FPK	Interaction	IPK Rule

Feature-Interaction Rules Table

IF . . . .

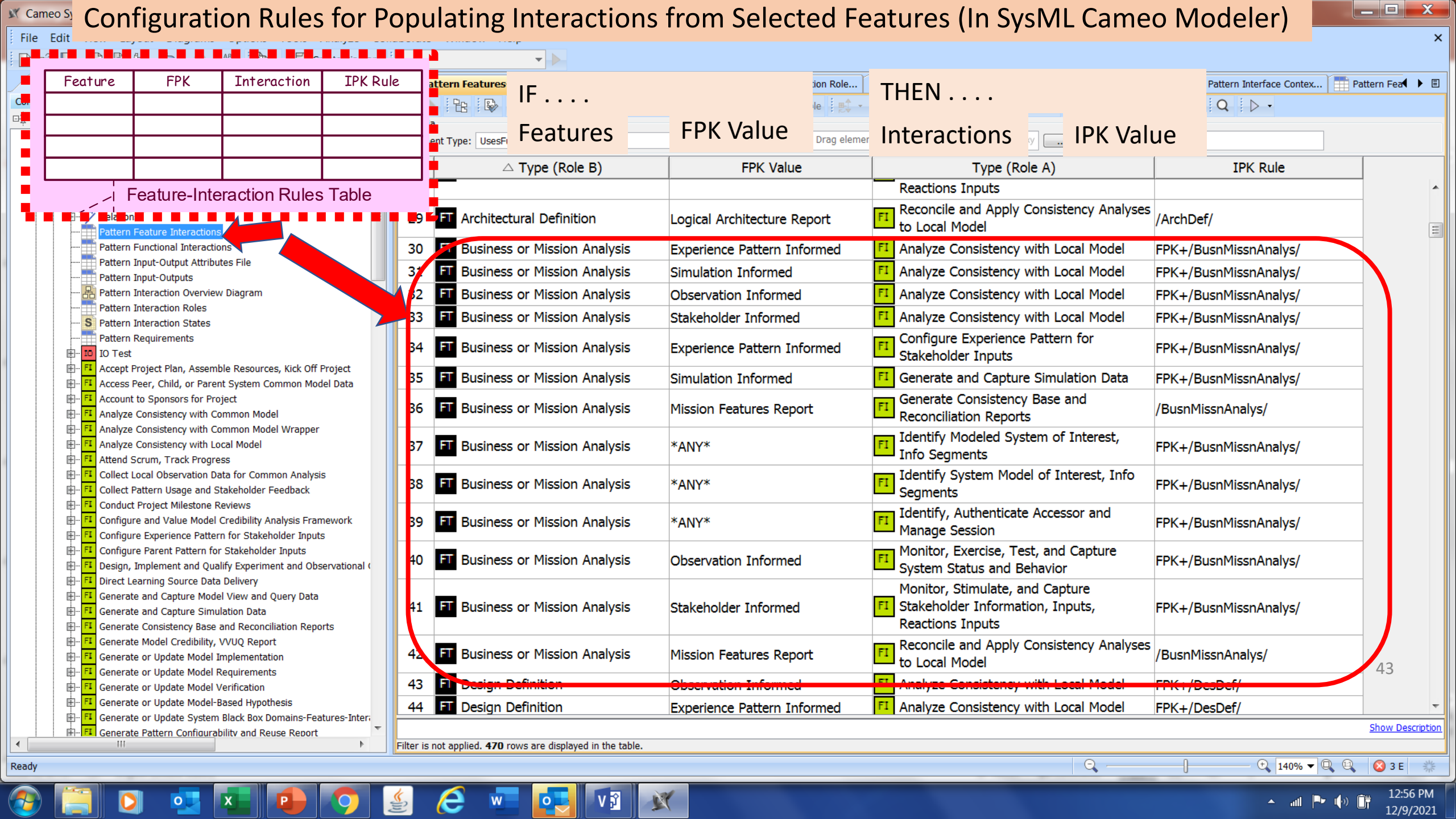
Features

FPK Value

THEN . . . .

Interactions

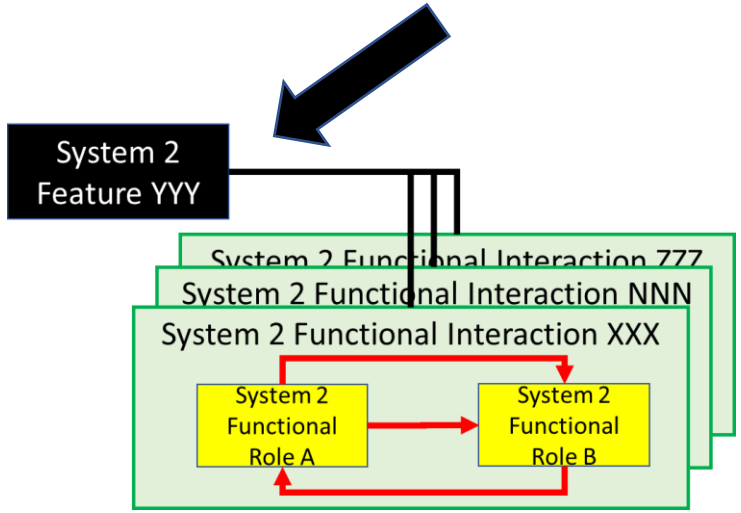
IPK Value



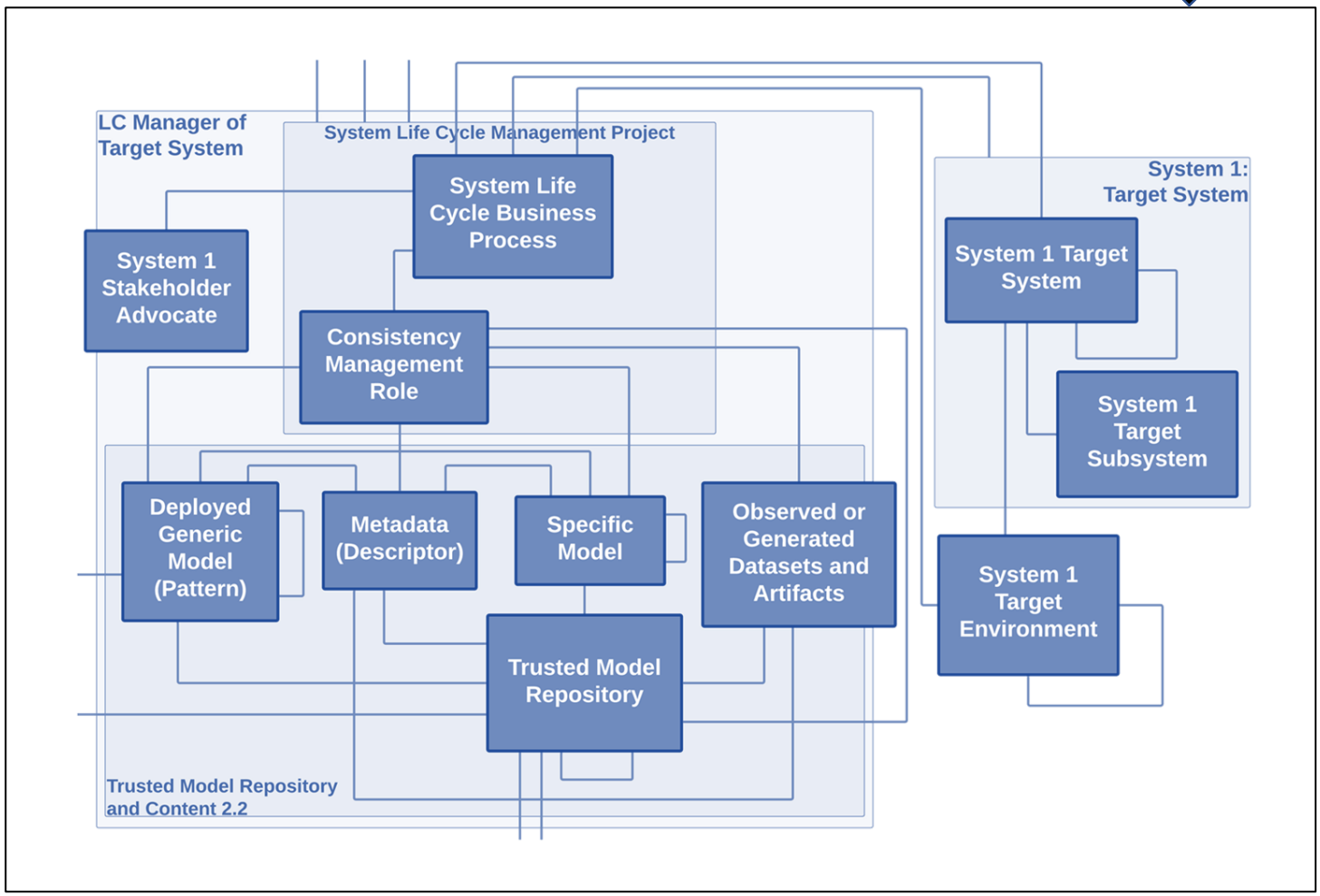
	Type (Role B)	FPK Value	Type (Role A)	IPK Rule
			Reactions Inputs	
29	Architectural Definition	Logical Architecture Report	Reconcile and Apply Consistency Analyses to Local Model	/ArchDef/
30	Business or Mission Analysis	Experience Pattern Informed	Analyze Consistency with Local Model	FPK+/BusnMissnAnalys/
31	Business or Mission Analysis	Simulation Informed	Analyze Consistency with Local Model	FPK+/BusnMissnAnalys/
32	Business or Mission Analysis	Observation Informed	Analyze Consistency with Local Model	FPK+/BusnMissnAnalys/
33	Business or Mission Analysis	Stakeholder Informed	Analyze Consistency with Local Model	FPK+/BusnMissnAnalys/
34	Business or Mission Analysis	Experience Pattern Informed	Configure Experience Pattern for Stakeholder Inputs	FPK+/BusnMissnAnalys/
35	Business or Mission Analysis	Simulation Informed	Generate and Capture Simulation Data	FPK+/BusnMissnAnalys/
36	Business or Mission Analysis	Mission Features Report	Generate Consistency Base and Reconciliation Reports	/BusnMissnAnalys/
37	Business or Mission Analysis	*ANY*	Identify Modeled System of Interest, Info Segments	FPK+/BusnMissnAnalys/
38	Business or Mission Analysis	*ANY*	Identify System Model of Interest, Info Segments	FPK+/BusnMissnAnalys/
39	Business or Mission Analysis	*ANY*	Identify, Authenticate Accessor and Manage Session	FPK+/BusnMissnAnalys/
40	Business or Mission Analysis	Observation Informed	Monitor, Exercise, Test, and Capture System Status and Behavior	FPK+/BusnMissnAnalys/
41	Business or Mission Analysis	Stakeholder Informed	Monitor, Stimulate, and Capture Stakeholder Information, Inputs, Reactions Inputs	FPK+/BusnMissnAnalys/
42	Business or Mission Analysis	Mission Features Report	Reconcile and Apply Consistency Analyses to Local Model	/BusnMissnAnalys/
43	Design Definition	Observation Informed	Analyze Consistency with Local Model	FPK+/DesDef/
44	Design Definition	Experience Pattern Informed	Analyze Consistency with Local Model	FPK+/DesDef/

Filter is not applied. **470** rows are displayed in the table.

Interactions will be populated, based on chosen features



The interactions will be between these S2 roles--



[Don't be confused that the following historical diagrams "mix colors" of logical role blocks--both yellow and blue.]

Following drills into several example Features and their Interactions and Roles ….

Selection of FPK Values Populates Interactions, Which in Turn Populate Roles

Next 5 pages, each showing interactions for one selected FPK value

- Feature: Mission or Business Analysis

Additional cases shown in attachment pages

- Feature: Stakeholder Needs and Requirements Definition
- Feature: System Requirements Definition

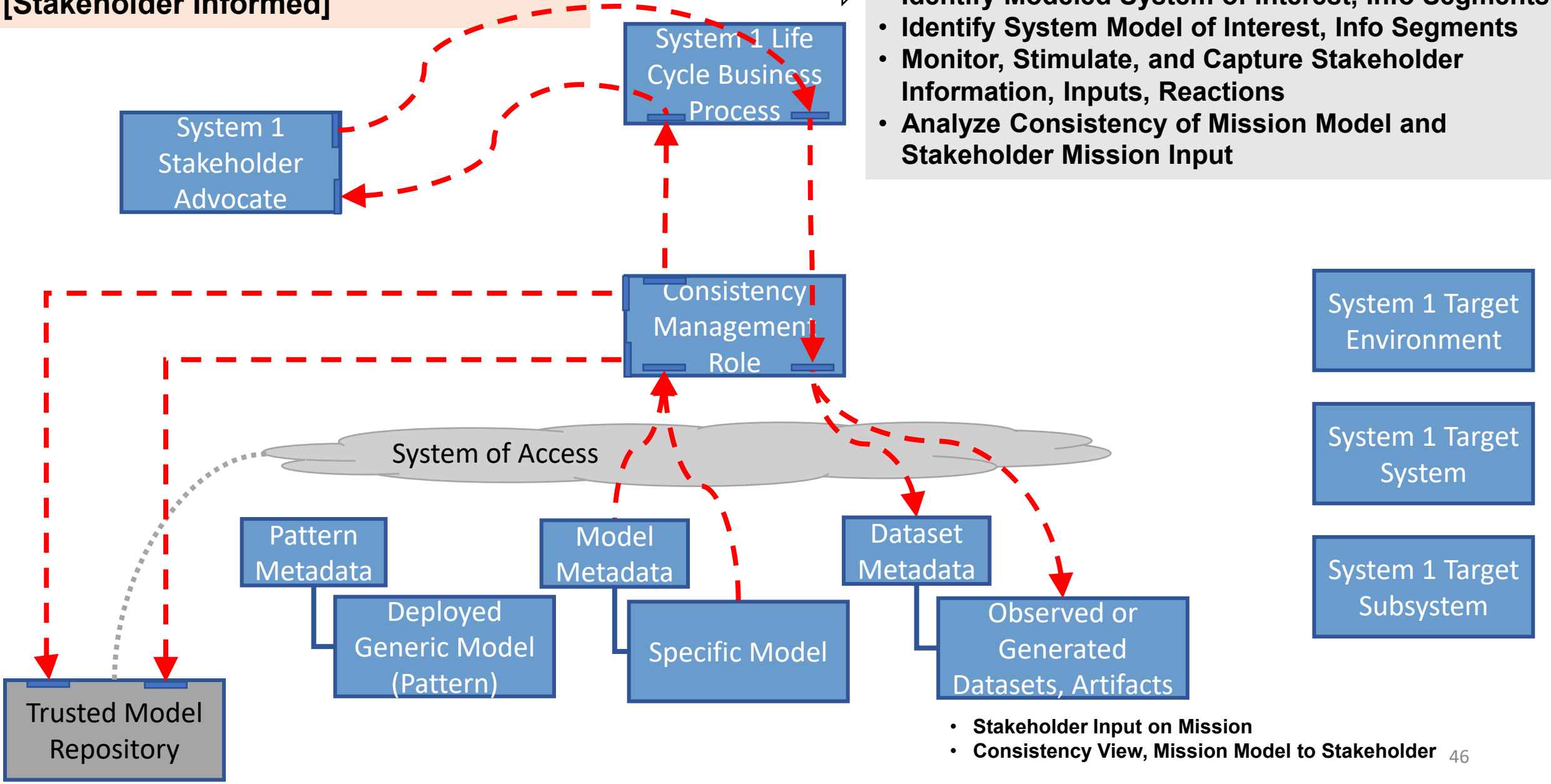
Feature: Business or Mission Analysis
Primary Key Value: (Capability)
[Stakeholder Informed]

Selected Feature+FPK

Resulting Interactions

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Monitor, Stimulate, and Capture Stakeholder Information, Inputs, Reactions**
- **Analyze Consistency of Mission Model and Stakeholder Mission Input**



- **Stakeholder Input on Mission**
- **Consistency View, Mission Model to Stakeholder**

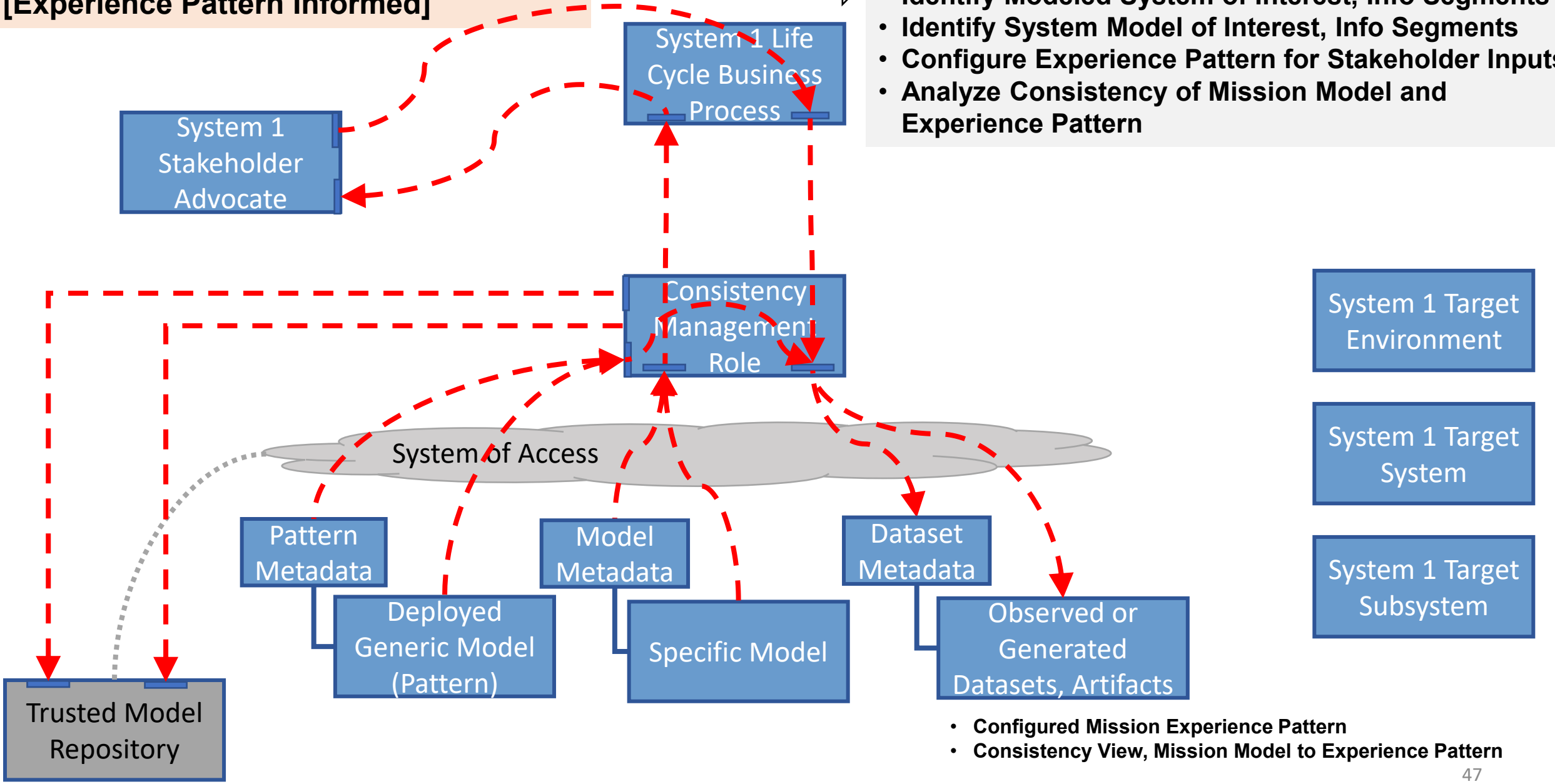
Feature: Business or Mission Analysis
Primary Key Value: (Capability)
[Experience Pattern Informed]

Selected Feature+FPK

Resulting Interactions

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Configure Experience Pattern for Stakeholder Inputs**
- **Analyze Consistency of Mission Model and Experience Pattern**



- **Configured Mission Experience Pattern**
- **Consistency View, Mission Model to Experience Pattern**

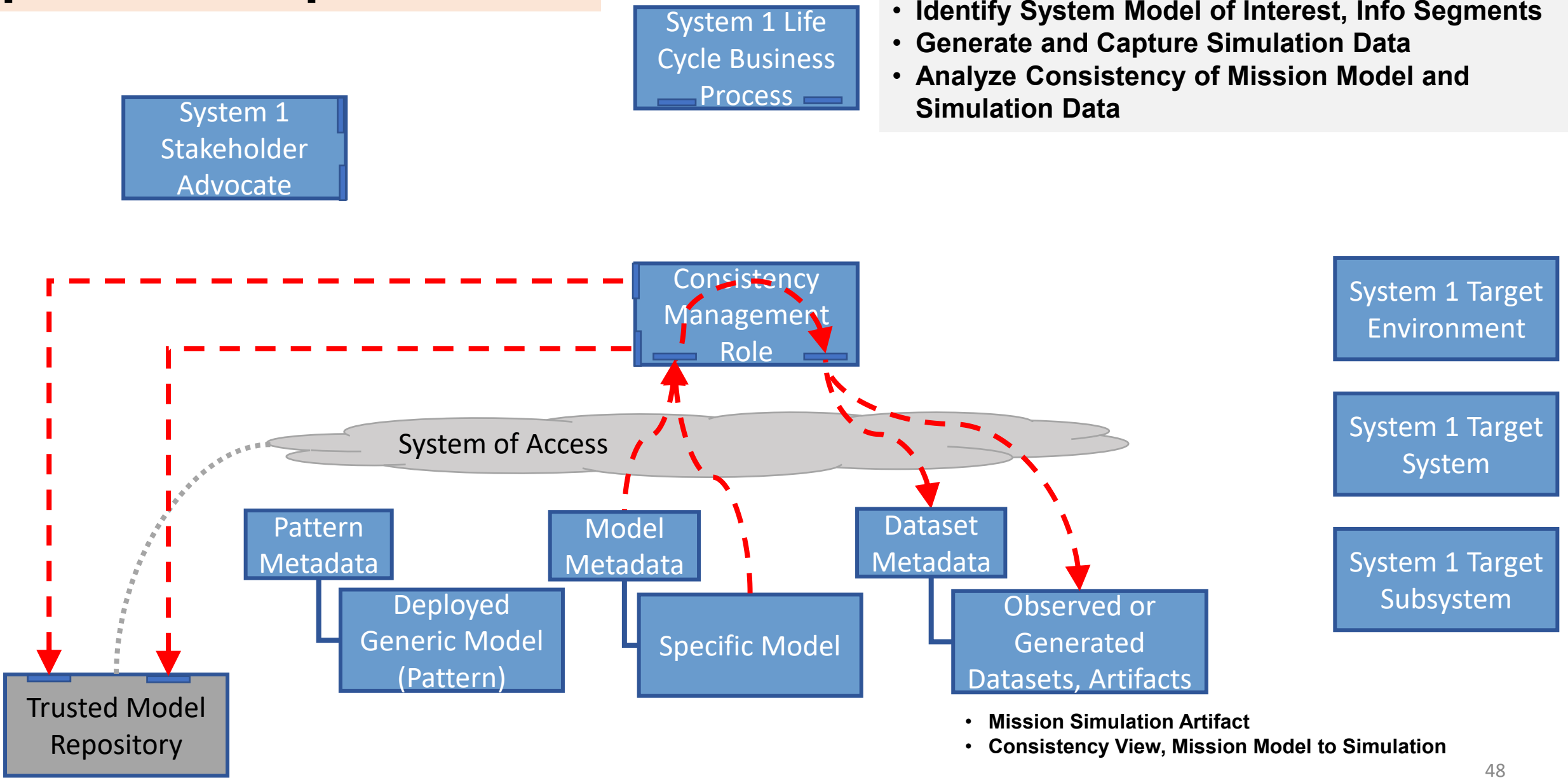
Feature: Business or Mission Analysis
Primary Key Value: (Capability)
[Simulation Informed]

Selected Feature+FPK

Resulting Interactions

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Generate and Capture Simulation Data**
- **Analyze Consistency of Mission Model and Simulation Data**



- **Mission Simulation Artifact**
- **Consistency View, Mission Model to Simulation**

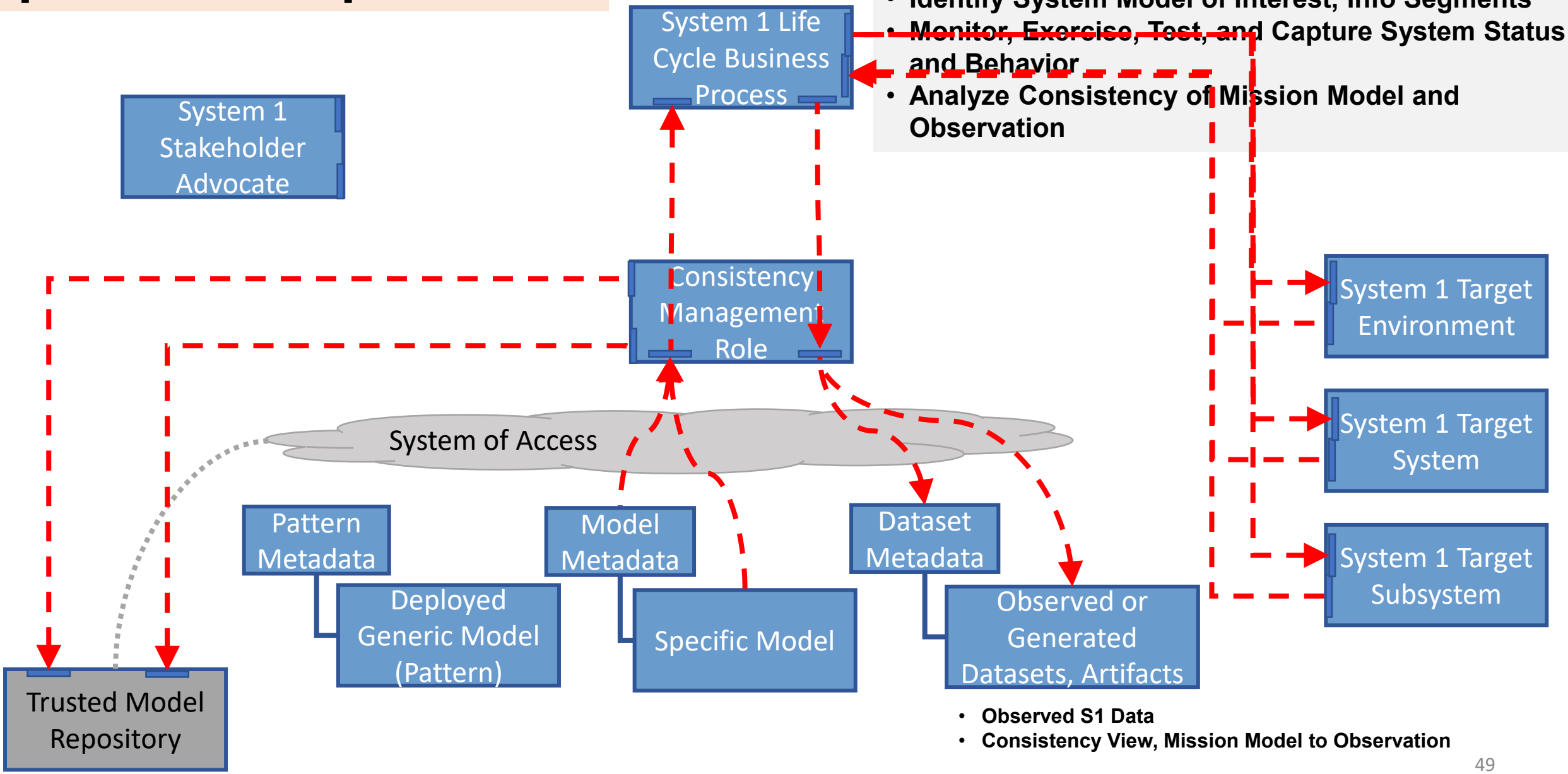
Feature: Business or Mission Analysis
Primary Key Value: (Capability)
[Observation Informed]

Selected Feature+FPK

Resulting Interactions

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Monitor, Exercise, Test, and Capture System Status and Behavior**
- **Analyze Consistency of Mission Model and Observation**



- **Observed S1 Data**
- **Consistency View, Mission Model to Observation**

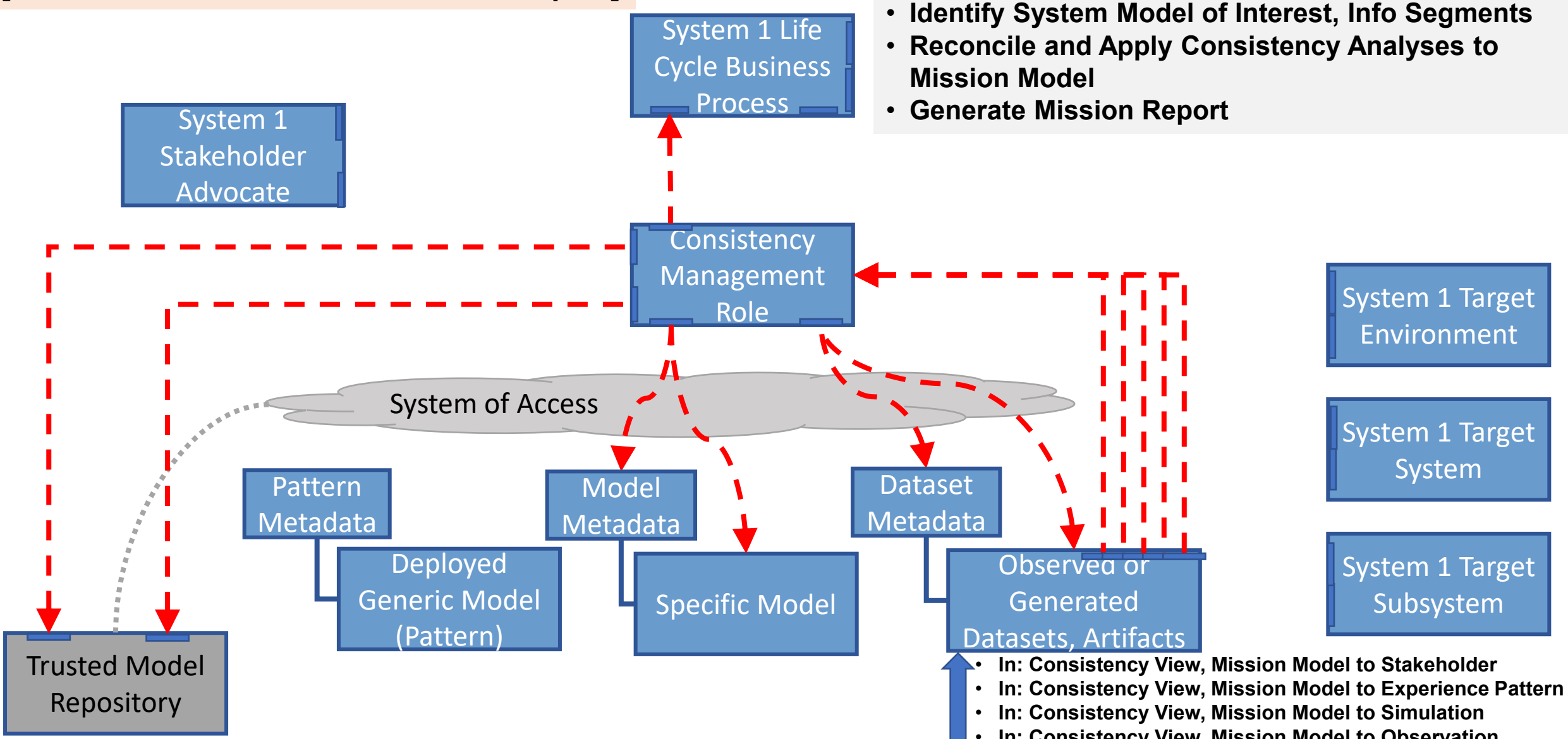
Feature: Business or Mission Analysis
Primary Key Value: (Capability)
[Mission Features Reconciliation & Report]

Selected Feature+FPK

Resulting Interactions

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Reconcile and Apply Consistency Analyses to Mission Model**
- **Generate Mission Report**

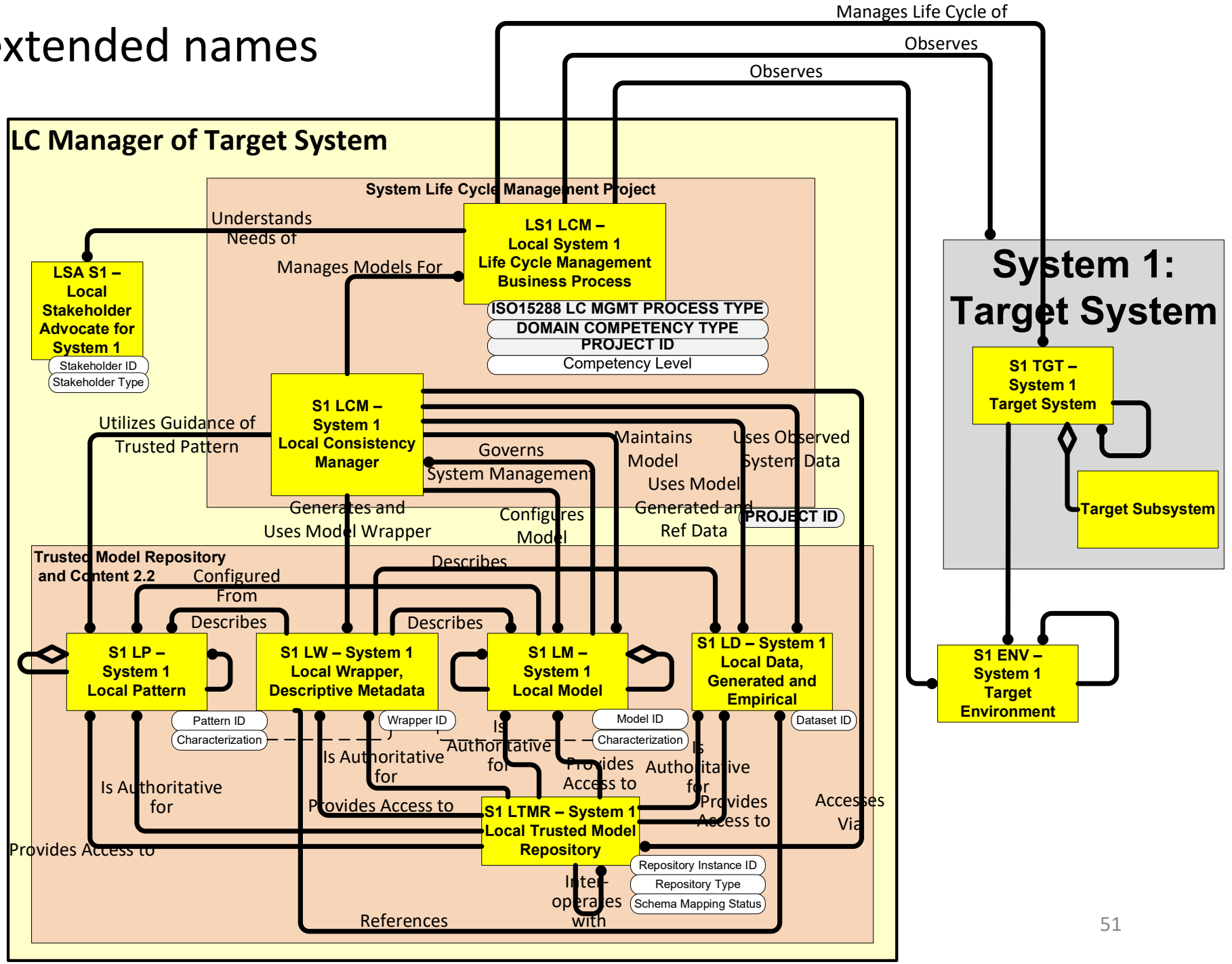


- **In: Consistency View, Mission Model to Stakeholder**
- **In: Consistency View, Mission Model to Experience Pattern**
- **In: Consistency View, Mission Model to Simulation**
- **In: Consistency View, Mission Model to Observation**
- **In: Consistency View, Mission Model to Stakeholder Reqs**
- **Out: Mission Analysis Report**

Memory aid: Formal extended names of key Level 2 classes

Process Classes

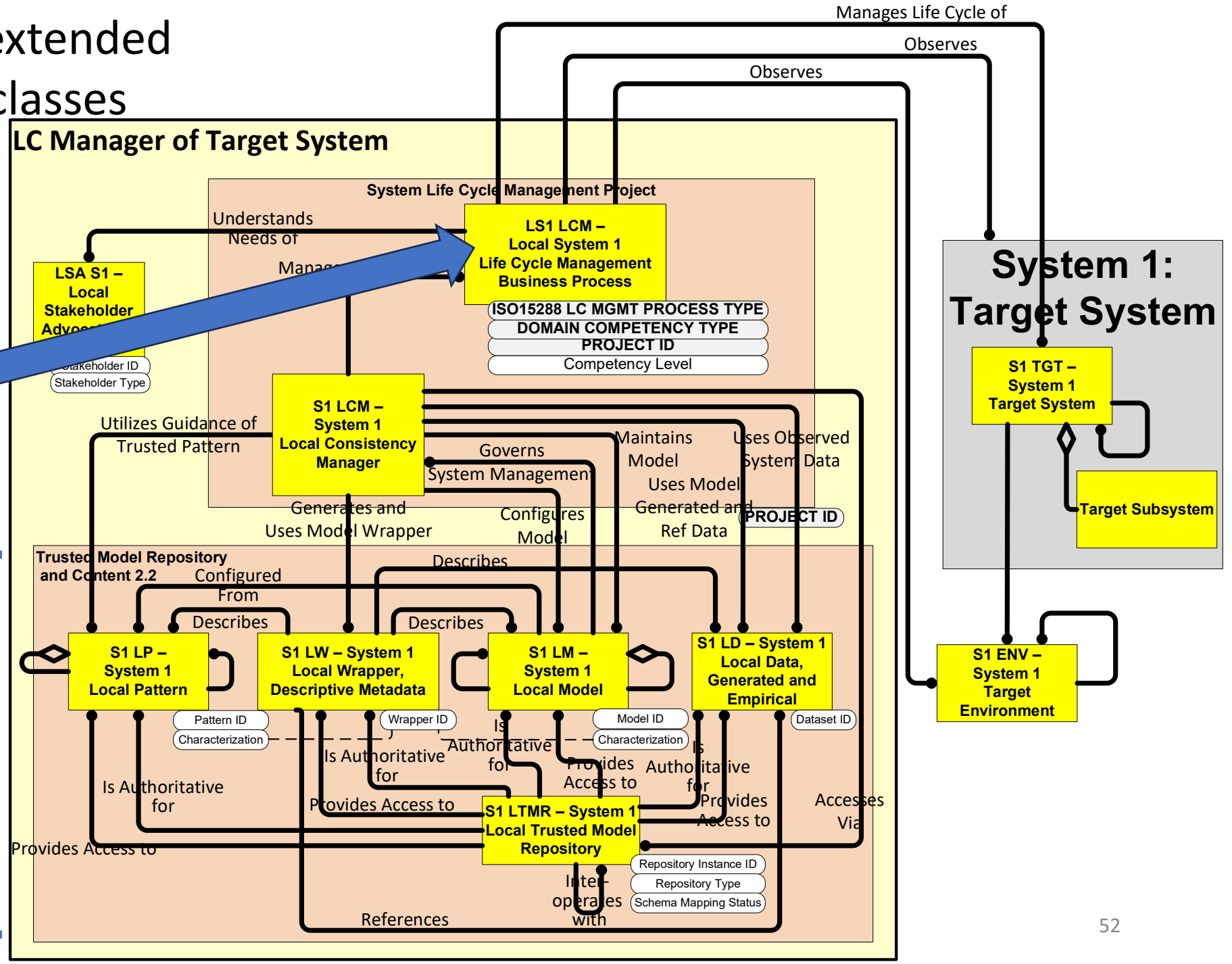
Repository Information Classes



Memory aid: Formal extended names of key Level 2 classes

All Production Roles, Distribution Roles, Engineering Roles, Acquisition Roles, Supply Roles, Sustainment Roles, etc. (except for information, stakeholder, S1, and S1 Environment)

Production Info, Distribution Info, Engineering Info, Acquisition Info, Supply Info, Sustainment Info, etc.



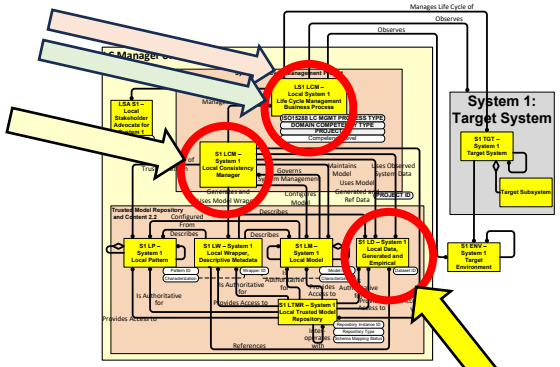
Introduction to Decision Management Extensions to Consistency Management

The emerging extensions to Consistency Management:

- Extension of the Consistency Management paradigm
- Features--Extension to Decision Management Features
- Representation of multiple design cycles and their proliferating artifacts
- Bulk loading of instances to the Configuration Wizard
- For larger, detailed V&V / consistency management of decomposed system.

- Introduced here, more on this next class.

ASELCM Consistency Management Pattern:
Process and Information Functional Roles (Level 2, 3)



ASELCM L2 Pattern

Business Process Owning the Targeted Information Segment to be Checked and Updated

Business Process Owning the Information Segment to be Compared

S1 LD – Updated Targeted InfoSeg

S1 LCM -- Updater

S1 LD – LCM Concurrence

Recurrent feedback network

S1 LD – Targeted InfoSeg

S1 LD -- Feedback

S1 LD -- Feedback

S1 LD – Informing InfoSeg

S1 LCM Comparator

S1 LD – Consistency View

S1 LCM -- Reconciler

S1 LD -- ReconcilRpt

1

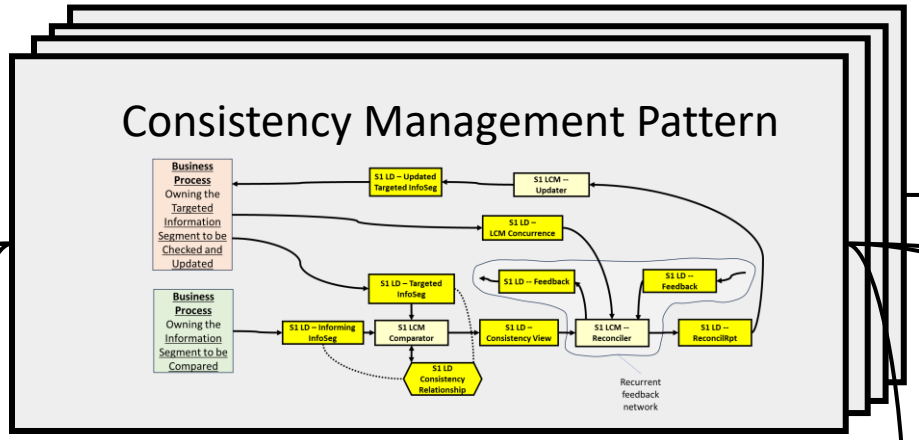
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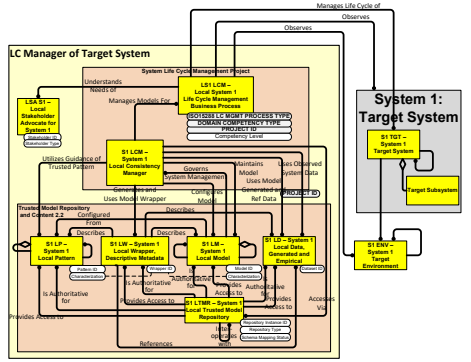
S1 LD Consistency Relationship

Process Role

Repository Information Role

Many-to-1: A single Targeted InfoSeg (AKA Subject) is informed by multiple Informing InfoSegs (AKA Referents)





ASELCM L2 Pattern

Reaches across both internal and external boundaries, but with local control:

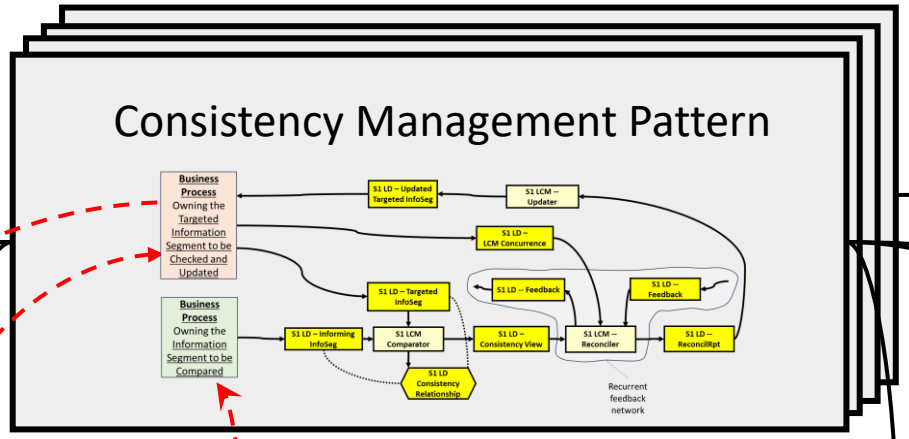
- Detect Inconsistencies
- Reconcile Inconsistencies

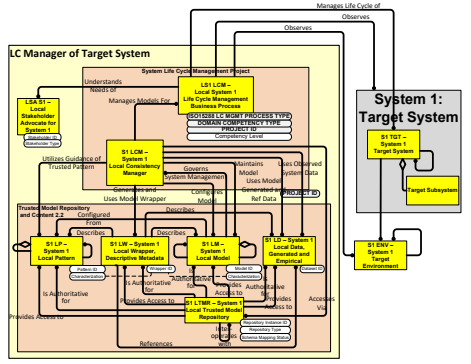
PARTS SUPPLIER

LARGE OEM

Production | Engineering | Supply | Acquisition | Engineering | Production

Case 1: Within a Functional Area





ASELCM L2 Pattern

Targeted data

Informing Data

PARTS SUPPLIER

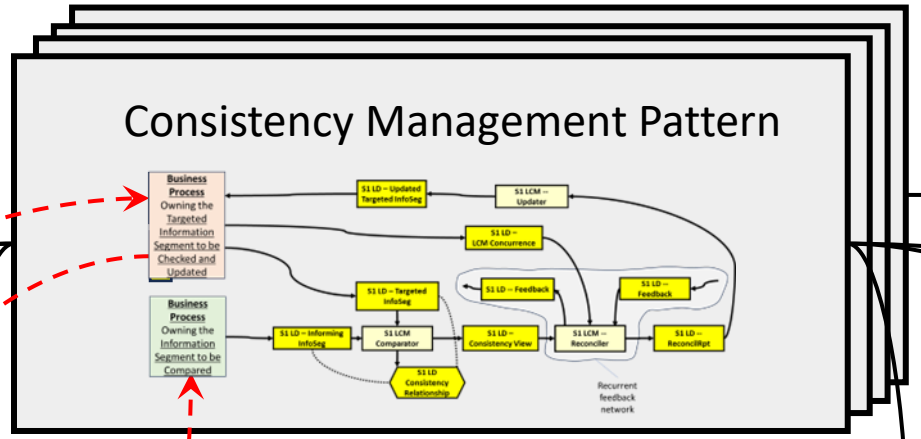
LARGE OEM

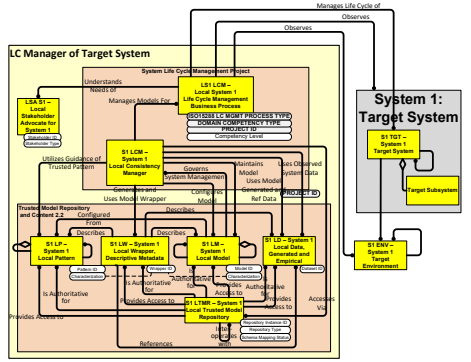
This case applies in two ways:

1. Stage Gate <u>decisions</u> on achieving consistency (e.g., Requirements –> Design).
2. But also earlier, during <u>origination/refinement</u> of information.

Production | Engineering | Supply | Acquisition | Engineering | Production

Case 2: Across Functional Areas





Targeted data

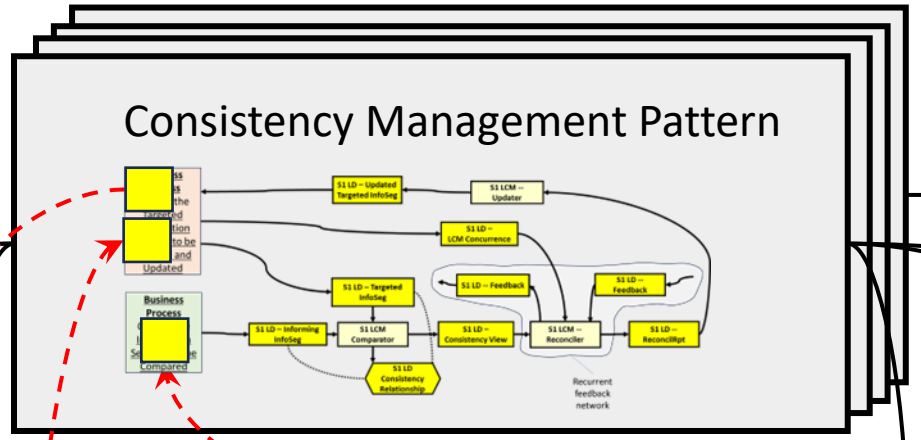
Informing data

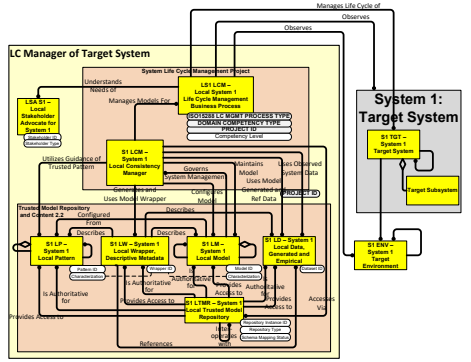
PARTS SUPPLIER

LARGE OEM

Production | Engineering | Supply | Acquisition | Engineering | Production

Case 3: Across Enterprises





ASELCM L2 Pattern

Targeted data

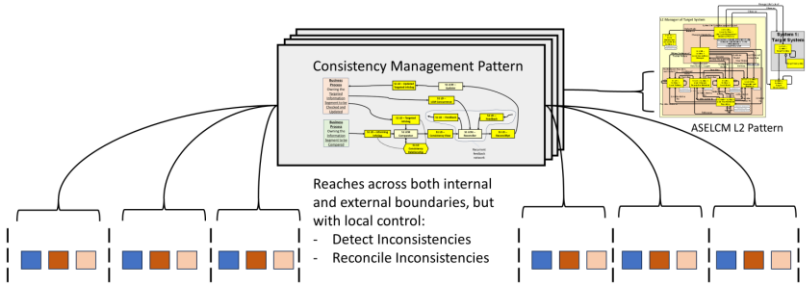
Informing Data

PARTS SUPPLIER

LARGE OEM

Production | Engineering | Supply | Acquisition | Engineering | Production

ASELCM Consistency Management Pattern:
Process and Information Functional Roles



Business Process Owning the Targeted Information Segment to be Checked and Updated

Business Process Owning the Information Segment to be Compared

S1 LD – Updated Targeted InfoSeg

S1 LCM -- Updater

S1 LD – LCM Concurrence

Recurrent feedback network

S1 LD – Targeted InfoSeg

S1 LD -- Feedback

S1 LD -- Feedback

S1 LD – Informing InfoSeg

S1 LCM Comparator

S1 LD – Consistency View

S1 LCM -- Reconciler

S1 LD -- ReconcilRpt

1

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S1 LD Consistency Relationship

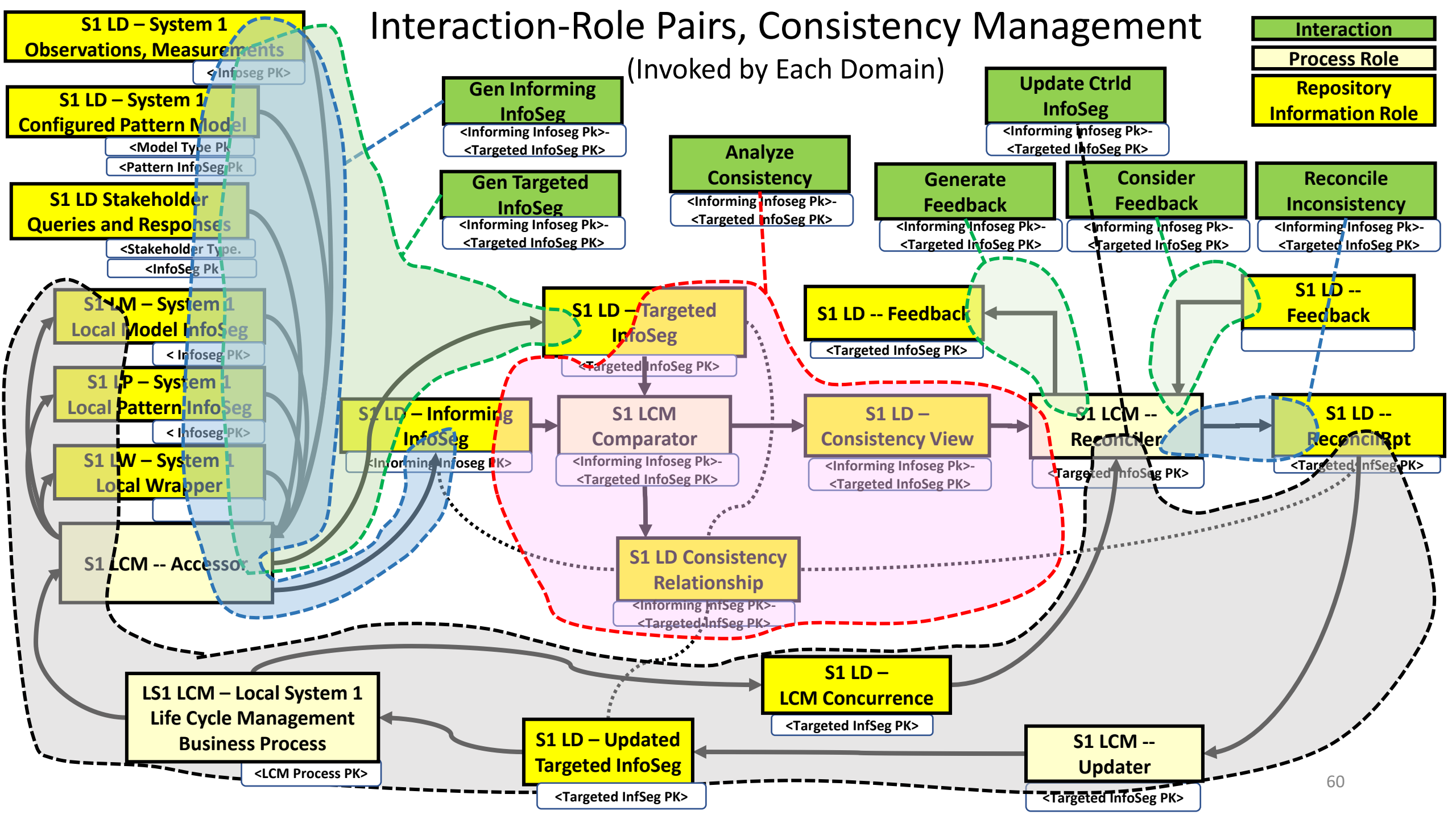
Process Role

Repository Information Role

Many-to-1: A single Targeted InfoSeg can be informed by multiple Informing InfoSegs

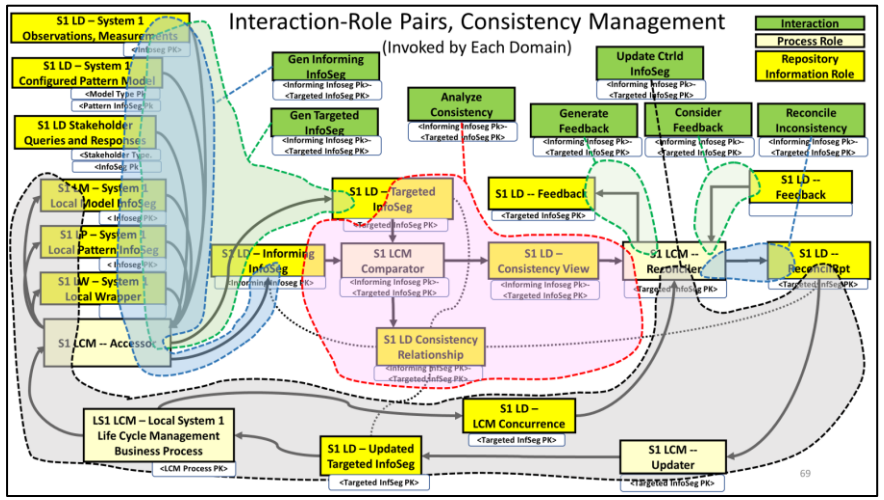
Interaction-Role Pairs, Consistency Management

(Invoked by Each Domain)



Extending the consistency management paradigm: 7 standard interactions between 11 standard roles

- **7 Interactions:**
  - Gen Informing InfoSeg
  - Gen Targeted InfoSeg
  - Analyze Consistency
  - Consider Feedback
  - Reconcile Consistency
  - Generate Feedback
  - Update Ctrld InfoSeg



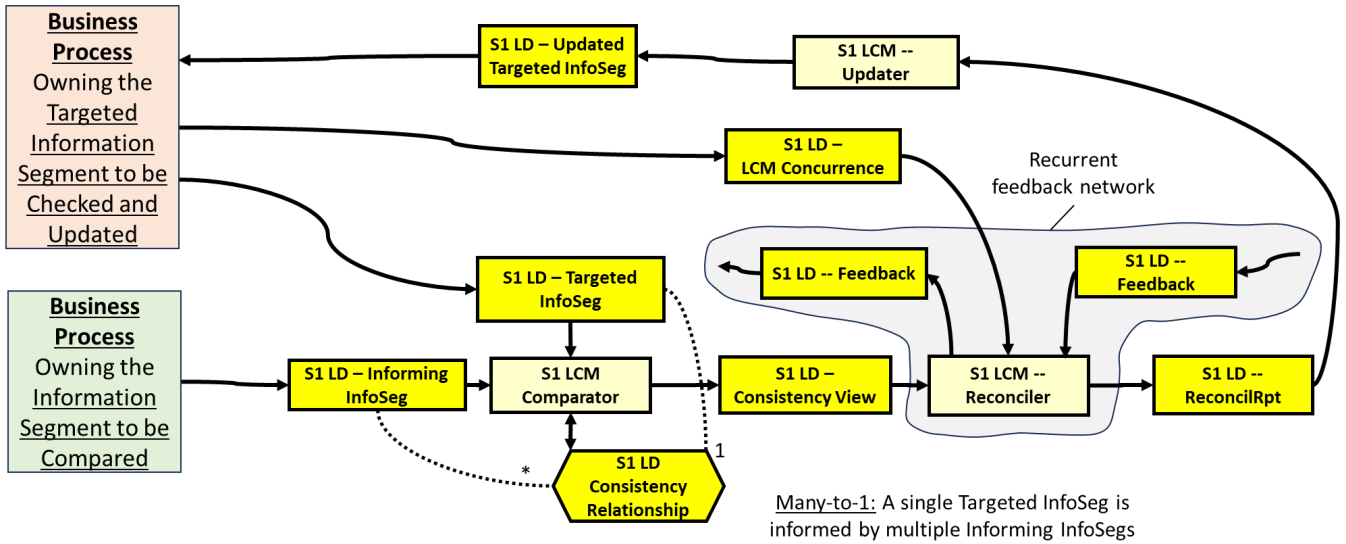
- **11 Roles:**
  - 7 Information Roles
    - S1 LD—Targeted InfoSeg
    - S1 LD—Informing InfoSeg
    - S1 LD—Consistency View
    - S1 LD--Feedback
    - S1 LD—ReconcilRpt
    - S1 LD—LCM Concurrence
    - S2 LD—Updated Targeted InfoSeg
  - 4 Process Roles
    - S1 LCM--Comparator
    - S1 LCM--Reconciler
    - S1 LCM--Updater
    - S1 LCM--Local System 1 Life Cycle Management Business Process

Seeing reconciliation in a larger way

- The expanded view of Consistency Management is the human equivalent of the difference between earlier machine learning and generative AI.
- This is not an "AI pitch":
  - Rather, it is an enlarged way to understand how human organizations already generate the content (missions, requirements, designs, etc.) they synthesize, whether as models or their prose predecessors.
  - It just happens to also be consistent with applying AI.
  - So, it provides an integration framework for evolutionary hybrid ecosystems.
- It begins by understanding reconciliation more broadly:
  - Reconciliation as learning
  - Reconciliation as stakeholder negotiation
  - Reconciliation as (generative) content synthesis
  - Reconciliation as control of production, sustainment, operations, retirement

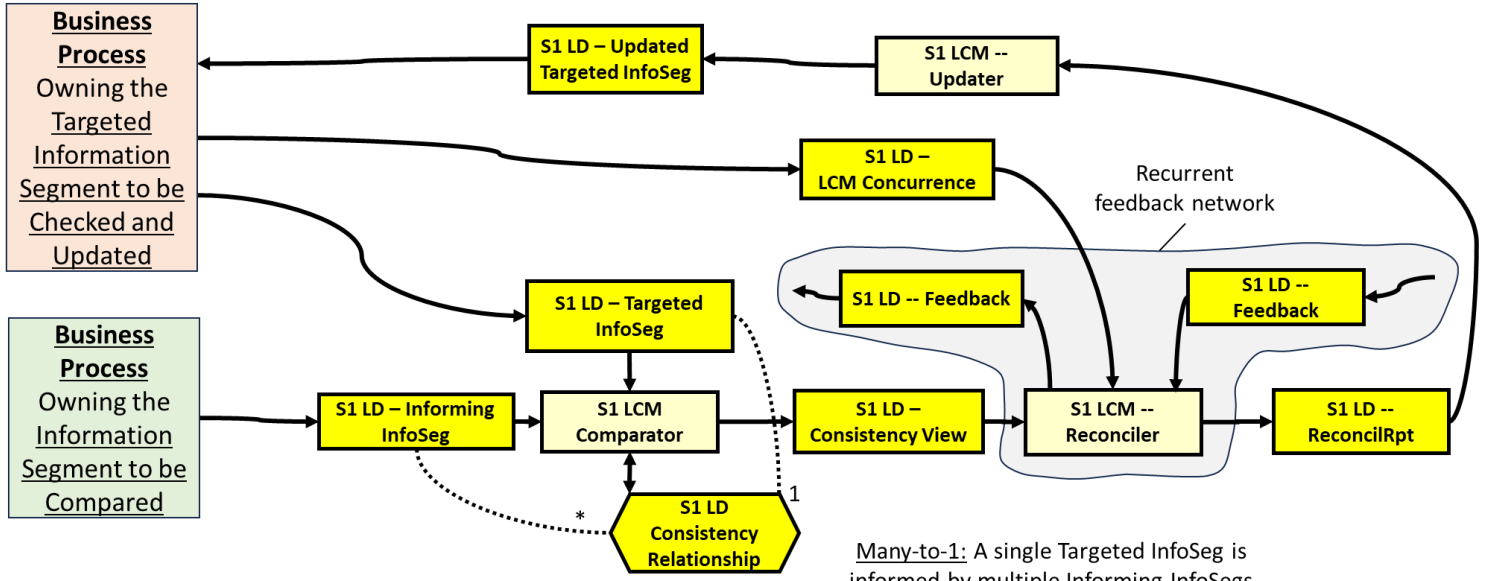
Reconciliation as learning

- When reconciliations are changes to a model that is being adjusted to reconcile observation or other referent(s) content, the model accumulates a more accurate representation of the referent(s).
- This is true in machine learning, but also true in manually-constructed formal models of physical sciences or other observation-oriented processes.
- It is also true in informal human learning.



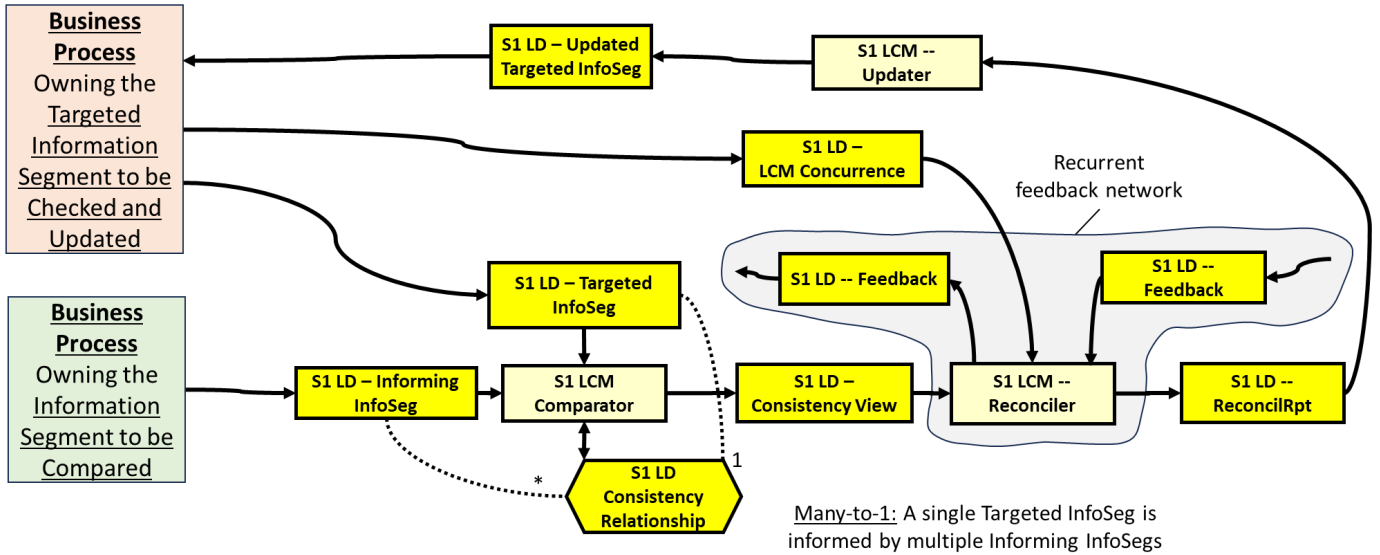
Reconciliation as stakeholder negotiation

- When reconciliations reflect adjustments in the “positions” of negotiators (buyer-sellers, stakeholders-designers, etc.) in response to consistency views, the results reflect the outcome of negotiation.



Reconciliation as (generative) content synthesis

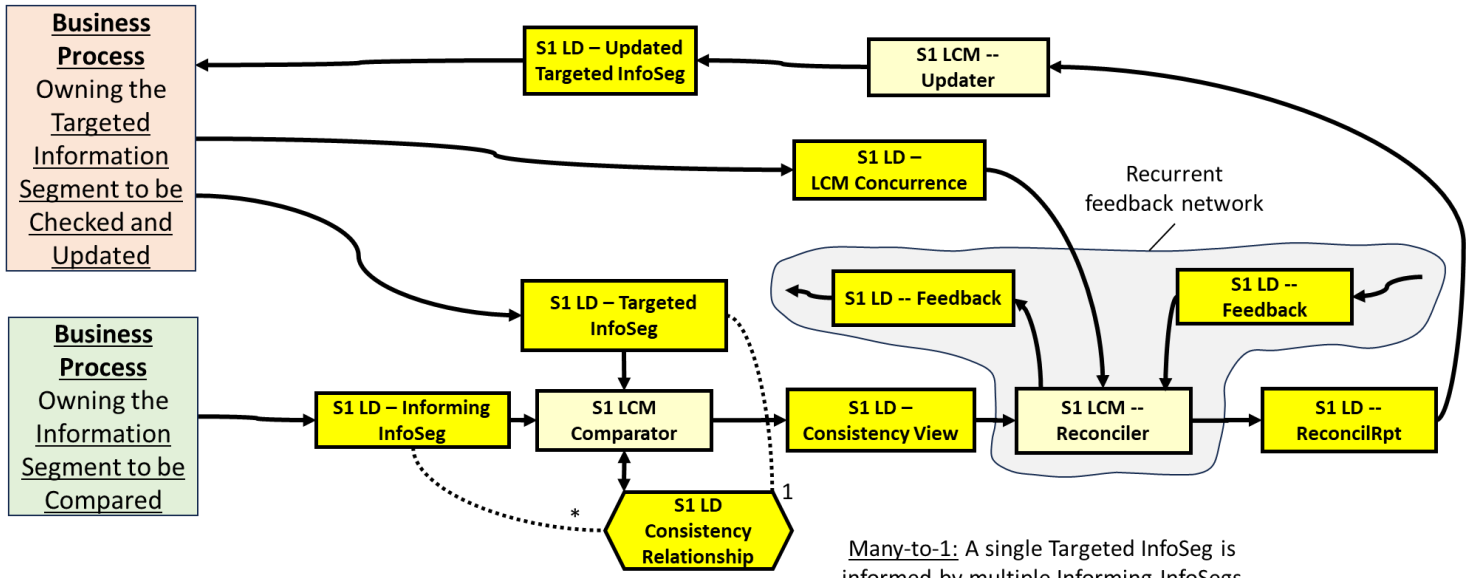
- When reconciliations reflect adjustments to artifacts that are synthesized from referents describing RFPs/RFQs, opportunities, orders, configurations of past learning, standards, or other patterns, or observations---then if we list enough referents, we can see that content synthesis itself is a (generative) form of reconciliation.



Note that ASELCM's representation of learned patterns includes cases that are entirely in the form of human experience housed in a person or group of persons.

Reconciliation as control of production, sustainment, operations, retirement

- When reconciliations reflect adjustments to controlling variables of processes (e.g., manufacturing, flight, therapy, etc.) in response to "error signal" feedback consistency measures, then the results of reconciliations may be viewed as feedback control, whether formalized in control systems, or informal in human or other control.

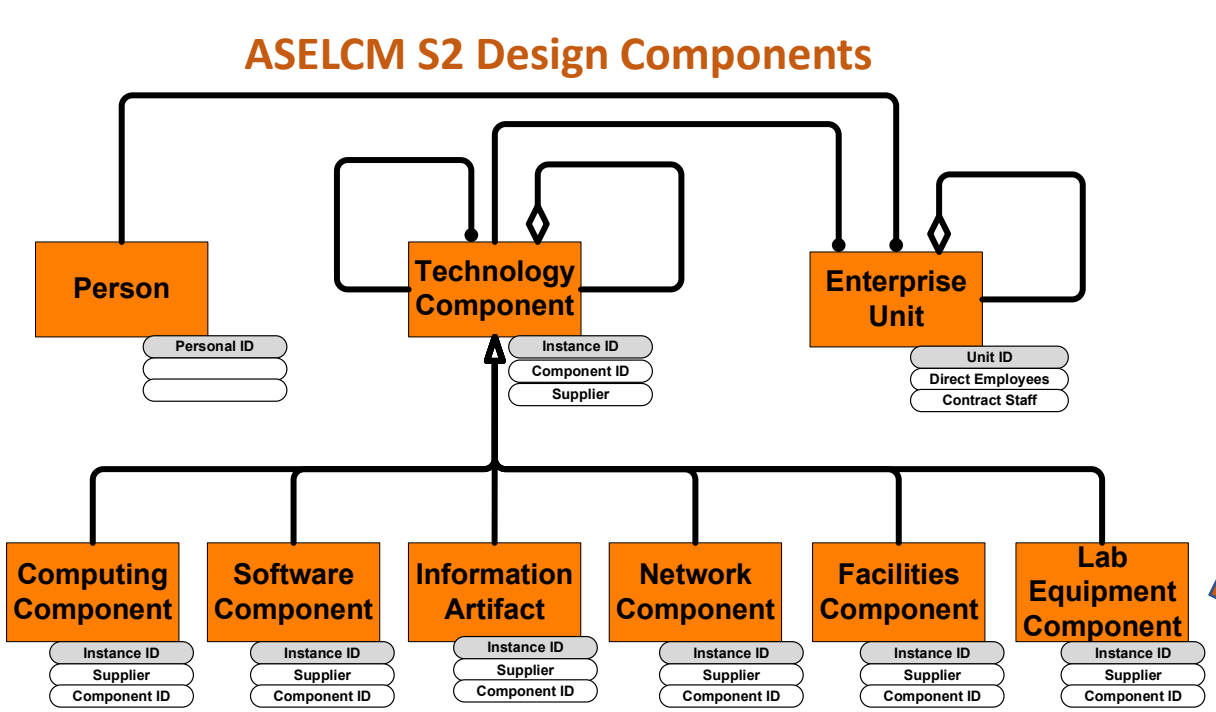


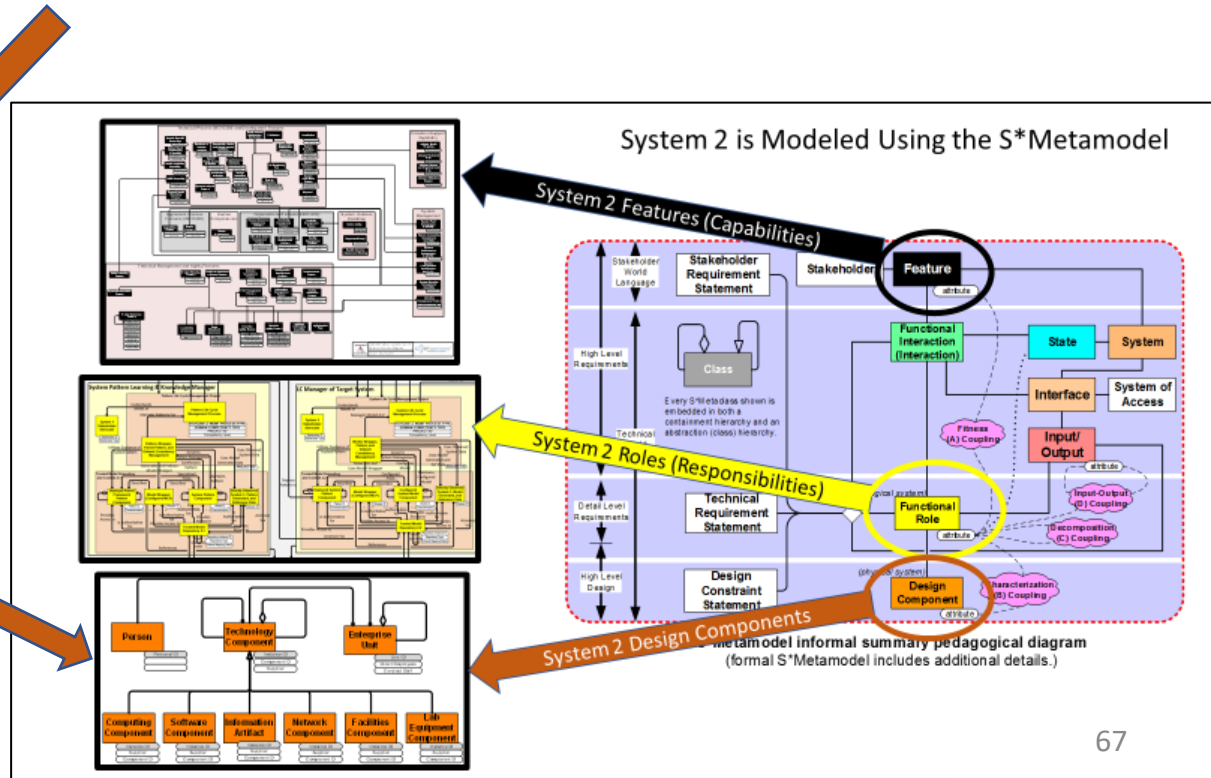
Many-to-1: A single Targeted InfoSeg is informed by multiple Informing InfoSegs

Note that ASELCM's representation of consistency management supports viewing consistency gaps as energy terms in a Hamiltonian of the ecosystem itself.

Implementations of info artifacts, IT, supply chain, other S2 Design Components

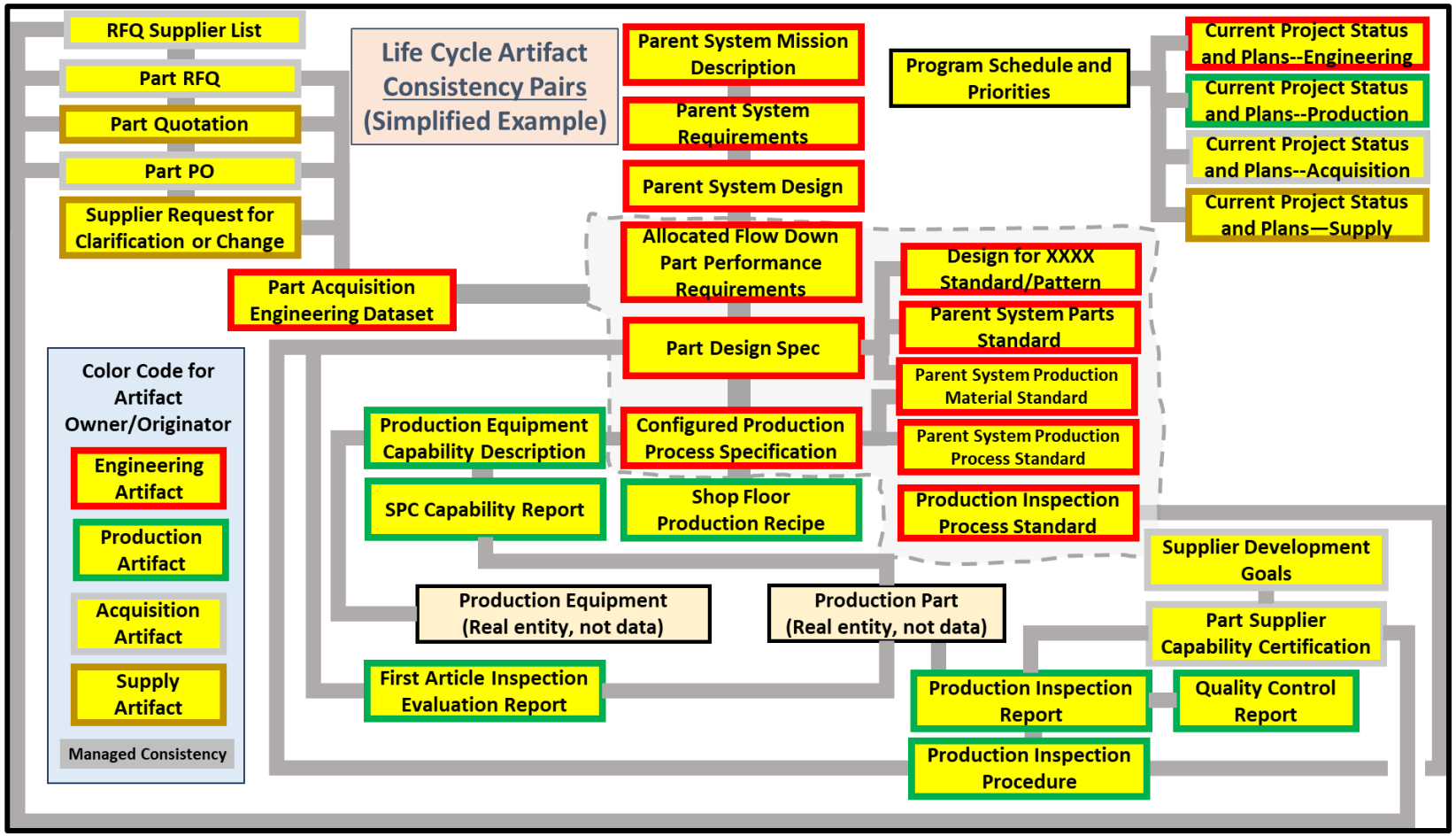
- Some users / appliers of the Ecosystem Pattern will want to use it to plan/populate/analyze:
  - At least a high level requirement allocation to the key Role instances—including those of the supply chain;
  - An assertion as to the capability of the allocated Design Component to satisfy those high level requirements.
- An ASELCM S2 Pattern library of Design Component types can be instantiated based on population of the S2 Level 2 Role instances is shown again below:
  - Enterprise or Ecosystem specific name lists of these are typically inserted.





Exercise

- All this “runs on” the fuel of the information Artifacts, so . . .
- Discuss who (on this team) is generating which of these (and other!) artifacts for use in customer programs. . .



Homework assignment

For programs you are involved in now, soon, or in the past . . .

1. Name two artifact types, which could be / ought to be compared for consistency. Are there artifact pairs for which consistency amounts to something other than just occurrence of “equal values” in the two artifacts?
2. Describe in detail the consistency sought for that pair. What knowledge does a human (subject matter expert) reviewer of the artifacts know if they are consistent with each other?

Discussion, Q&A.

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Attachment: Selection of FPK Values Populates Interactions, Which in Turn Populate Roles

Earlier material above

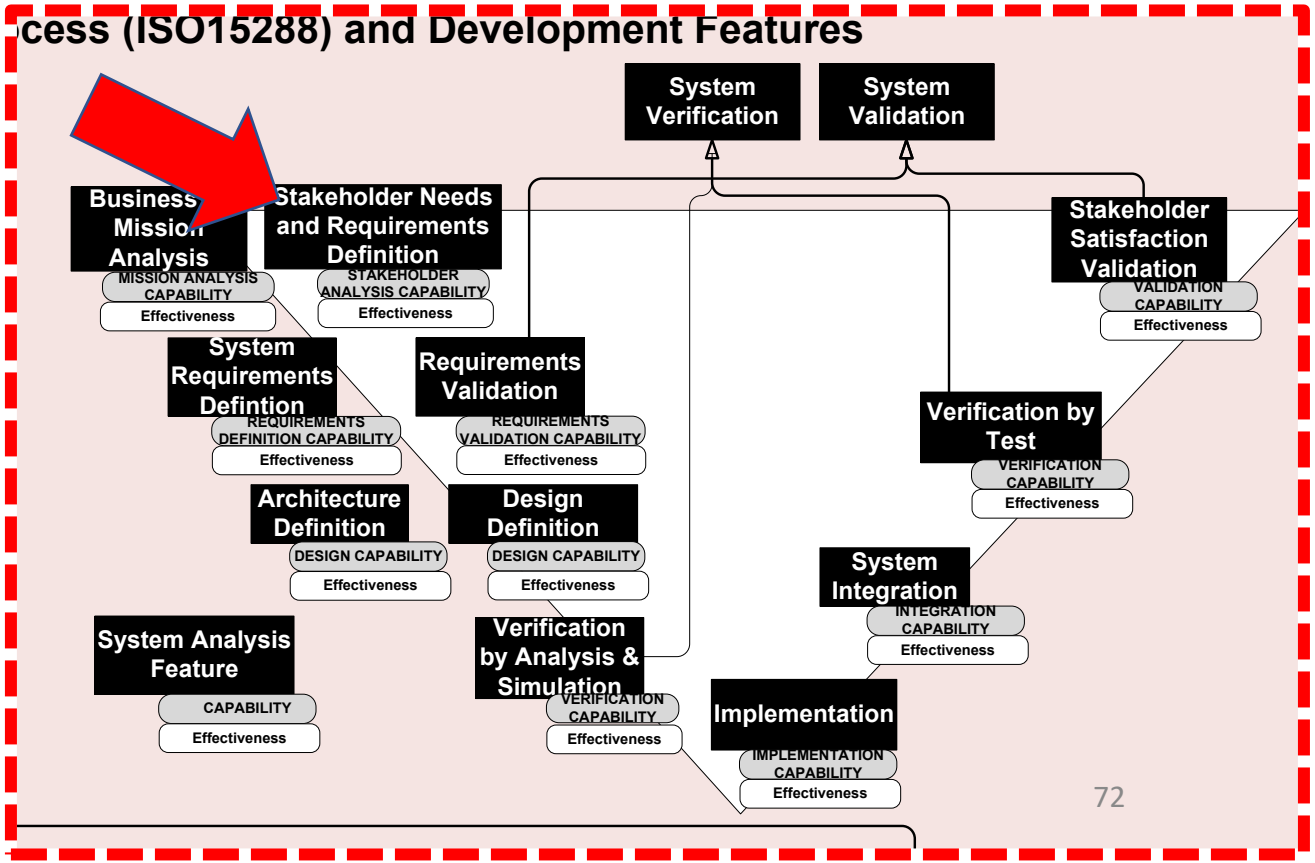
- Feature: Mission or Business Analysis

Additional cases in following attachment pages

- Feature: Stakeholder Needs and Requirements Definition
- Feature: System Requirements Definition

Feature: Stakeholder Needs and Requirements Definition

- Feature Primary Key (capability) options: (okay to populate multiple)
  - Stakeholder Informed
  - Experience Pattern Informed
  - Simulation Informed
  - System Requirements Feedback Informed
  - Observation Informed
  - Mission Informed
  - Stakeholder Requirements Reconciliation and Report



Configuration Rules for Populating Interactions from Selected Features (In SysML Cameo Modeler)

Feature	FPK	Interaction	IPK Rule

Feature-Interaction Rules Table

IF . . . .

Features

FPK Value

THEN . . . .

Interactions

IPK Value

- Relations
- Pattern Feature Interactions
- Pattern Functional Interactions
- Pattern Input-Output Attributes File
- Pattern Input-Outputs
- Pattern Interaction Overview Diagram
- Pattern Interaction Roles
- Pattern Interaction States
- Pattern Requirements
- IO Test
- Accept Project Plan, Assemble Resources, Kick Off Project
- Access Peer, Child, or Parent System Common Model Data
- Account to Sponsors for Project
- Analyze Consistency with Common Model
- Analyze Consistency with Common Model Wrapper
- Analyze Consistency with Local Model
- Attend Scrum, Track Progress
- Collect Local Observation Data for Common Analysis
- Collect Pattern Usage and Stakeholder Feedback
- Conduct Project Milestone Reviews
- Configure and Value Model Credibility Analysis Framework
- Configure Experience Pattern for Stakeholder Inputs
- Configure Parent Pattern for Stakeholder Inputs
- Design, Implement and Qualify Experiment and Observational Capability
- Direct Learning Source Data Delivery
- Generate and Capture Model View and Query Data
- Generate and Capture Simulation Data
- Generate Consistency Base and Reconciliation Reports
- Generate Model Credibility, VVUQ Report
- Generate or Update Model Implementation
- Generate or Update Model Requirements
- Generate or Update Model Verification
- Generate or Update Model-Based Hypothesis
- Generate or Update System Black Box Domains-Features-Interactions-States-F

#	Type	FPK Value	Type	△ IPK Rule
216	FT Requirements Validation	Stakeholder Informed	FI Stakeholder Information, Inputs, Reaction...	FPK+/ReqsValidation/
217	FT Requirements Validation	Observation Informed	FI Monitor, Exercise, Test, and Capture System Status and Behavior	FPK+/ReqsValidation/
218	FT Requirements Validation	Simulation Informed	FI Generate and Capture Simulation Data	FPK+/ReqsValidation/
219	FT Requirements Validation	*ANY*	FI Identify System Model of Interest, Info Segments	FPK+/ReqsValidation/
220	FT Stakeholder Needs and Requirements Definition	Experience Pattern Informed	FI Configure Experience Pattern for Stakeholder Inputs	FPK+/StkhldrNeedsRqsAnalys/
221	FT Stakeholder Needs and Requirements Definition	Simulation Informed	FI Generate and Capture Simulation Data	FPK+/StkhldrNeedsRqsAnalys/
222	FT Stakeholder Needs and Requirements Definition	Observation Informed	FI Monitor, Exercise, Test, and Capture System Status and Behavior	FPK+/StkhldrNeedsRqsAnalys/
223	FT Stakeholder Needs and Requirements Definition	Stakeholder Informed	FI Monitor, Stimulate, and Capture Stakeholder Information, Inputs, Reaction...	FPK+/StkhldrNeedsRqsAnalys/
224	FT Stakeholder Needs and Requirements Definition	Experience Pattern Informed	FI Analyze Consistency with Local Model	FPK+/StkhldrNeedsRqsAnalys/
225	FT Stakeholder Needs and Requirements Definition	Simulation Informed	FI Analyze Consistency with Local Model	FPK+/StkhldrNeedsRqsAnalys/
226	FT Stakeholder Needs and Requirements Definition	Observation Informed	FI Analyze Consistency with Local Model	FPK+/StkhldrNeedsRqsAnalys/
227	FT Stakeholder Needs and Requirements Definition	Stakeholder Informed	FI Analyze Consistency with Local Model	FPK+/StkhldrNeedsRqsAnalys/
228	FT Stakeholder Needs and Requirements Definition	Mission Informed	FI Analyze Consistency with Local Model	FPK+/StkhldrNeedsRqsAnalys/
229	FT Stakeholder Needs and Requirements Definition	System Requirements Feedback Informed	FI Analyze Consistency with Local Model	FPK+/StkhldrNeedsRqsAnalys/
230	FT Stakeholder Needs and Requirements Definition	*ANY*	FI Identify Modeled System of Interest, Info Segments	FPK+/StkhldrNeedsRqsAnalys/
231	FT Stakeholder Needs and Requirements Definition	*ANY*	FI Identify System Model of Interest, Info Segments	FPK+/StkhldrNeedsRqsAnalys/
232	FT Stakeholder Needs and Requirements Definition	*ANY*	FI Identify, Authenticate Accessor and Manage Session	FPK+/StkhldrNeedsRqsAnalys/
233	FT System Requirements Definition	Experience Pattern Informed	FI Configure Experience Pattern for Stakeholder Inputs	FPK+/SysReqsDef/
234	FT System Requirements Definition	Simulation Informed	FI Generate and Capture Simulation Data	FPK+/SysReqsDef/
235	FT System Requirements Definition	Observation Informed	FI Monitor, Exercise, Test, and Capture System Status and Behavior	FPK+/SysReqsDef/
236	FT System Requirements Definition	Stakeholder Informed	FI Monitor, Stimulate, and Capture Stakeholder Information, Inputs, Reaction...	FPK+/SysReqsDef/

Show Description

Filter is not applied. **266** rows are displayed in the table.

Ready

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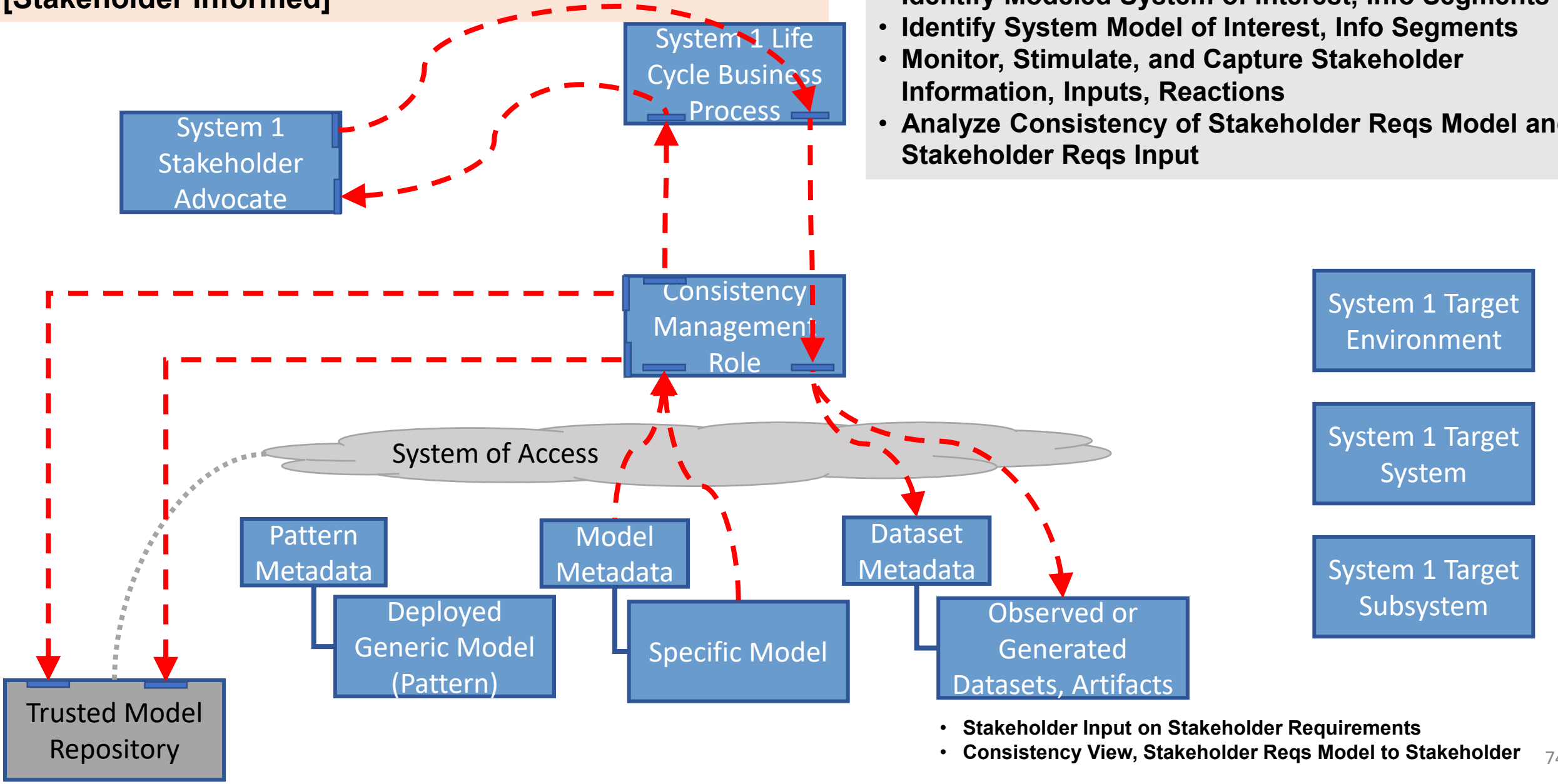
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11/1/2021

Feature: Stakeholder Needs and Requirements Definition
Primary Key Value: (Capability)
[Stakeholder Informed]

Interactions:

- Identify, Authenticate Accessor & Manage Session
- Identify Modeled System of Interest, Info Segments
- Identify System Model of Interest, Info Segments
- Monitor, Stimulate, and Capture Stakeholder Information, Inputs, Reactions
- Analyze Consistency of Stakeholder Reqs Model and Stakeholder Reqs Input

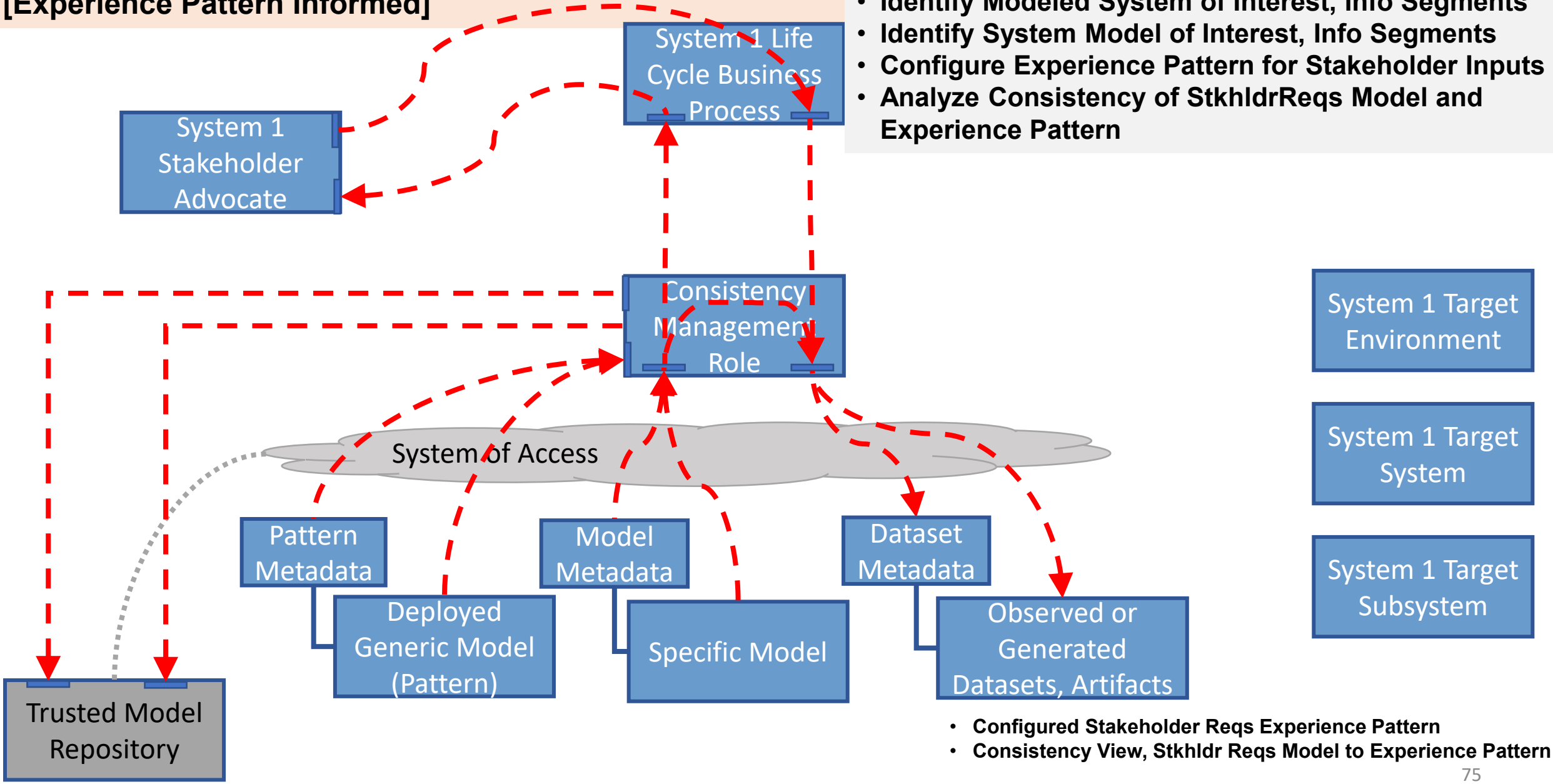


- Stakeholder Input on Stakeholder Requirements
- Consistency View, Stakeholder Reqs Model to Stakeholder

Feature: Stakeholder Needs and Requirements Definition
Primary Key Value: (Capability)
[Experience Pattern Informed]

Interactions:

- Identify, Authenticate Accessor & Manage Session
- Identify Modeled System of Interest, Info Segments
- Identify System Model of Interest, Info Segments
- Configure Experience Pattern for Stakeholder Inputs
- Analyze Consistency of StkhldrReqs Model and Experience Pattern

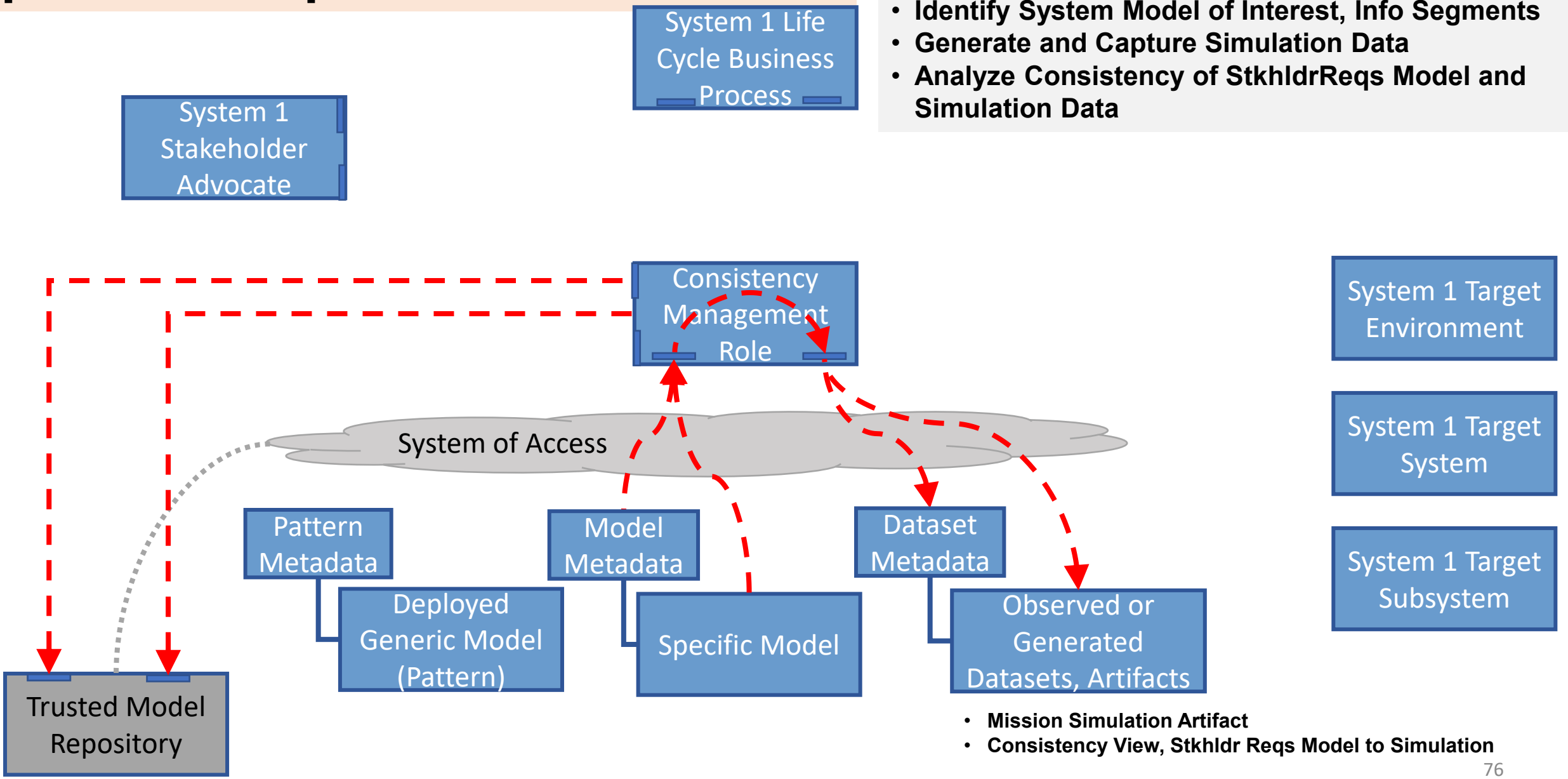


- Configured Stakeholder Reqs Experience Pattern
- Consistency View, Stkhldr Reqs Model to Experience Pattern

Feature: Stakeholder Needs and Requirements Definition
Primary Key Value: (Capability)
[Simulation Informed]

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Generate and Capture Simulation Data**
- **Analyze Consistency of StkhldrReqs Model and Simulation Data**

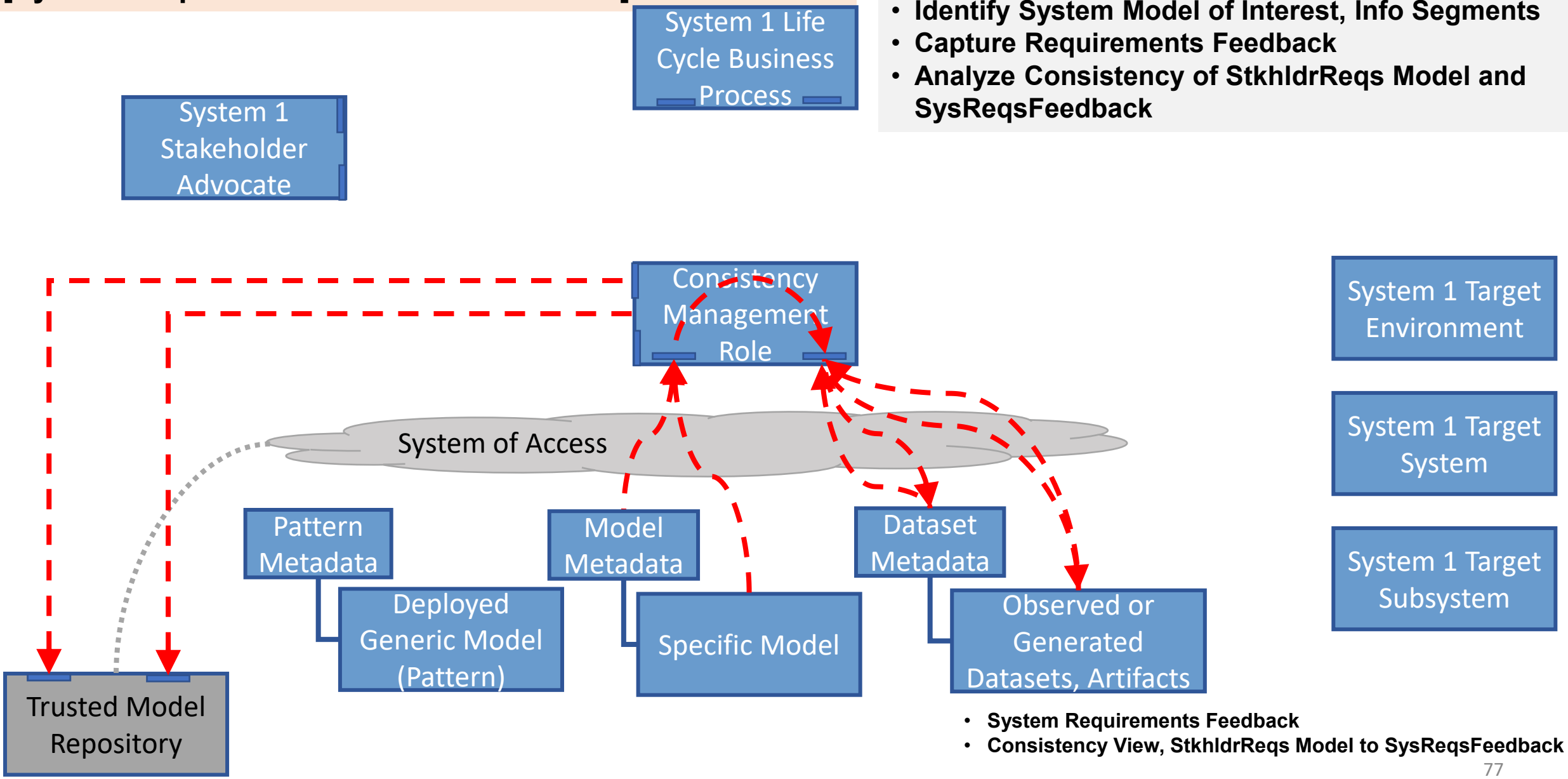


- **Mission Simulation Artifact**
- **Consistency View, Stkhldr Reqs Model to Simulation**

Feature: Stakeholder Needs and Requirements Definition
Primary Key Value: (Capability)
[System Requirements Feedback Informed]

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Capture Requirements Feedback**
- **Analyze Consistency of StkhldrReqs Model and SysReqsFeedback**

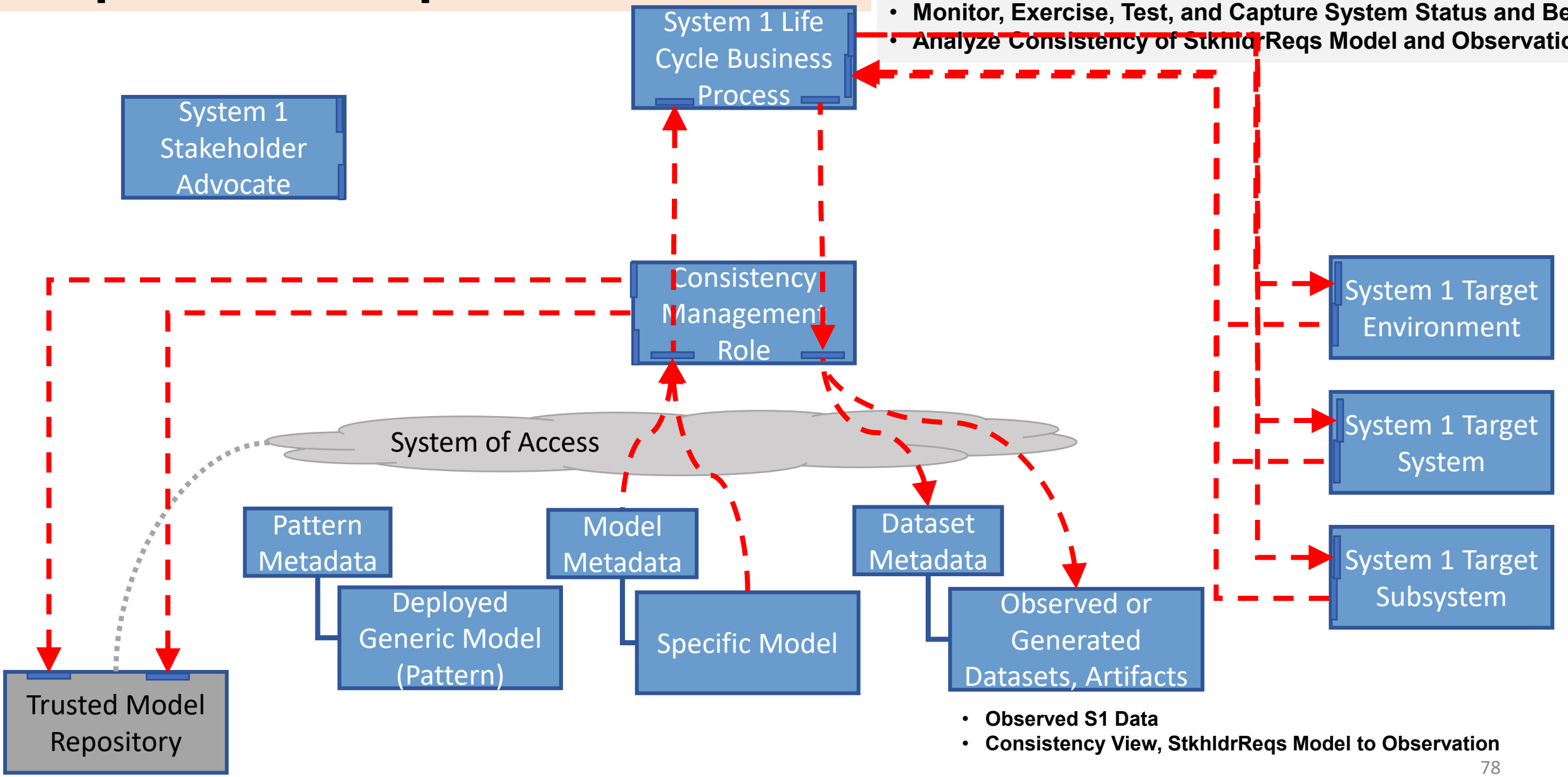


- **System Requirements Feedback**
- **Consistency View, StkhldrReqs Model to SysReqsFeedback**

Feature: Stakeholder Needs and Requirements Definition
Primary Key Value: (Capability)
[Observation Informed]

Interactions:

- Identify, Authenticate Accessor & Manage Session
- Identify Modeled System of Interest, Info Segments
- Identify System Model of Interest, Info Segments
- Monitor, Exercise, Test, and Capture System Status and Behav
- Analyze Consistency of StkhldrReqs Model and Observation

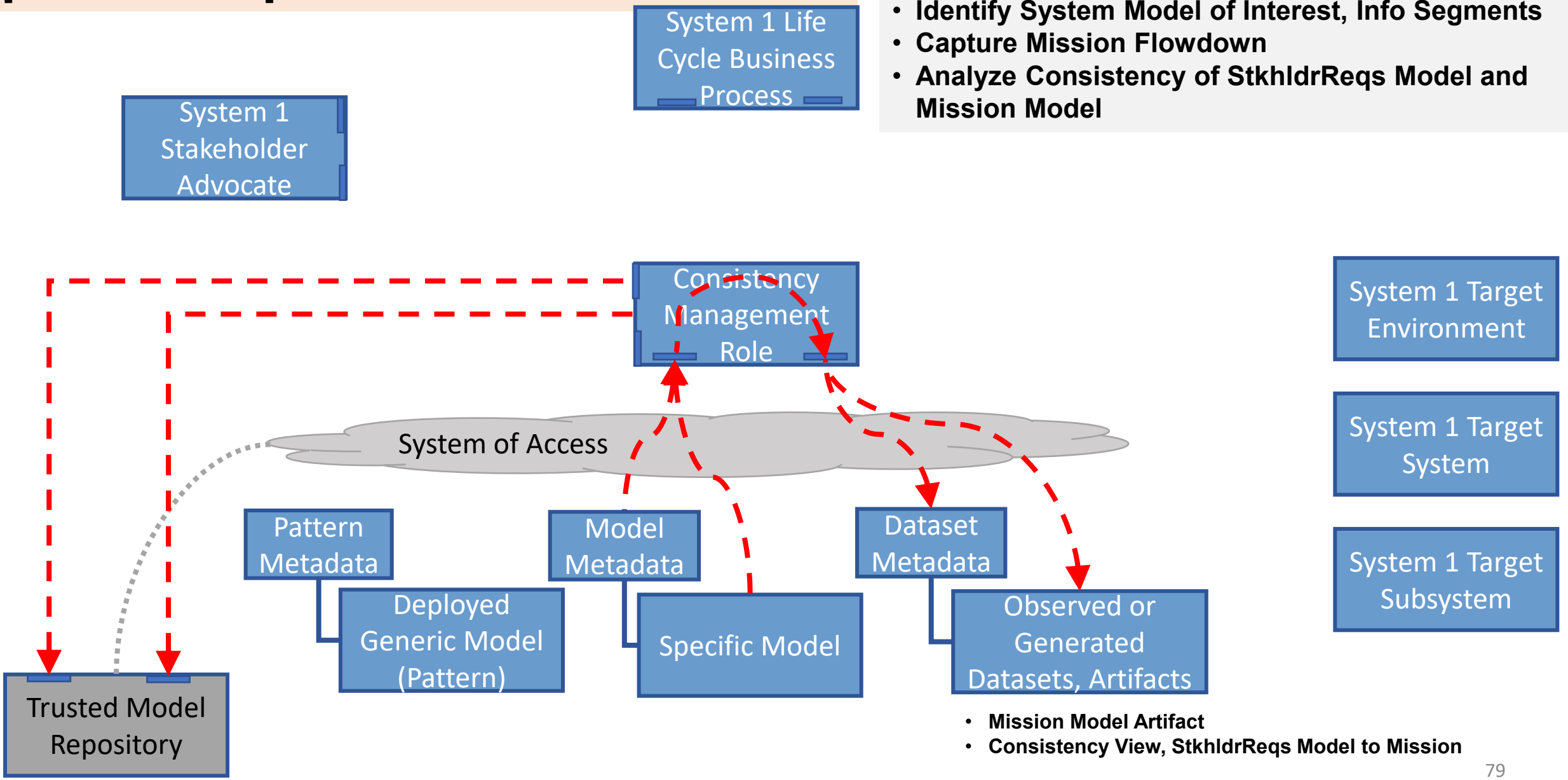


- Observed S1 Data
- Consistency View, StkhldrReqs Model to Observation

Feature: Stakeholder Needs and Requirements Definition
Primary Key Value: (Capability)
[Mission Informed]

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Capture Mission Flowdown**
- **Analyze Consistency of StkhldrReqs Model and Mission Model**

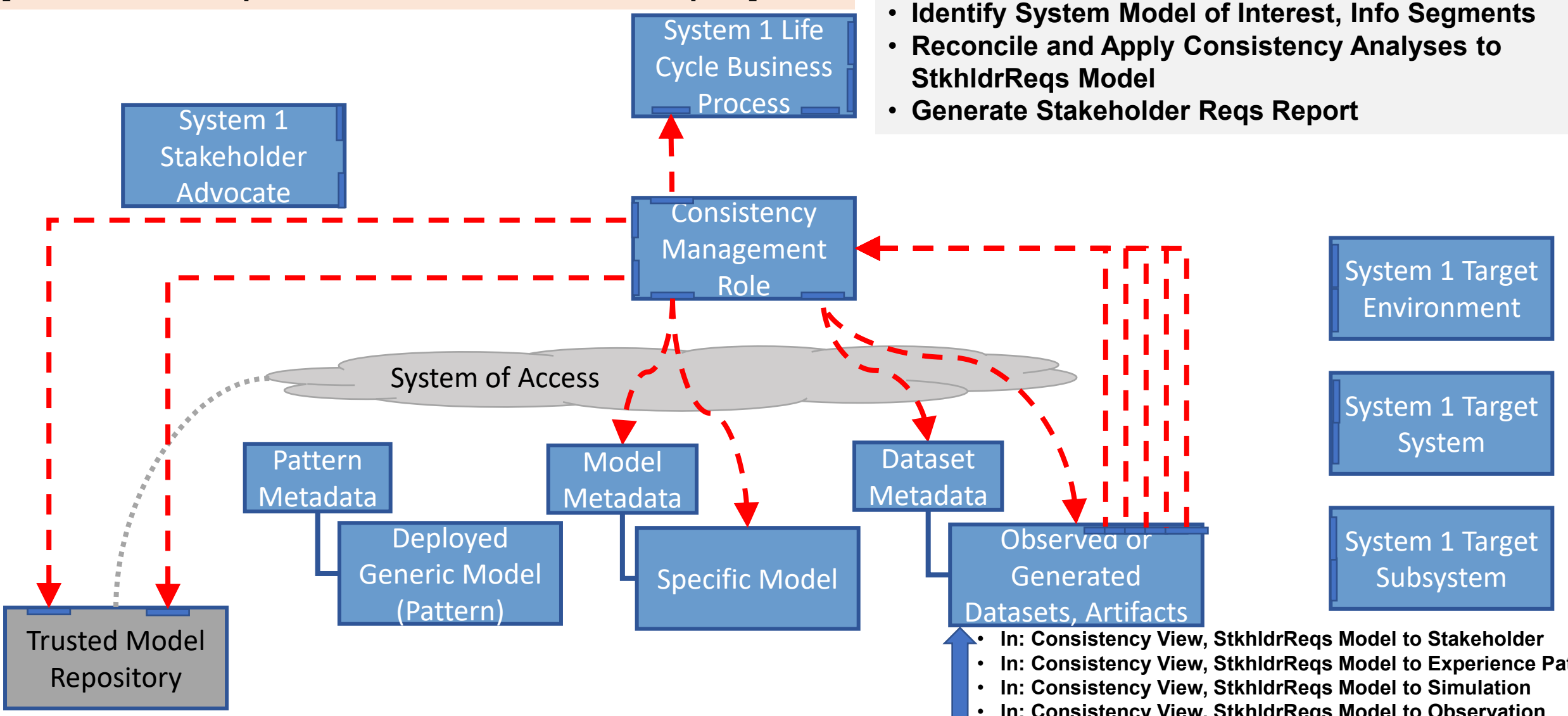


- **Mission Model Artifact**
- **Consistency View, StkhldrReqs Model to Mission**

Feature: Stakeholder Needs and Requirements Definition
Primary Key Value: (Capability)
[Stakeholder Requirements Reconciliation & Report]

Interactions:

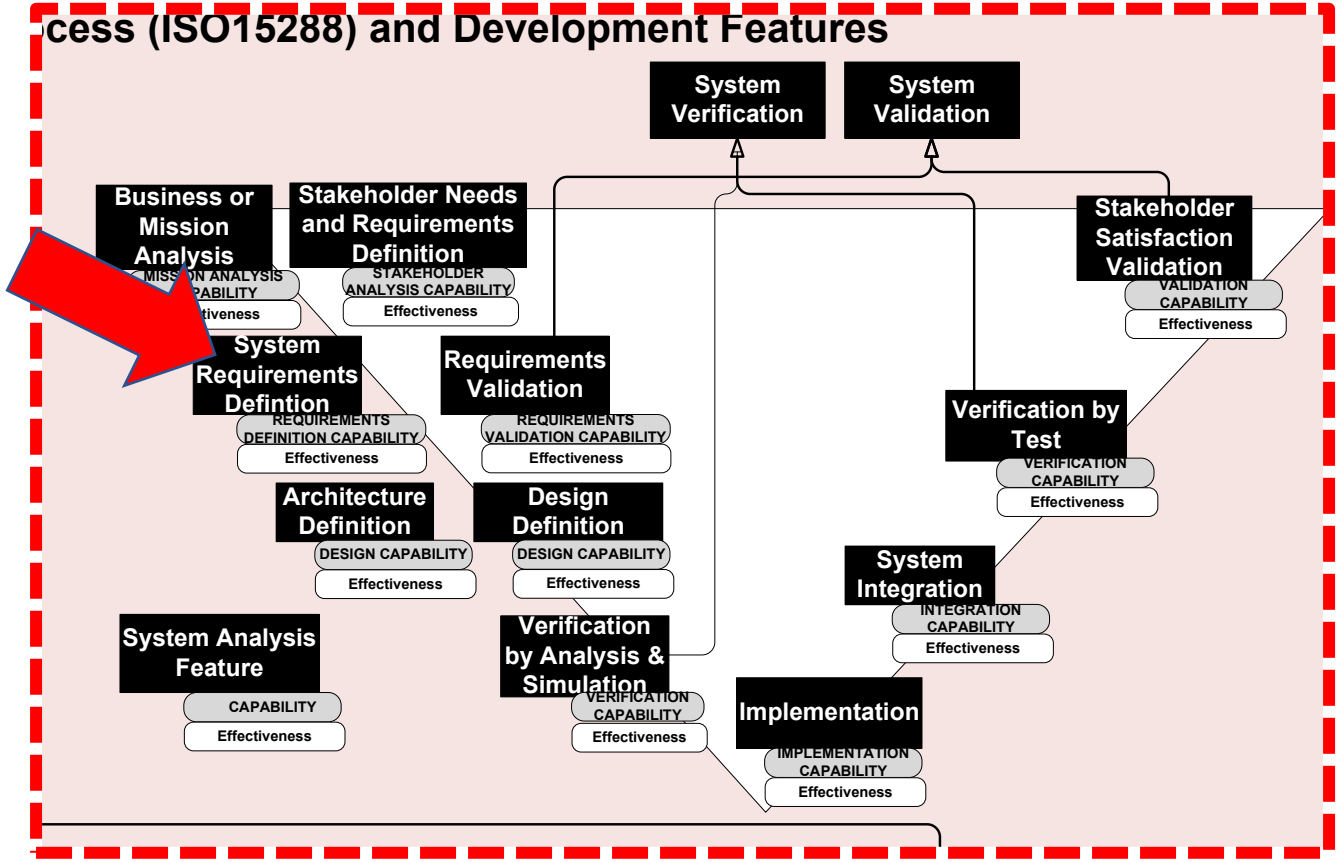
- Identify, Authenticate Accessor & Manage Session
- Identify Modeled System of Interest, Info Segments
- Identify System Model of Interest, Info Segments
- Reconcile and Apply Consistency Analyses to StkhldrReqs Model
- Generate Stakeholder Reqs Report



- In: Consistency View, StkhldrReqs Model to Stakeholder
- In: Consistency View, StkhldrReqs Model to Experience Pattern
- In: Consistency View, StkhldrReqs Model to Simulation
- In: Consistency View, StkhldrReqs Model to Observation
- In: Consistency View, StkhldrReqs Model to Stakeholder Reqs
- Out: Stakeholder Reqs Analysis Report
- Out: StkhldrReqs Feedback to Mission

Feature: System Requirements Definition

- Feature Primary Key (capability) options: (okay to populate multiple)
  - Stakeholder Informed
  - Experience Pattern Informed
  - Simulation Informed
  - System Design Feedback Informed
  - Observation Informed
  - Stakeholder Requirements Informed
  - Flow Down Requirements Informed
  - System Requirements Reconciliation and Report



Configuration Rules for Populating Interactions from Selected Features (In SysML Cameo Modeler)

Feature	FPK	Interaction	IPK Rule

Feature-Interaction Rules Table

IF . . . .

Features

FPK Value

THEN . . . .

Interactions

IPK Value

Pattern Feature Interactions
Pattern Functional Interactions
Pattern Input-Output Attributes File
Pattern Input-Outputs
Pattern Interaction Overview Diagram
Pattern Interaction Roles
Pattern Interaction States
Pattern Requirements
IO Test
Accept Project Plan, Assemble Resources, Kick Off Project
Access Peer, Child, or Parent System Common Model Data
Account to Sponsors for Project
Analyze Consistency with Common Model
Analyze Consistency with Common Model Wrapper
Analyze Consistency with Local Model
Attend Scrum, Track Progress
Collect Local Observation Data for Common Analysis
Collect Pattern Usage and Stakeholder Feedback
Conduct Project Milestone Reviews
Configure and Value Model Credibility Analysis Framework
Configure Experience Pattern for Stakeholder Inputs
Configure Parent Pattern for Stakeholder Inputs
Design, Implement and Qualify Experiment and Observational
Direct Learning Source Data Delivery
Generate and Capture Model View and Query Data
Generate and Capture Simulation Data
Generate Consistency Base and Reconciliation Reports
Generate Model Credibility, VVUQ Report
Generate or Update Model Implementation
Generate or Update Model Requirements
Generate or Update Model Verification
Generate or Update Model-Based Hypothesis
Generate or Update System Black Box Domains-Features-Inter
Generate Pattern Configurability and Reuse Report

	Type (Role B)	FPK Value	Type (Role A)	IPK Rule
	FT System Integration	Integration Report	FI Model	/Integration/
	FT System Integration	Integration Report	FI Reconcile and Apply Consistency Analyses to Target System	/Integration/
433	FT System Requirements Definition	MBSE Black Box Capability	FI Analyze Consistency with Local Model	FPK+/SysReqsDef/
434	FT System Requirements Definition	Flow Down Requirements Informed	FI Analyze Consistency with Local Model	FPK+/SysReqsDef/
435	FT System Requirements Definition	Stakeholder Informed	FI Analyze Consistency with Local Model	FPK+/SysReqsDef/
436	FT System Requirements Definition	Observation Informed	FI Analyze Consistency with Local Model	FPK+/SysReqsDef/
437	FT System Requirements Definition	Experience Pattern Informed	FI Analyze Consistency with Local Model	FPK+/SysReqsDef/
438	FT System Requirements Definition	Simulation Informed	FI Analyze Consistency with Local Model	FPK+/SysReqsDef/
439	FT System Requirements Definition	Stakeholder Requirements Informed	FI Analyze Consistency with Local Model	FPK+/SysReqsDef/
440	FT System Requirements Definition	Design Feedback Informed	FI Analyze Consistency with Local Model	FPK+/SysReqsDef/
441	FT System Requirements Definition	Experience Pattern Informed	FI Configure Experience Pattern for Stakeholder Inputs	FPK+/SysReqsDef/
442	FT System Requirements Definition	Simulation Informed	FI Generate and Capture Simulation Data	FPK+/SysReqsDef/
443	FT System Requirements Definition	System Requirements Report	FI Generate Consistency Base and Reconciliation Reports	/SysReqsDef/
444	FT System Requirements Definition	MBSE Black Box Capability	FI Generate or Update System Black Box Domains-Features-Interactions-States-Fitness Couplings-Requirements Models	FPK+/SysReqsDef/
445	FT System Requirements Definition	*ANY*	FI Identify Modeled System of Interest, Info Segments	FPK+/SysReqsDef/
446	FT System Requirements Definition	*ANY*	FI Identify System Model of Interest, Info Segments	FPK+/SysReqsDef/
447	FT System Requirements Definition	*ANY*	FI Identify, Authenticate Accessor and Manage Session	FPK+/SysReqsDef/
448	FT System Requirements Definition	Observation Informed	FI Monitor, Exercise, Test, and Capture System Status and Behavior	FPK+/SysReqsDef/
449	FT System Requirements Definition	Stakeholder Informed	FI Monitor, Stimulate, and Capture Stakeholder Information, Inputs, Reactions Inputs	FPK+/SysReqsDef/
450	FT System Requirements Definition	System Requirements Report	FI Reconcile and Apply Consistency Analyses to Local Model	/SysReqsDef/
451	FT Verification by Analysis and Simulation	Verification by Experience Pattern	FI Analyze Consistency with Local Model	FPK+/VerifyEarly/

Show Description

Filter is not applied. **470** rows are displayed in the table.

Ready

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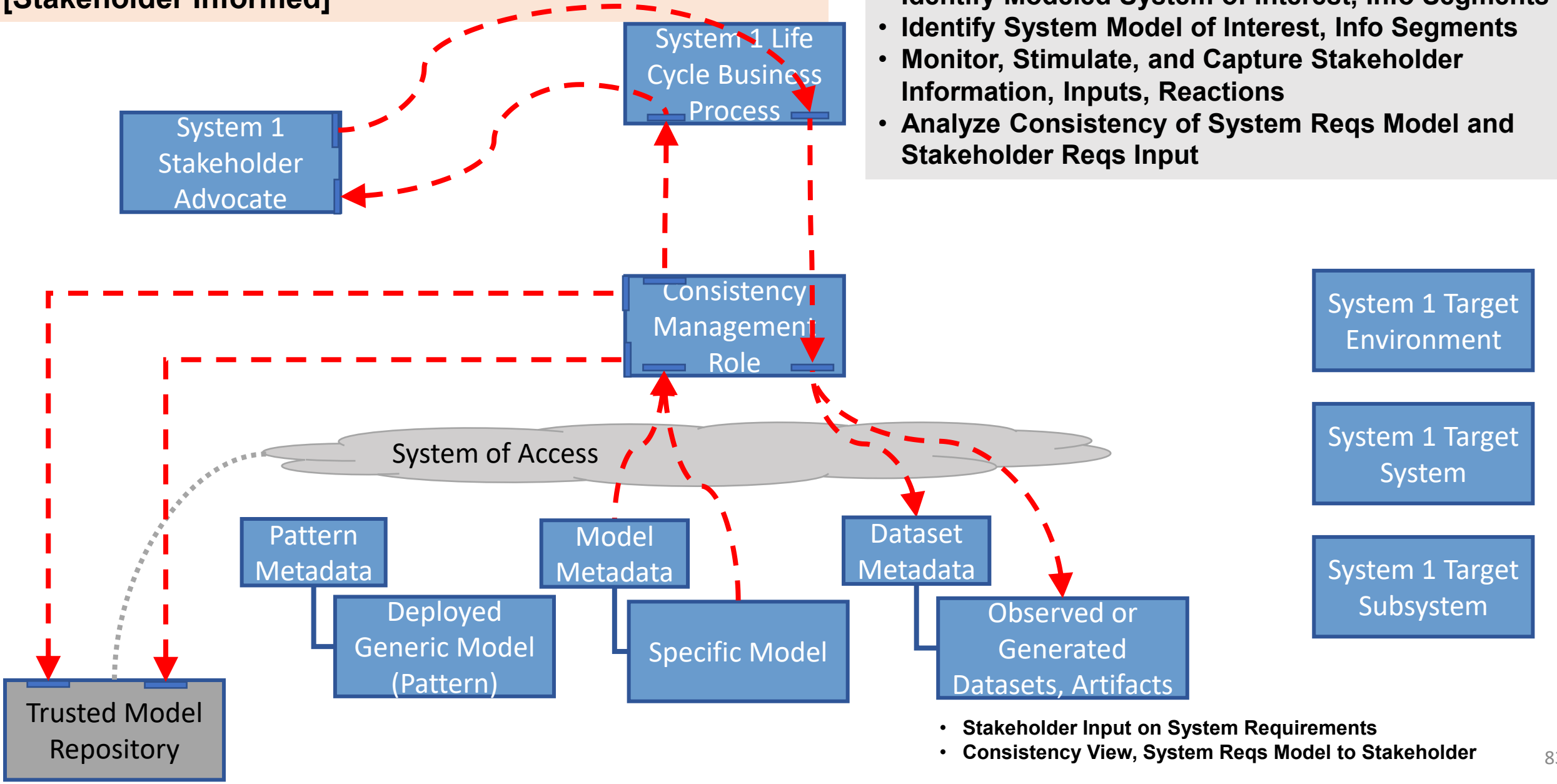
3 E

12:59 PM
12/9/2021

Feature: System Requirements Definition
Primary Key Value: (Capability)
[Stakeholder Informed]

Interactions:

- Identify, Authenticate Accessor & Manage Session
- Identify Modeled System of Interest, Info Segments
- Identify System Model of Interest, Info Segments
- Monitor, Stimulate, and Capture Stakeholder Information, Inputs, Reactions
- Analyze Consistency of System Reqs Model and Stakeholder Reqs Input

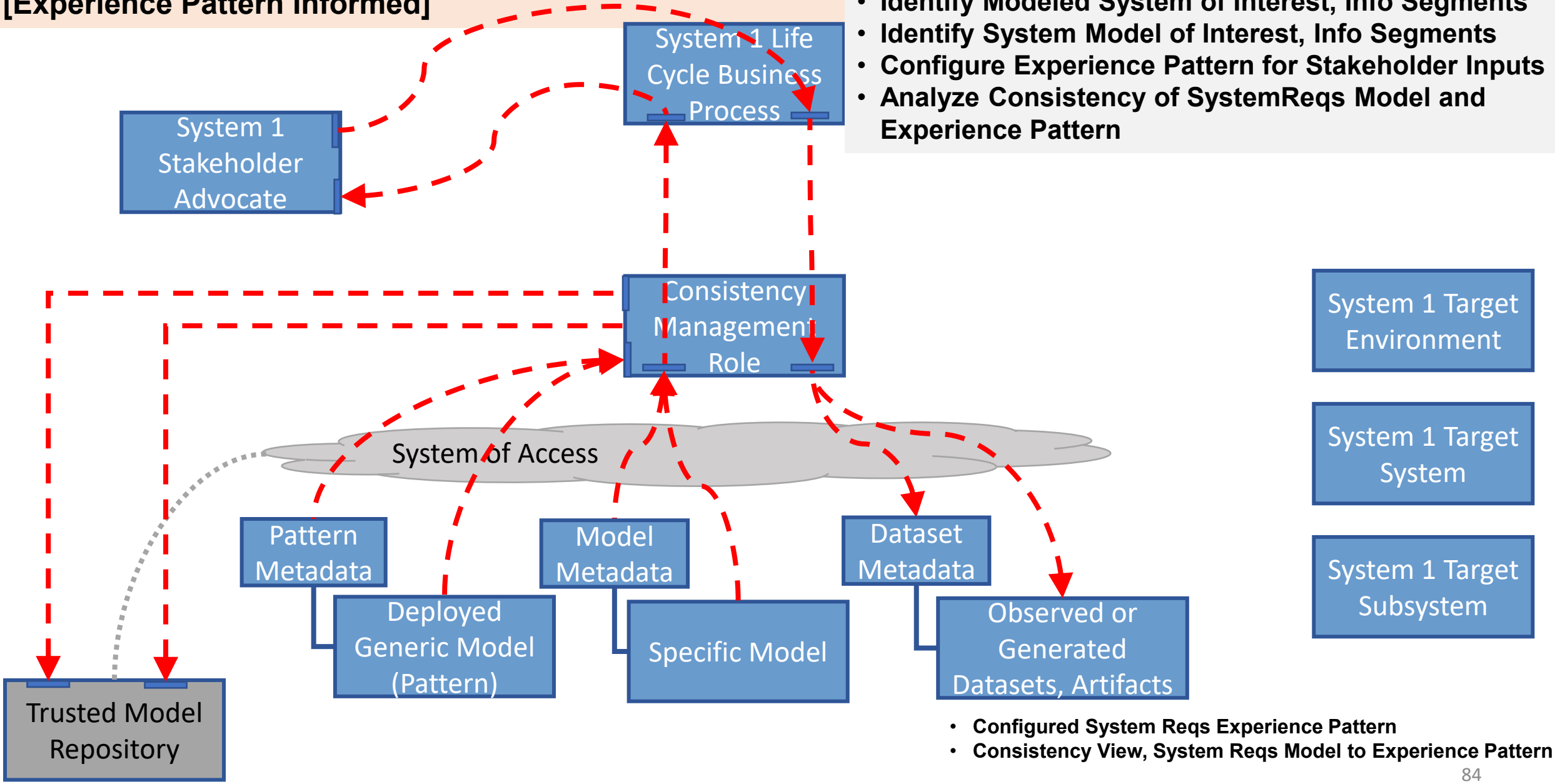


- Stakeholder Input on System Requirements
- Consistency View, System Reqs Model to Stakeholder

Feature: System Requirements Definition
Primary Key Value: (Capability)
[Experience Pattern Informed]

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Configure Experience Pattern for Stakeholder Inputs**
- **Analyze Consistency of SystemReqs Model and Experience Pattern**

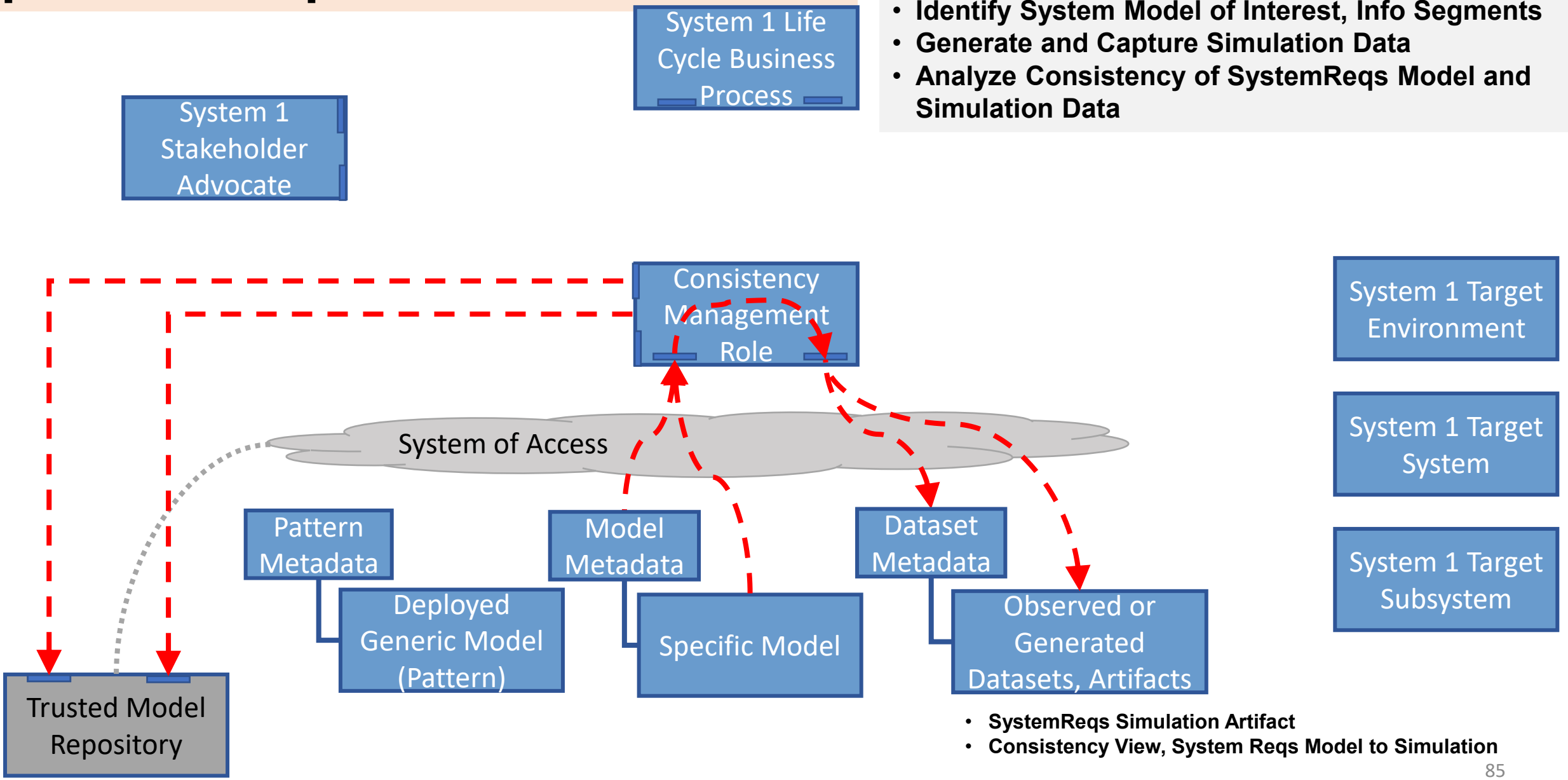


- **Configured System Reqs Experience Pattern**
- **Consistency View, System Reqs Model to Experience Pattern**

Feature: System Requirements Definition
Primary Key Value: (Capability)
[Simulation Informed]

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Generate and Capture Simulation Data**
- **Analyze Consistency of SystemReqs Model and Simulation Data**

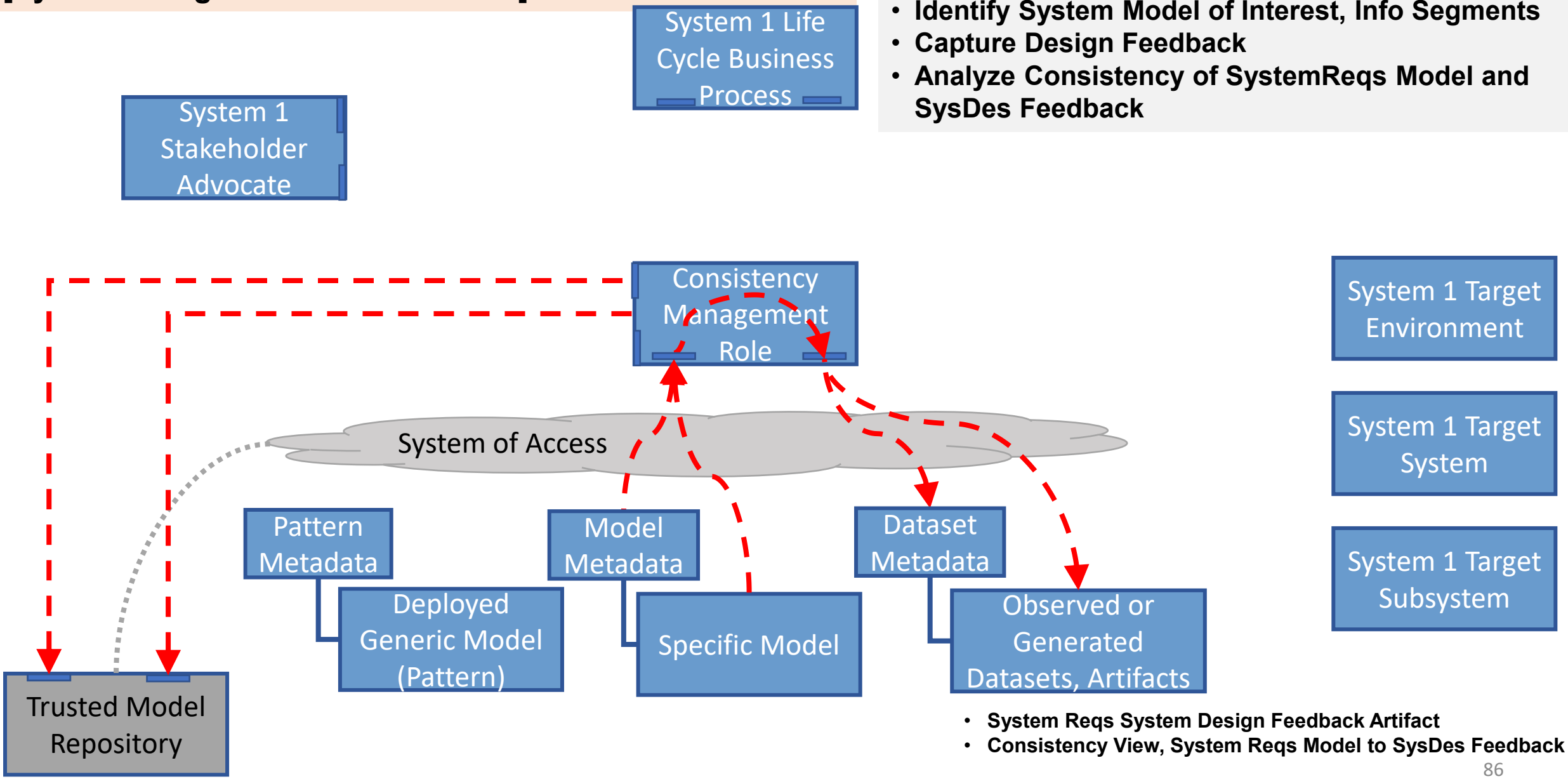


- **SystemReqs Simulation Artifact**
- **Consistency View, System Reqs Model to Simulation**

Feature: System Requirements Definition
Primary Key Value: (Capability)
[System Design Feedback Informed]

Interactions:

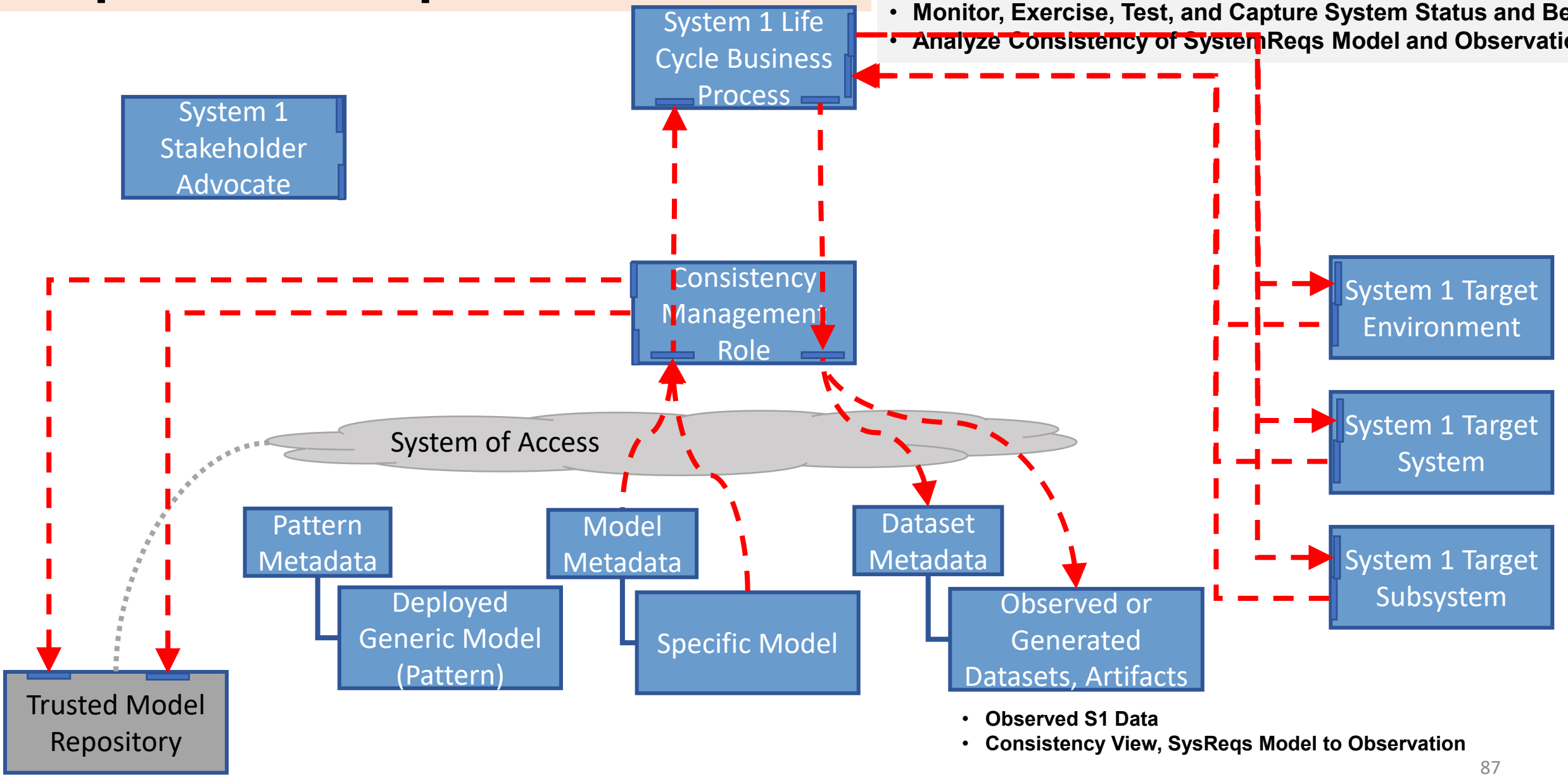
- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Capture Design Feedback**
- **Analyze Consistency of SystemReqs Model and SysDes Feedback**



- **System Reqs System Design Feedback Artifact**
- **Consistency View, System Reqs Model to SysDes Feedback**

Feature: System Requirements Definition
Primary Key Value: (Capability)
[Observation Informed]

Interactions:
- Identify, Authenticate Accessor & Manage Session
- Identify Modeled System of Interest, Info Segments
- Identify System Model of Interest, Info Segments
- Monitor, Exercise, Test, and Capture System Status and Behav
- Analyze Consistency of SystemReqs Model and Observation

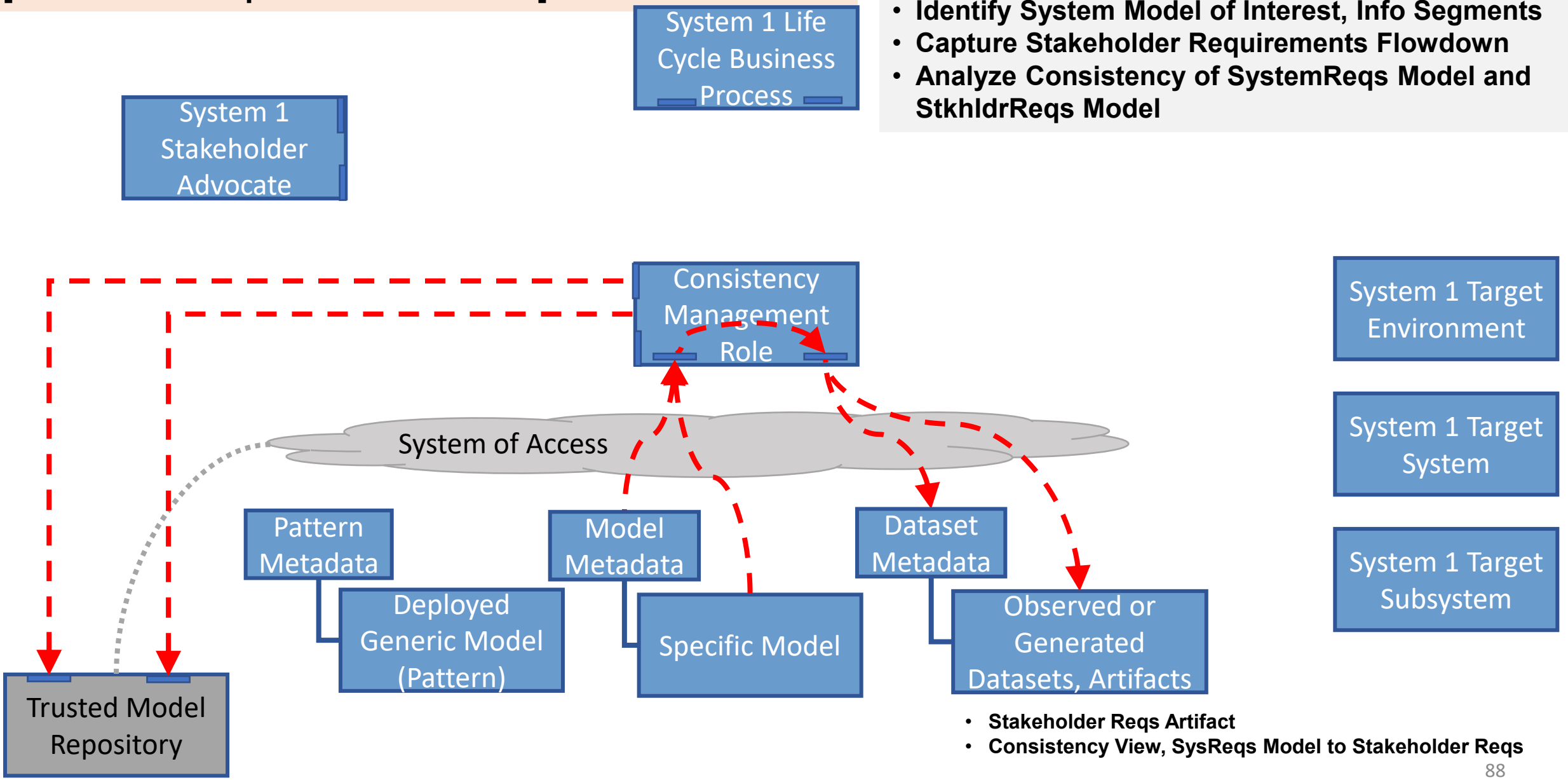


- Observed S1 Data
- Consistency View, SysReqs Model to Observation

Feature: System Requirements Definition
Primary Key Value: (Capability)
[Stakeholder Requirements Informed]

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Capture Stakeholder Requirements Flowdown**
- **Analyze Consistency of SystemReqs Model and StkhldrReqs Model**

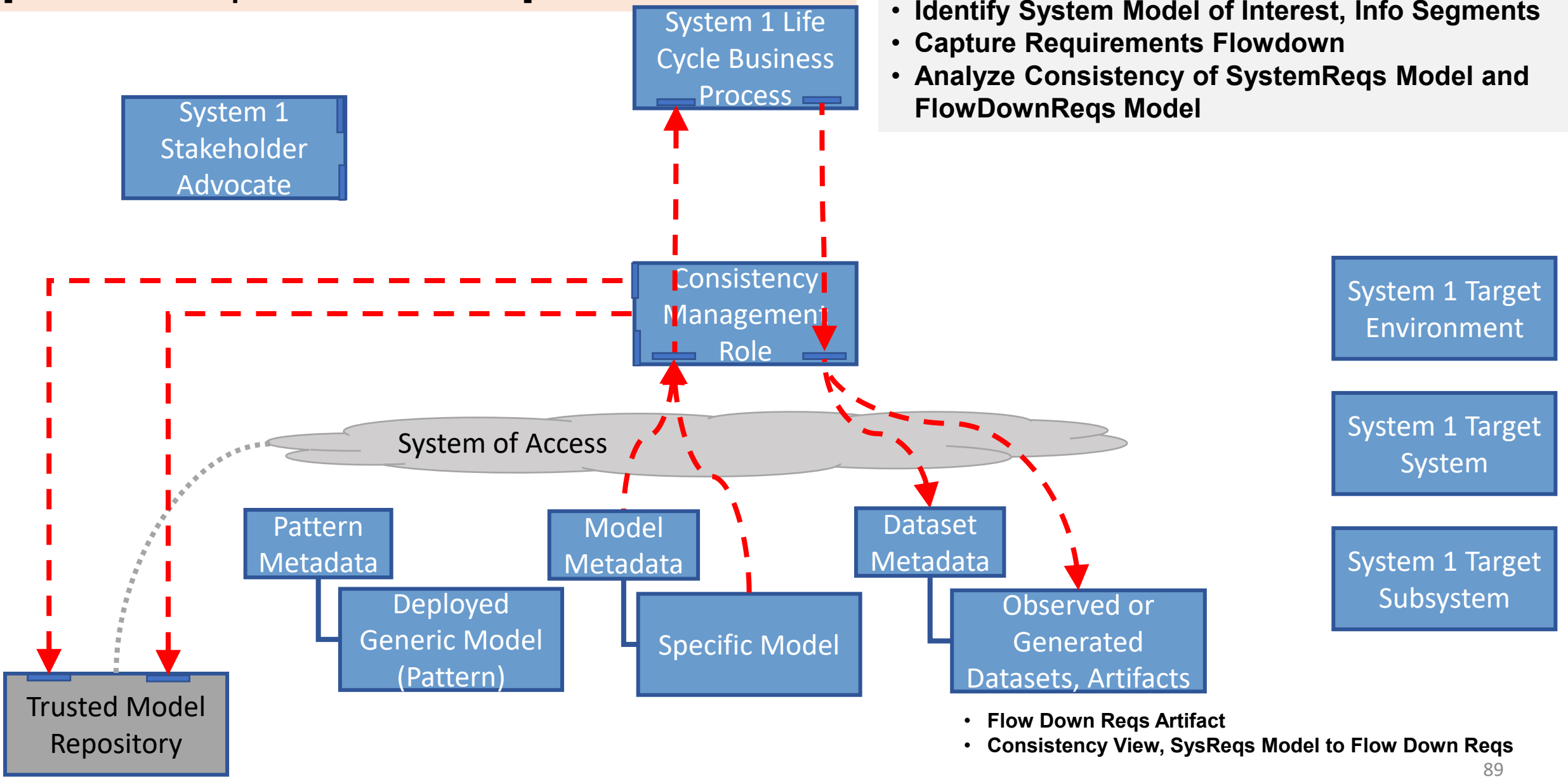


- **Stakeholder Reqs Artifact**
- **Consistency View, SysReqs Model to Stakeholder Reqs**

Feature: System Requirements Definition
Primary Key Value: (Capability)
[Flow Down Requirements Informed]

Interactions:

- **Identify, Authenticate Accessor & Manage Session**
- **Identify Modeled System of Interest, Info Segments**
- **Identify System Model of Interest, Info Segments**
- **Capture Requirements Flowdown**
- **Analyze Consistency of SystemReqs Model and FlowDownReqs Model**

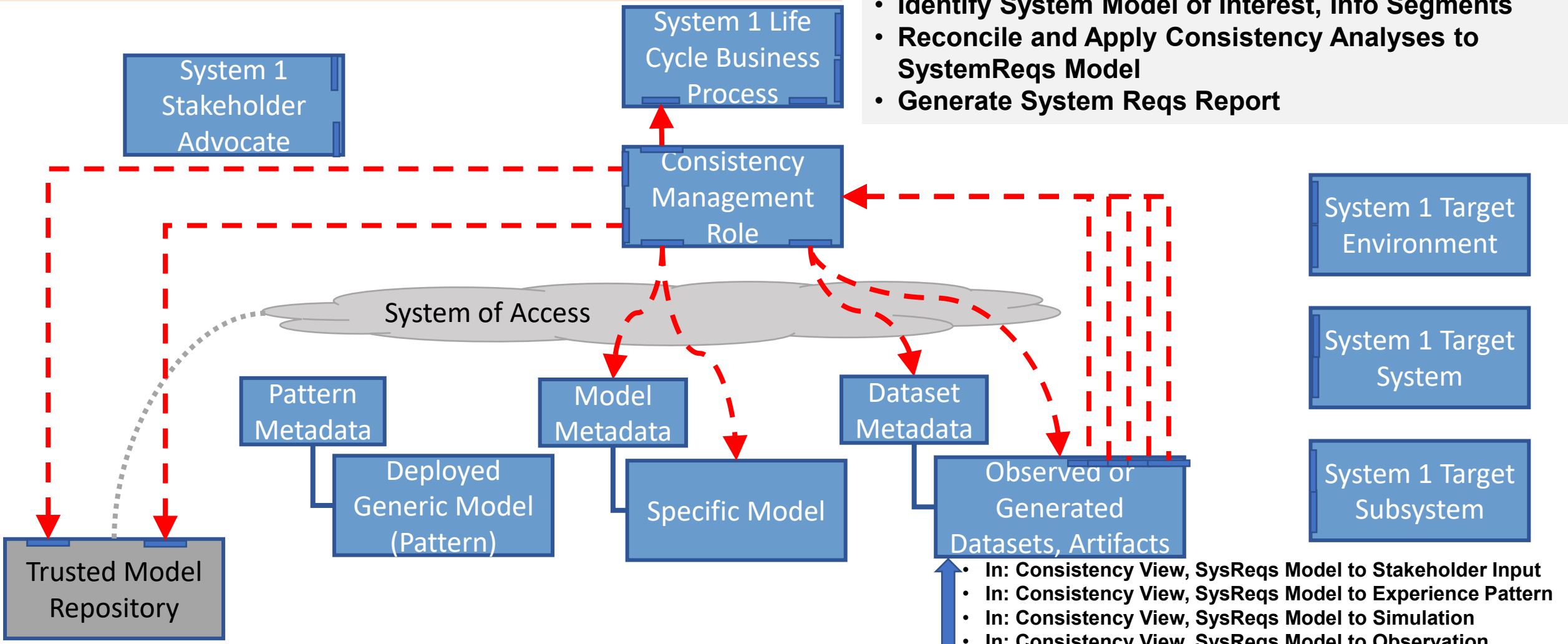


- **Flow Down Reqs Artifact**
- **Consistency View, SysReqs Model to Flow Down Reqs**

Feature: System Requirements Definition
Primary Key Value: (Capability)
[System Requirements Reconciliation & Report]

Interactions:

- Identify, Authenticate Accessor & Manage Session
- Identify Modeled System of Interest, Info Segments
- Identify System Model of Interest, Info Segments
- Reconcile and Apply Consistency Analyses to SystemReqs Model
- Generate System Reqs Report



- In: Consistency View, SysReqs Model to Stakeholder Input
- In: Consistency View, SysReqs Model to Experience Pattern
- In: Consistency View, SysReqs Model to Simulation
- In: Consistency View, SysReqs Model to Observation
- In: Consistency View, SysDes Feedback to Stakeholder Reqs
- In: Consistency View, SysReqs Model to Flowdown Reqs
- In: Consistency View, SysReqs Model to Stkhldr Reqs
- Out: Sys Reqs Analysis Report
- Out: SysReqs Feedback to Stkhldr Reqs