© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Full Lifecycle Modeling: Using Enterprise Architecture Updates to Guide Decentralized Organizations

Mr. John Schatz / SPEC Innovations
Director for Systems Engineering
Director for Test and Evaluation
571-485-7800
john.schatz@specinnovations.com

SPEC INNOVATIONS

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Overview

- Lifecycle Modeling Language Overview
- Enterprise Architecture and Systems Study Interrelation
- Systems Study Methodology
- Systems Study Data Manipulation
- Summary
- Backup Slides

SPEC INNOVATIONS

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

LIFECYCLE MODELING LANGUAGE (LML) OVERVIEW

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Lifecycle Modeling Language (LML)

- LML combines the logical constructs with an ontology to capture information
  - SysML – mainly constructs – limited ontology
  - DoDAF Metamodel 2.0 (DM2) ontology only
- LML simplifies both the “constructs” and ontology to make them more complete, yet easier to use
- Goal: A language that works across the full lifecycle

SPEC INNOVATIONS

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

LML Ontology* Overview

*Ontology = Taxonomy + relationships among terms and concepts
** Taxonomy = Collection of standardized, defined terms or concepts

- Taxonomy**:
  - 12 primary element classes
  - Many types of each element class
    - Action (types = Function, Activity, Task, etc.)
- Relationships: almost all classes related to each other and themselves with consistent words
  - Asset performs Action/Action performed by Asset
  - Hierarchies: decomposed by/decomposes
  - Peer-to-Peer: related to/relates

SPEC INNOVATIONS

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

LML Taxonomy

- Technical
  - Action
  - Artifact
  - Asset
  - Characteristic
  - Input/Output
  - Link
  - Statement
- Programmatic/Technical
  - Cost
  - Issue
  - Location
    - Physical, Orbital, Virtual
  - Risk
  - Time
    - Duration, Timeframe, Point-in-Time

SPEC INNOVATIONS

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

LML Relationships

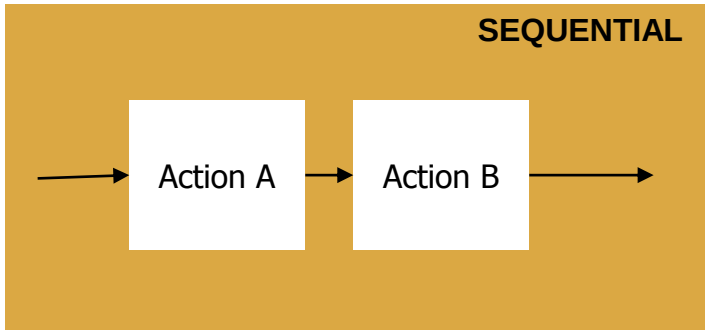
	ACTION	ARTIFACT	ASSET	CHARACTERISTIC	COST	INPUT/OUTPUT	ISSUE	LINK	LOCATION	RISK	STATEMENT	TIME	
ACTION	decomposed by related to	references	captures consumes preformed by produces	specified by	incurs	generates receives	causes resolves	-	located at	causes mitigates resolves	based on	takes occurs	ACTION
ARTIFACT	referenced by	decomposed by related to	referenced by	specified by referenced by	incurs referenced by	referenced by	causes referenced by	defines protocol for referenced by	located at	causes mitigates	based on referenced by	occurs	ARTIFACT
ASSET	captured by consumed by performs produced by	references	decomposed by orbited by related to	specified by	incurs	-	causes resolves responds to	connected by	located at	causes mitigates resolves	based on	occurs	ASSET
CHARACTERISTIC	specifies	references specifies	specifies	decomposed by related to	incurs specifies	specifies	causes resolves	specifies	located at	causes mitigates resolves	based on specifies	occurs	CHARACTERISTIC
COST	incurred by	incurred by references	incurred by	incurred by specified by	decomposed by related to	incurred by	causes incurred by resolves	incurred by	located at	causes incurred by resolves mitigates	cased on incurred by	occurs	COST
INPUT/OUTPUT	generated by received by	references	-	specified by	incurs	decomposed by related to	causes resolves	transferred by	located at	causes mitigates resolves	based on	occurs	INPUT/OUTPUT
ISSUE	caused by resolved by	caused by references resolved by	caused by resolved by responded by	caused by resolved by	caused by incurs resolved by	caused by resolved by	causes decomposed by related to resolved by	caused by resolved by	located at	caused by mitigates causes	caused by resolved by	date resolved by decision due occurs	ISSUE
LINK	-	defined protocol by references	connects to	specified by	incurs	transfers	causes resolves	decomposed by related to	located at	causes mitigates resolves	based on	delayed by occurs	LINK
LOCATION	locates	locates	locates	locates	locates	locates	locates	locates	decomposed by related to	locates mitigates	based on locates	occurs	LOCATION
RISK	caused by mitigated by resolved by	caused by mitigated by references resolved by	caused by mitigated by resolved by	caused by mitigated by resolved by	caused by incurs mitigated by resolved by	caused by mitigated by resolved by	caused by causes resolved by	caused by mitigated by resolved by	located at mitigated by	causes decomposed by related to resolved by	caused by mitigated by resolved by	occurs	RISK
STATEMENT	basis of	basis of references sourced by	basis of	basis of specified	basis of incurs	basis of	causes resolves	-	basis of located at	causes located at mitigates resolves	decomposed by related to	occurs	STATEMENT
TIME	taken by occurred by	occurred by	occurred by	occurred by	occurred by	occurred by	date resolves decided by occurred by	delays occurred by	occurred by	occurred by mitigates	occurred by	decomposed by related to	TIME
	ACTION	ARTIFACT	ASSET	CHARACTERISTIC	COST	INPUT/OUTPUT	ISSUE	LINK	LOCATION	RISK	STATEMENT	TIME	

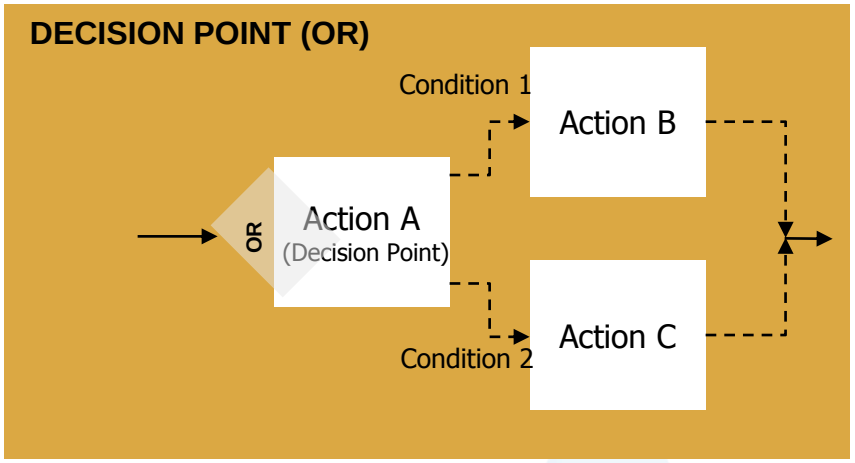
- decomposed by/decomposes
- orbited by/orbits
- related to/relates

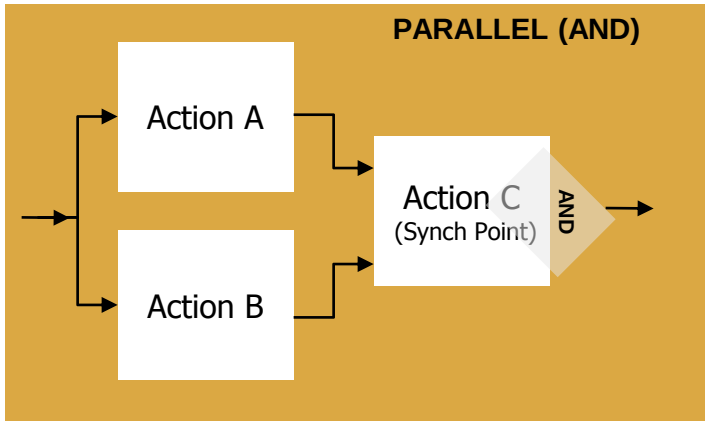
SPEC INNOVATIONS

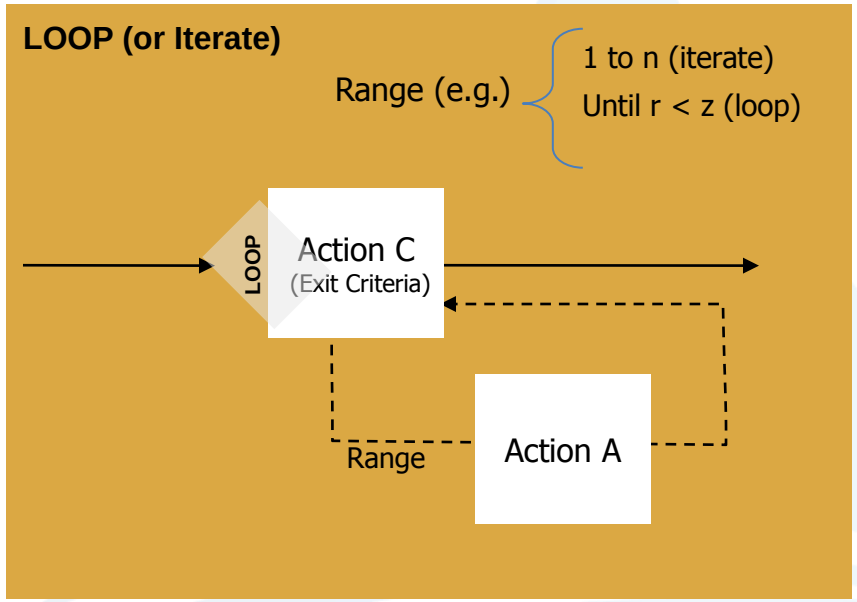
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

LML Logic









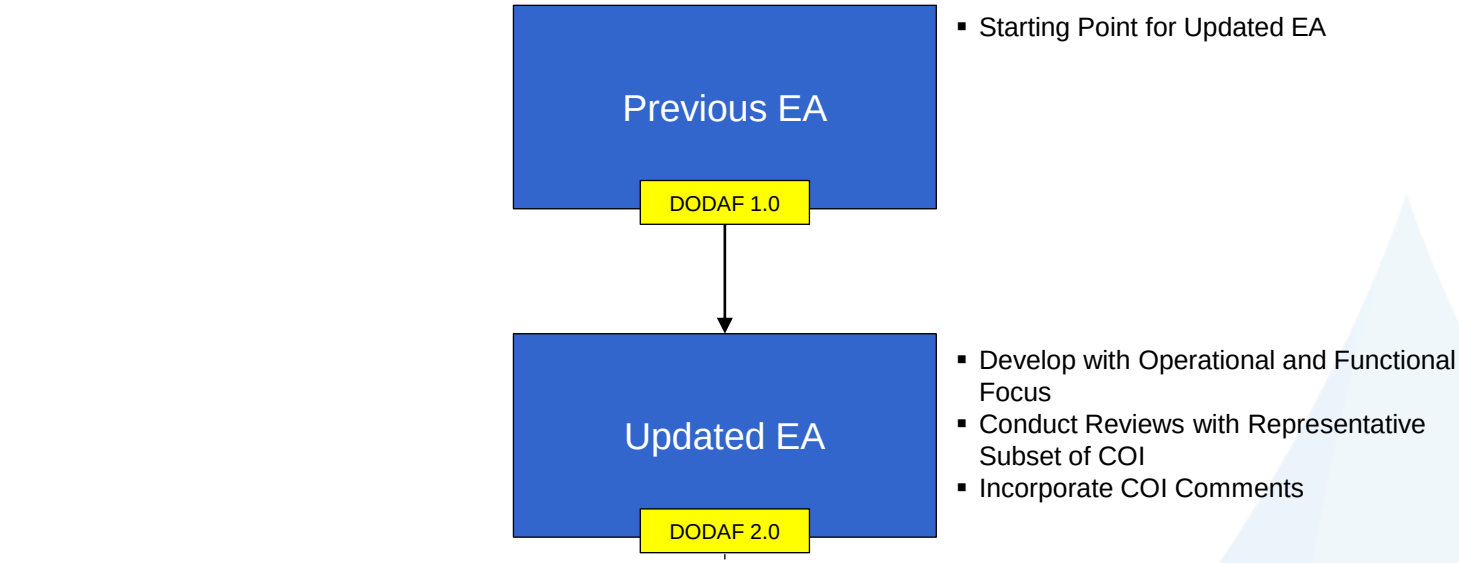
No constructs – only special types of Actions

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

ENTERPRISE ARCHITECTURE AND SYSTEMS STUDY INTERRELATION

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Enterprise Architecture (EA)



- Starting Point for Updated EA

- Develop with Operational and Functional Focus
- Conduct Reviews with Representative Subset of COI
- Incorporate COI Comments

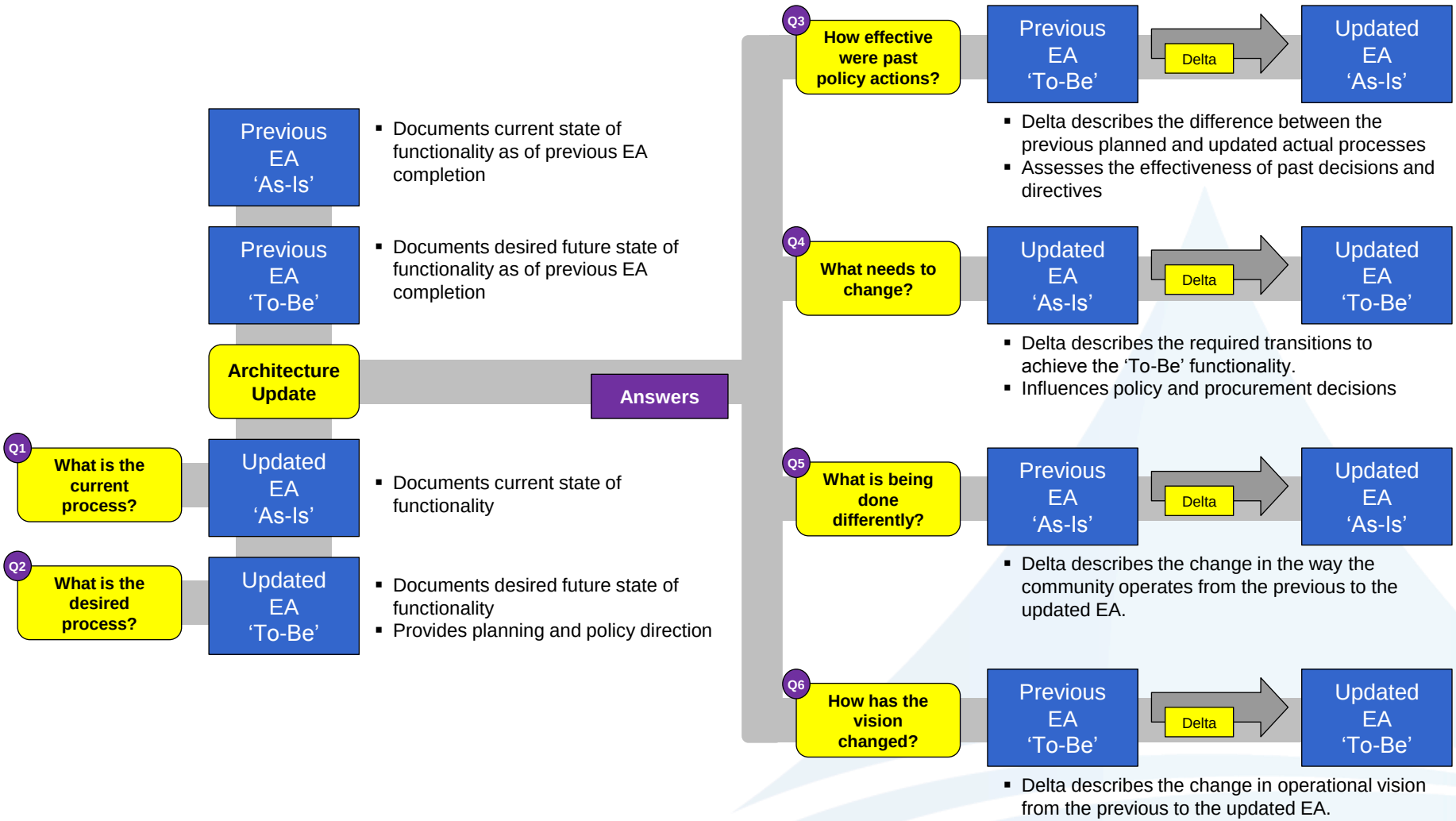
- Functional Model

- Transition from 'As-Is' to 'To-Be' Architectures
- Organizational and Technical Transition Initiatives

- Functional Model
- Notional Physical Model

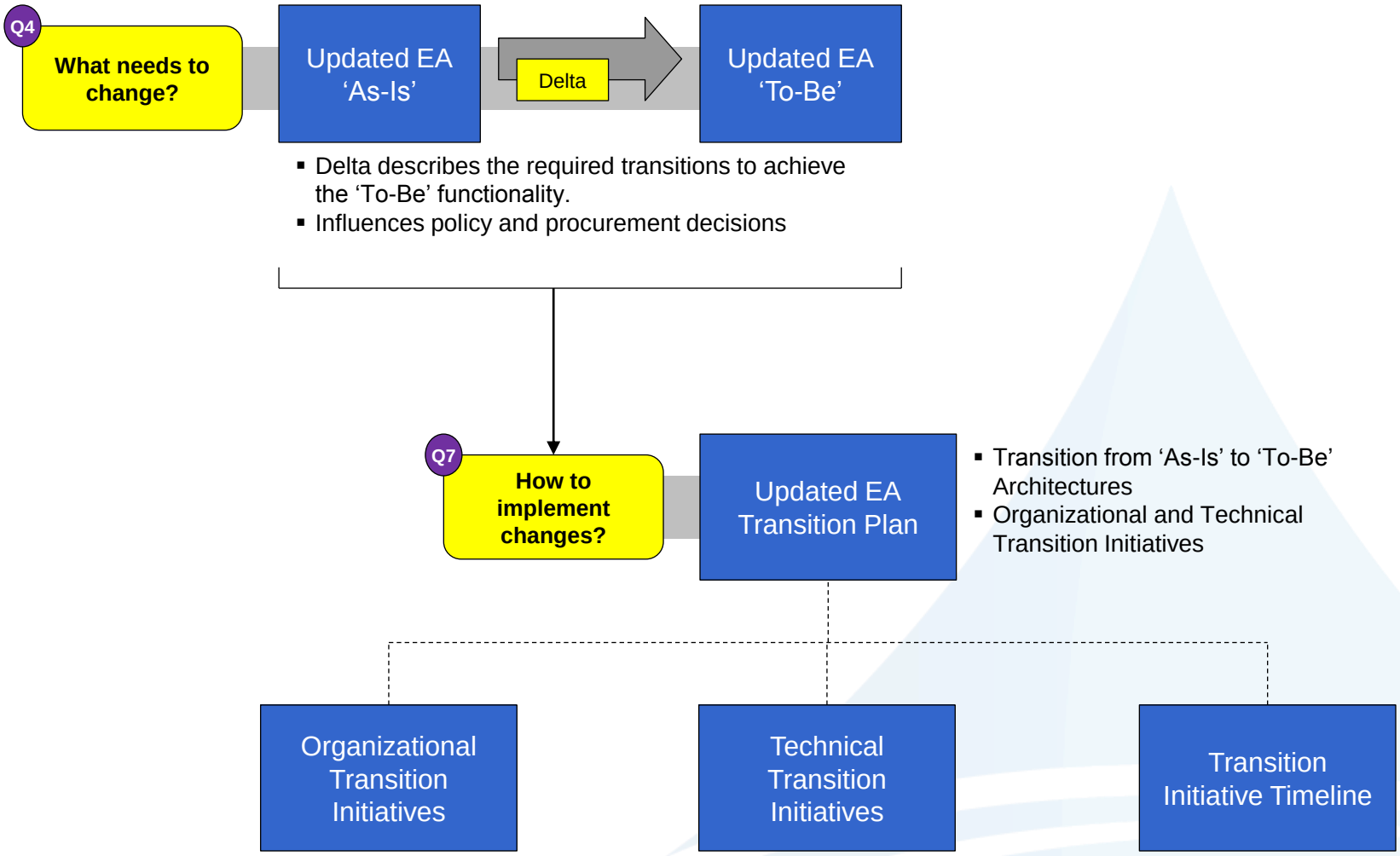
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Why Update the EA?



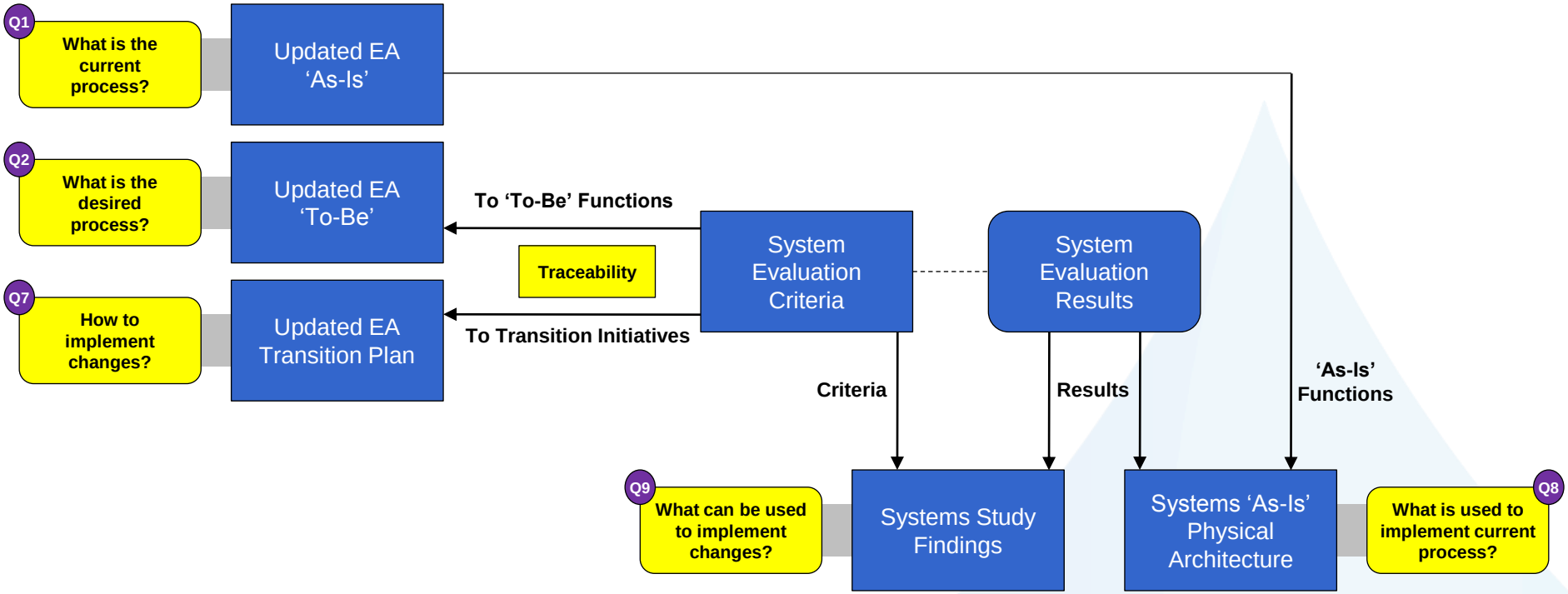
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

EA Transition Plan



© 2011 Systems and Proposal Engineering Company. All Rights Reserved

EA to Systems Study



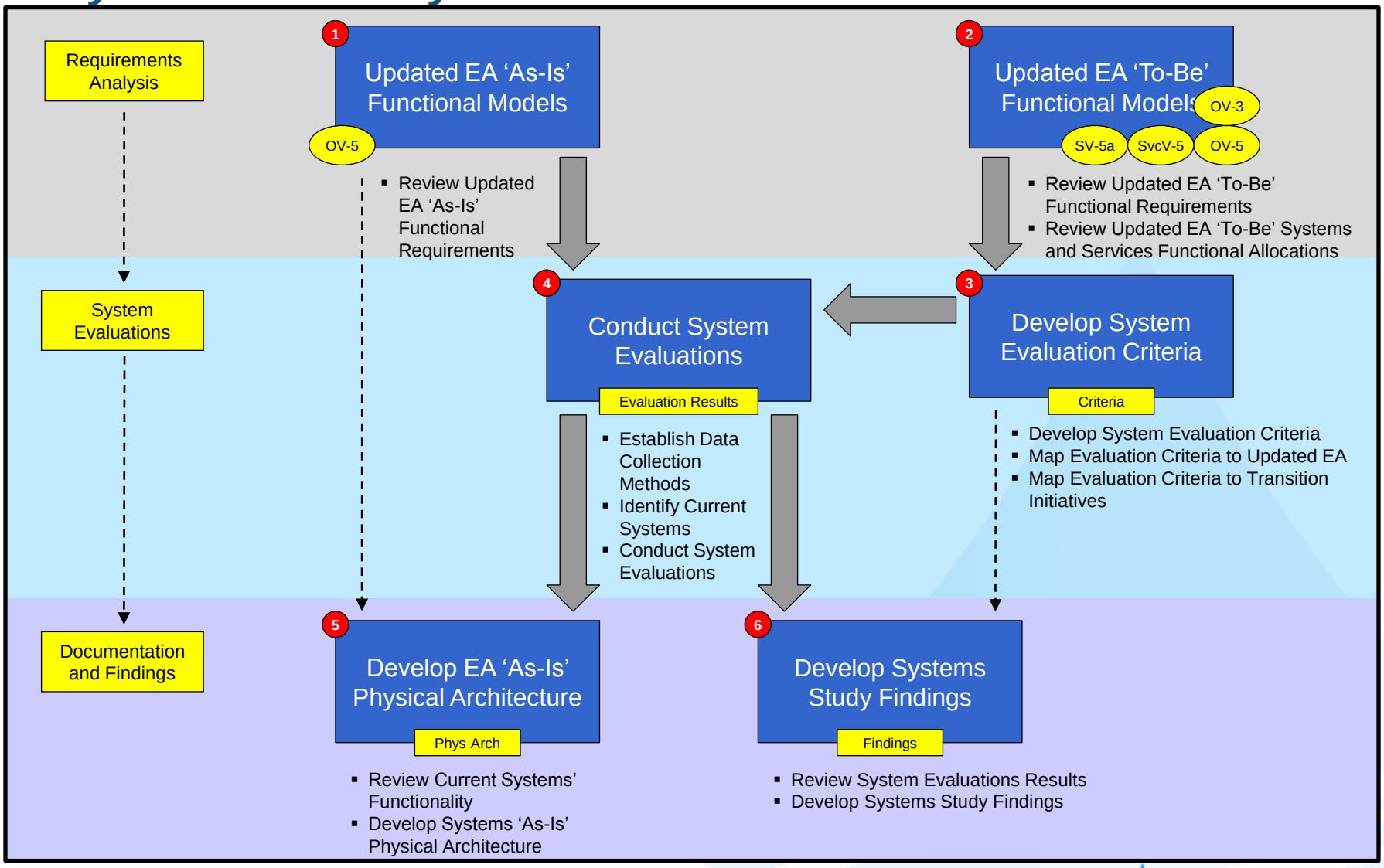
The Systems Study Findings will show how existing systems might be leveraged to implement the desired processes and changes as defined in the Updated EA.

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

SYSTEMS STUDY METHODOLOGY

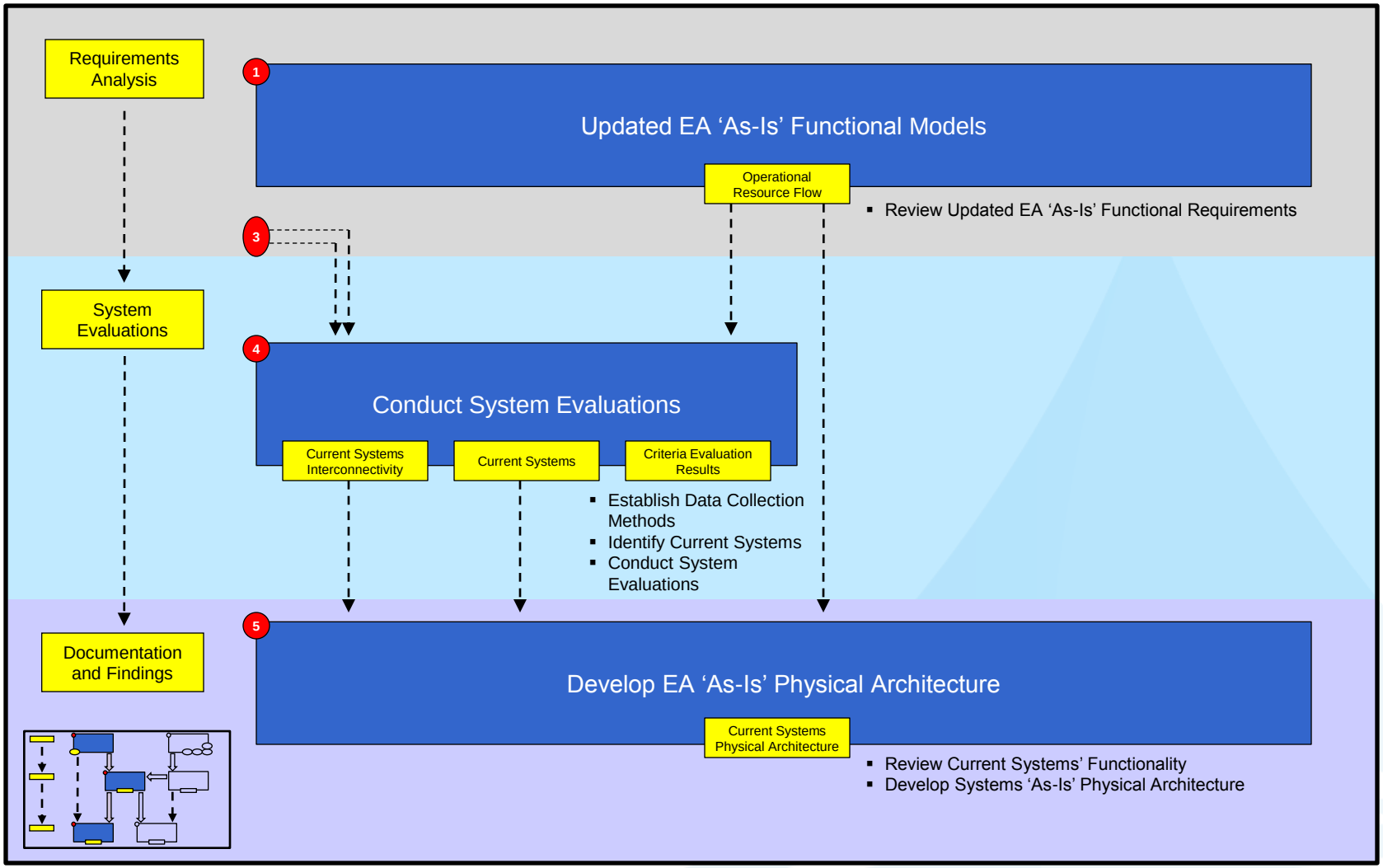
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Systems Study Path Forward



© 2011 Systems and Proposal Engineering Company. All Rights Reserved

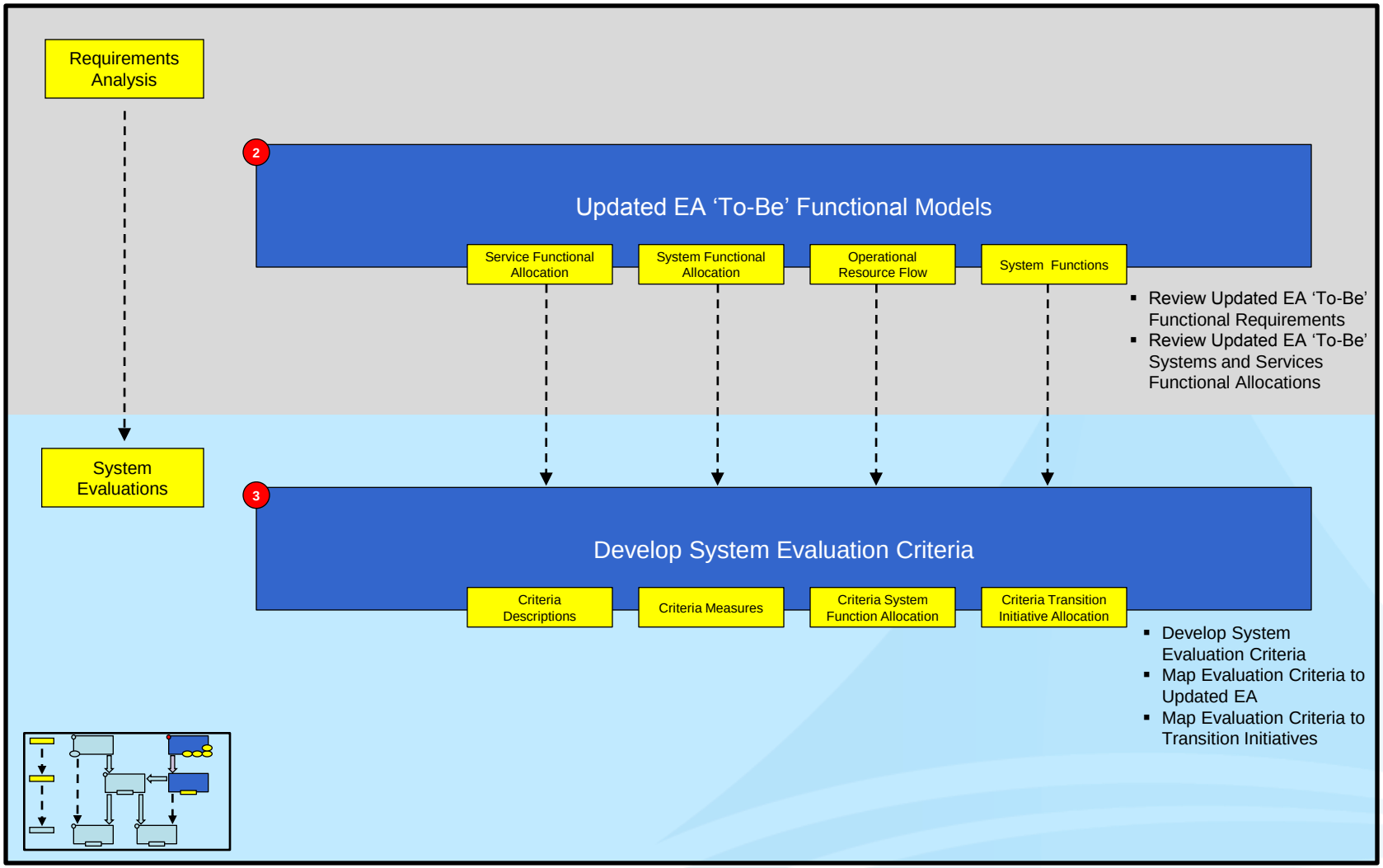
Systems Study Path Forward



SPEC INNOVATIONS

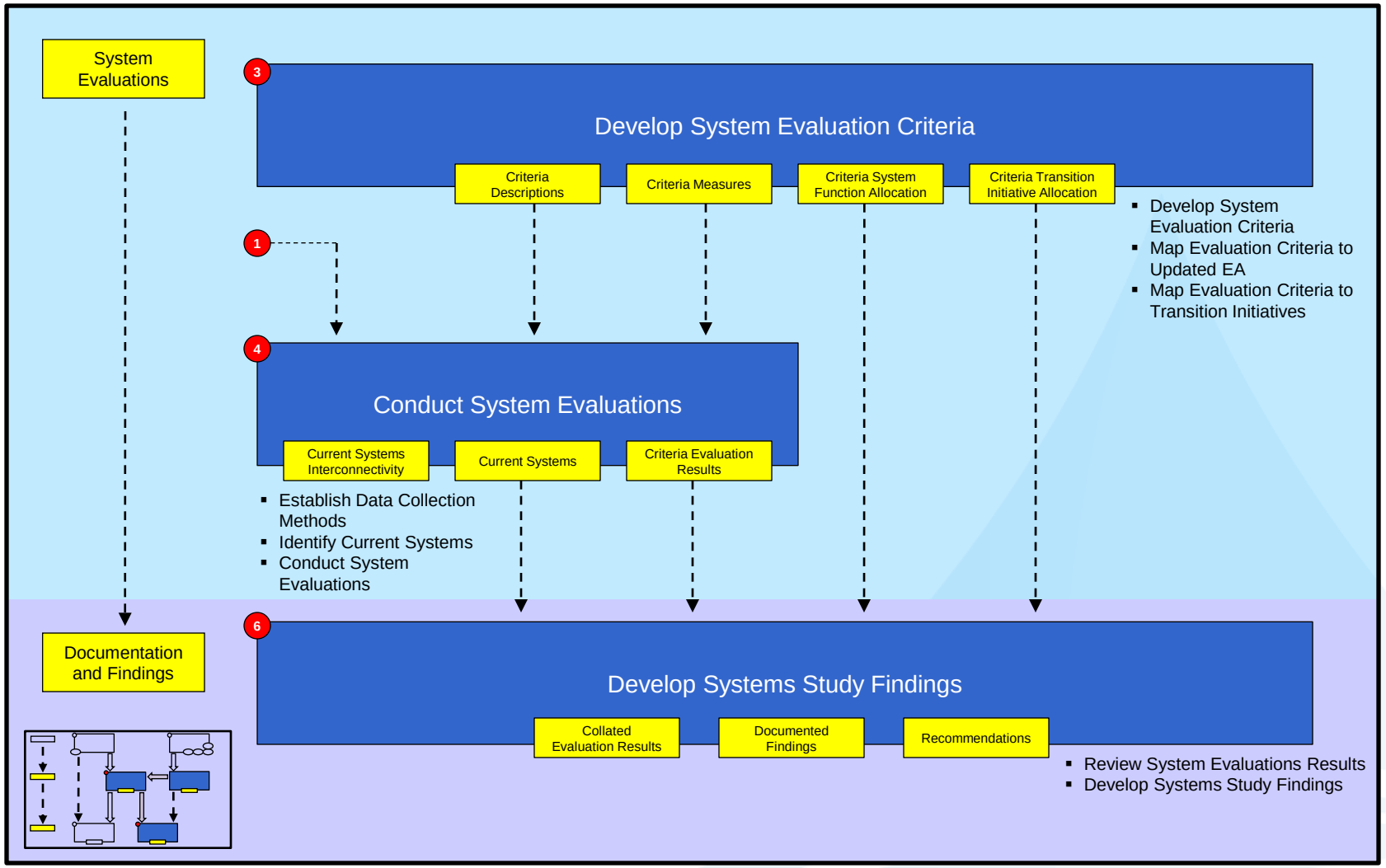
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Systems Study Path Forward



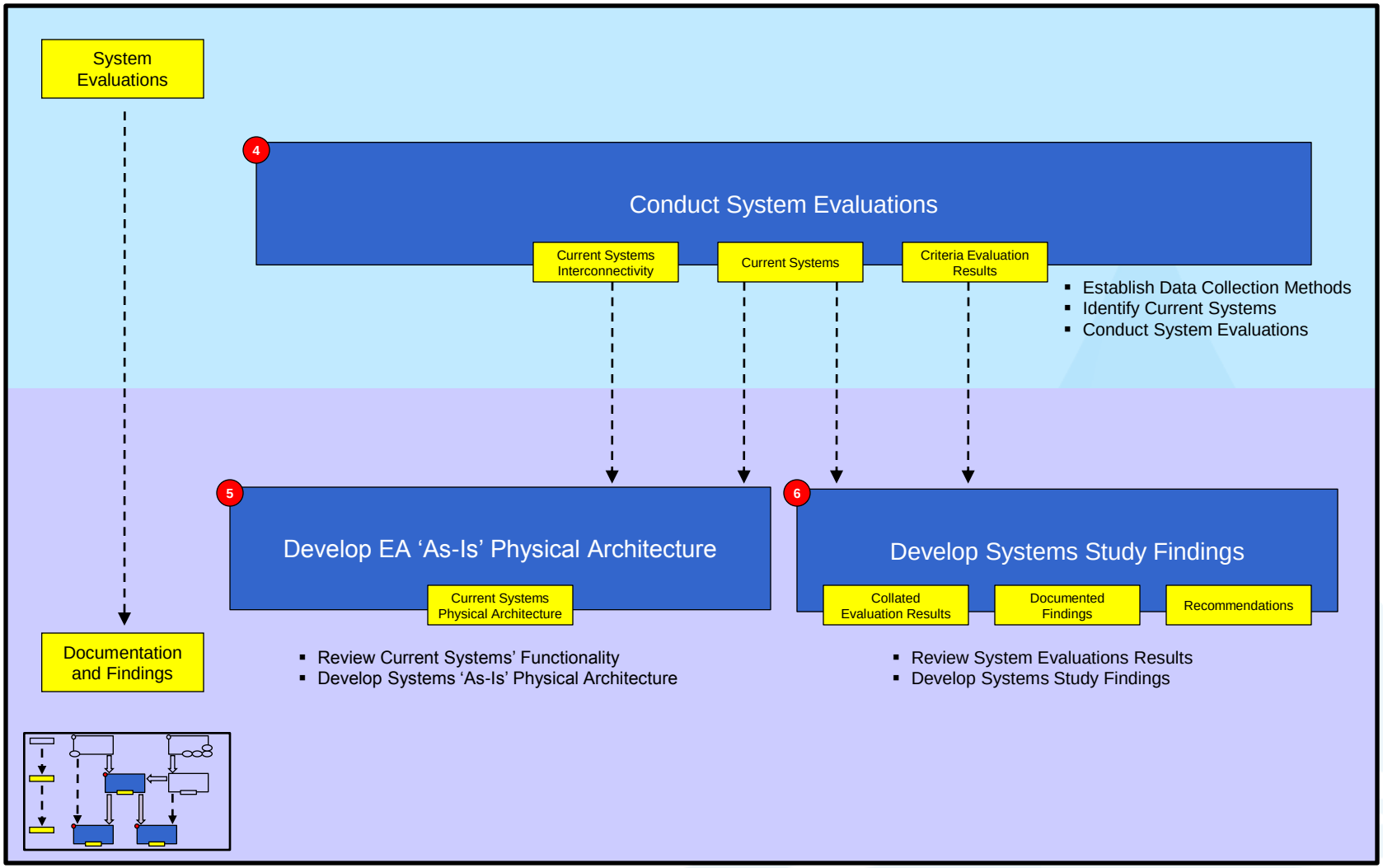
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Systems Study Path Forward



© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Systems Study Path Forward

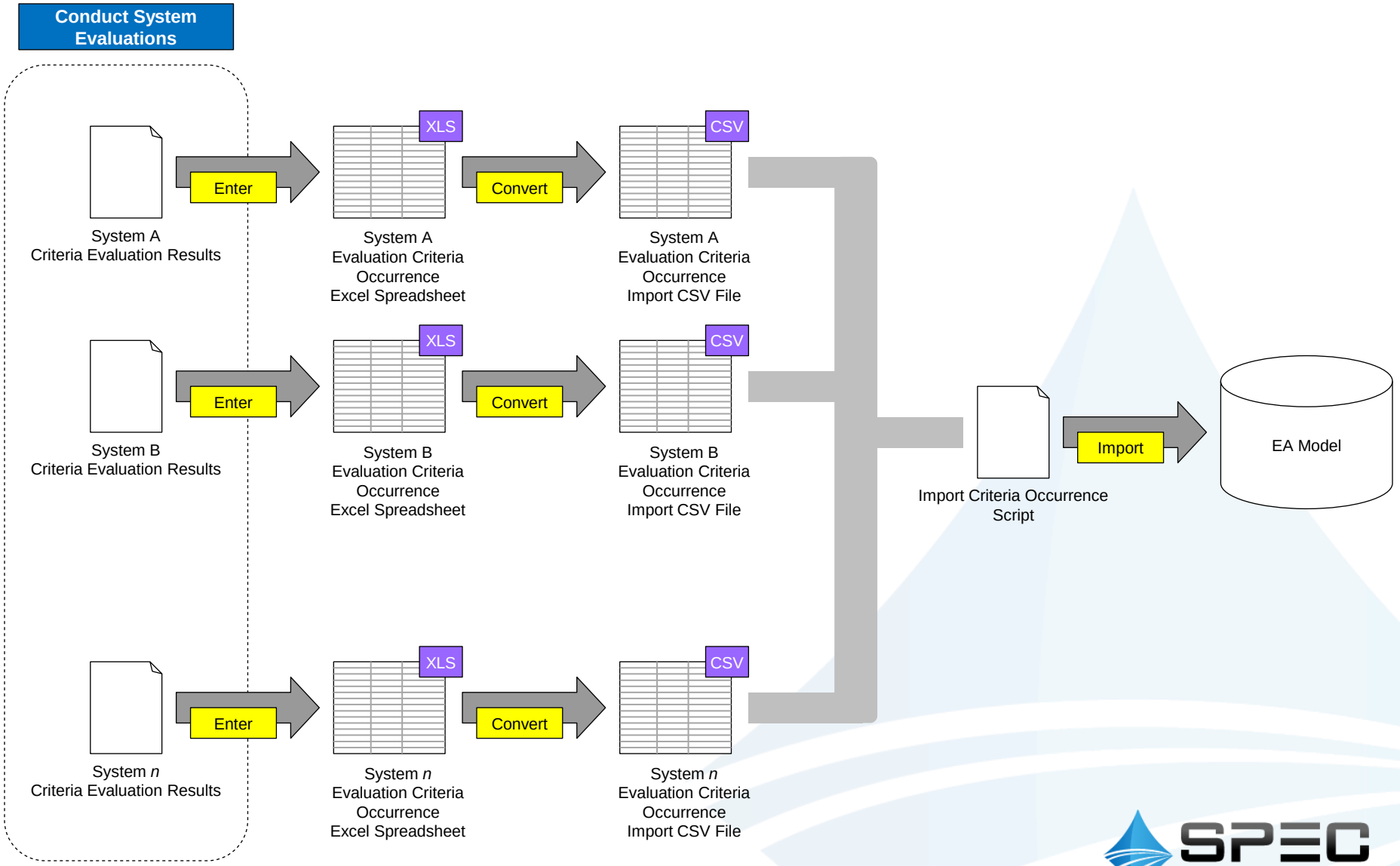


© 2011 Systems and Proposal Engineering Company. All Rights Reserved

SYSTEMS STUDY DATA MANIPULATION

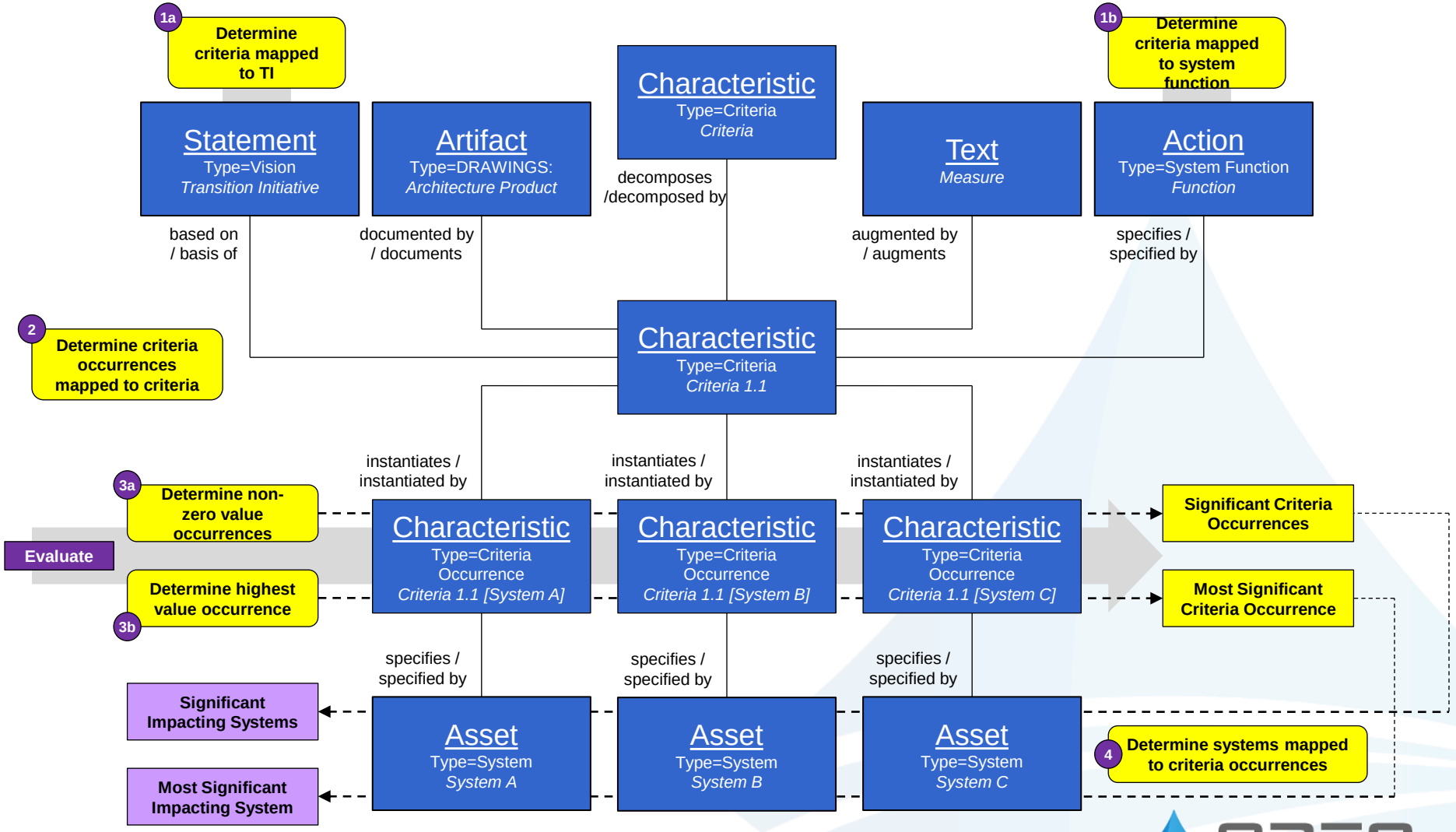
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Criteria Evaluation Results Data



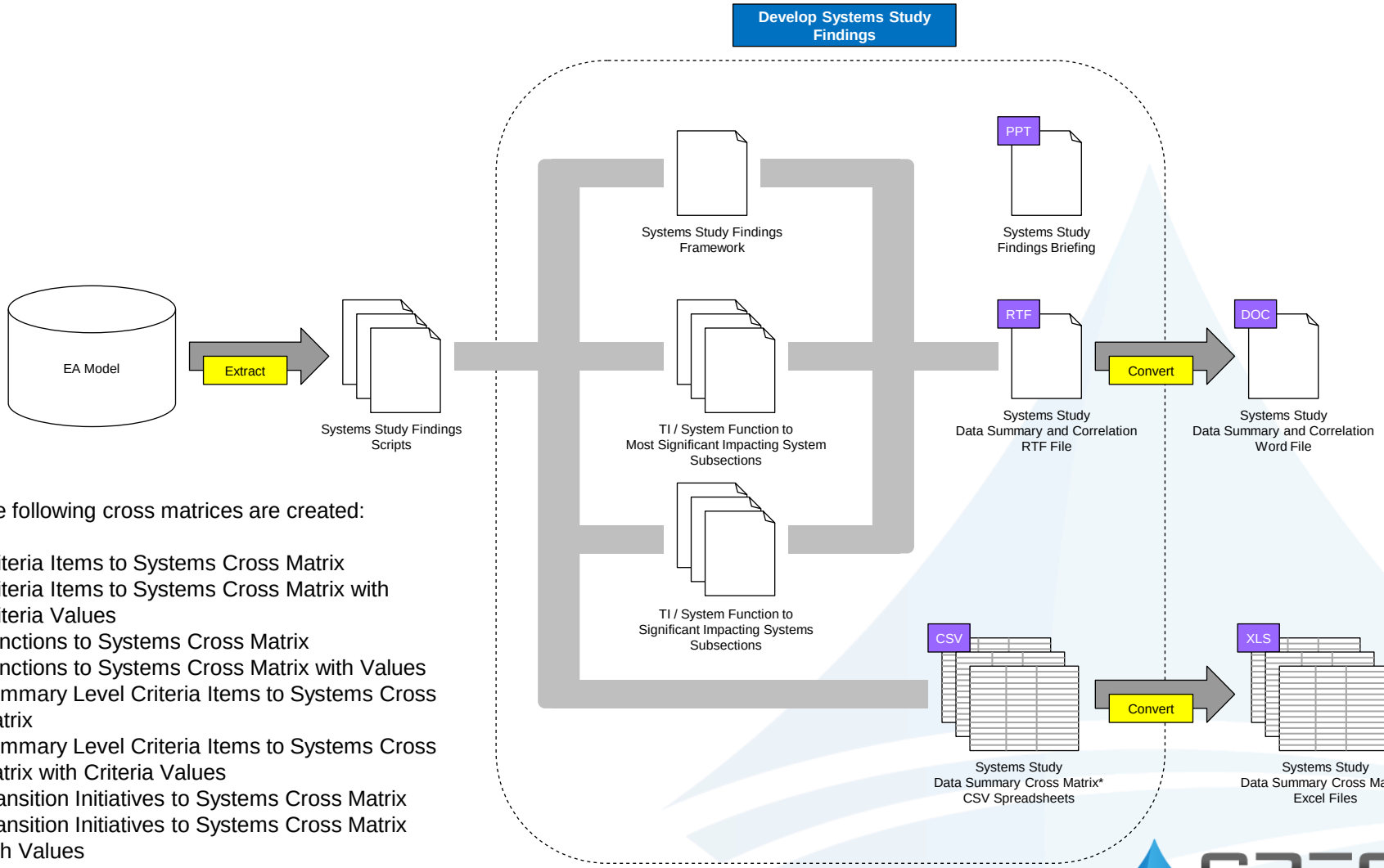
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Determining Systems Potentially Impacting Changes



© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Findings Document Creation

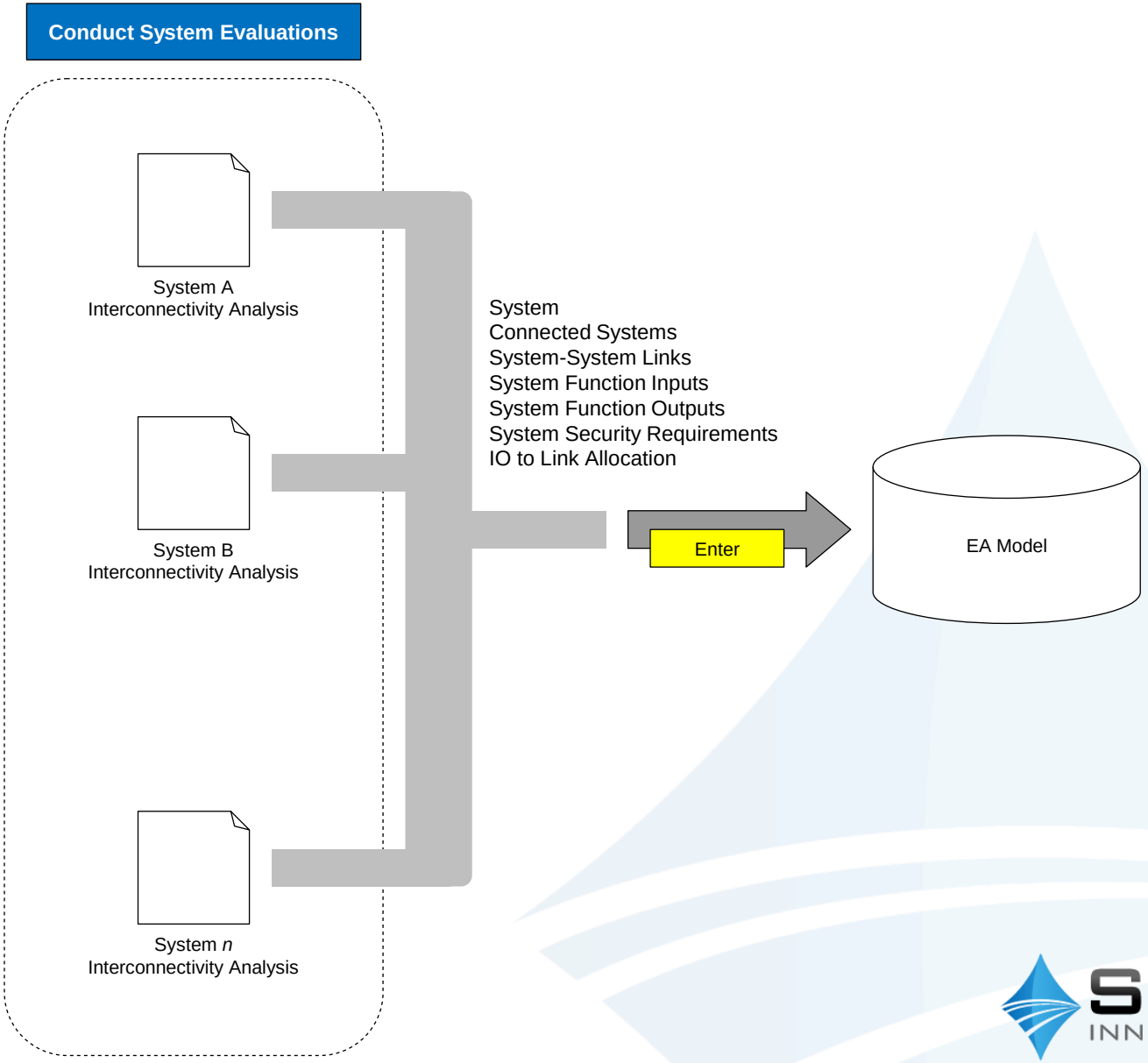


* The following cross matrices are created:

- Criteria Items to Systems Cross Matrix
- Criteria Items to Systems Cross Matrix with Criteria Values
- Functions to Systems Cross Matrix
- Functions to Systems Cross Matrix with Values
- Summary Level Criteria Items to Systems Cross Matrix
- Summary Level Criteria Items to Systems Cross Matrix with Criteria Values
- Transition Initiatives to Systems Cross Matrix
- Transition Initiatives to Systems Cross Matrix with Values

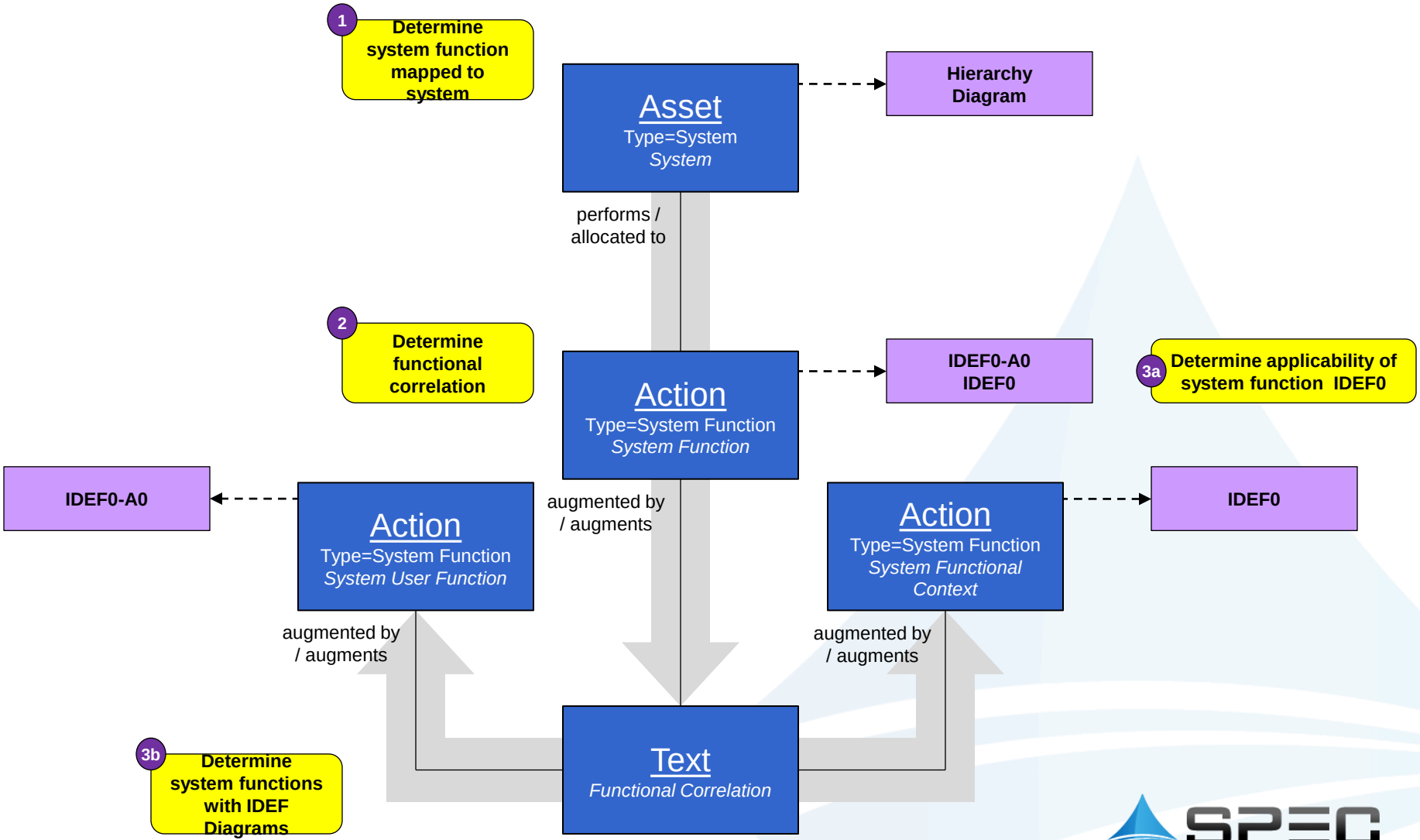
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

System Interconnectivity Data



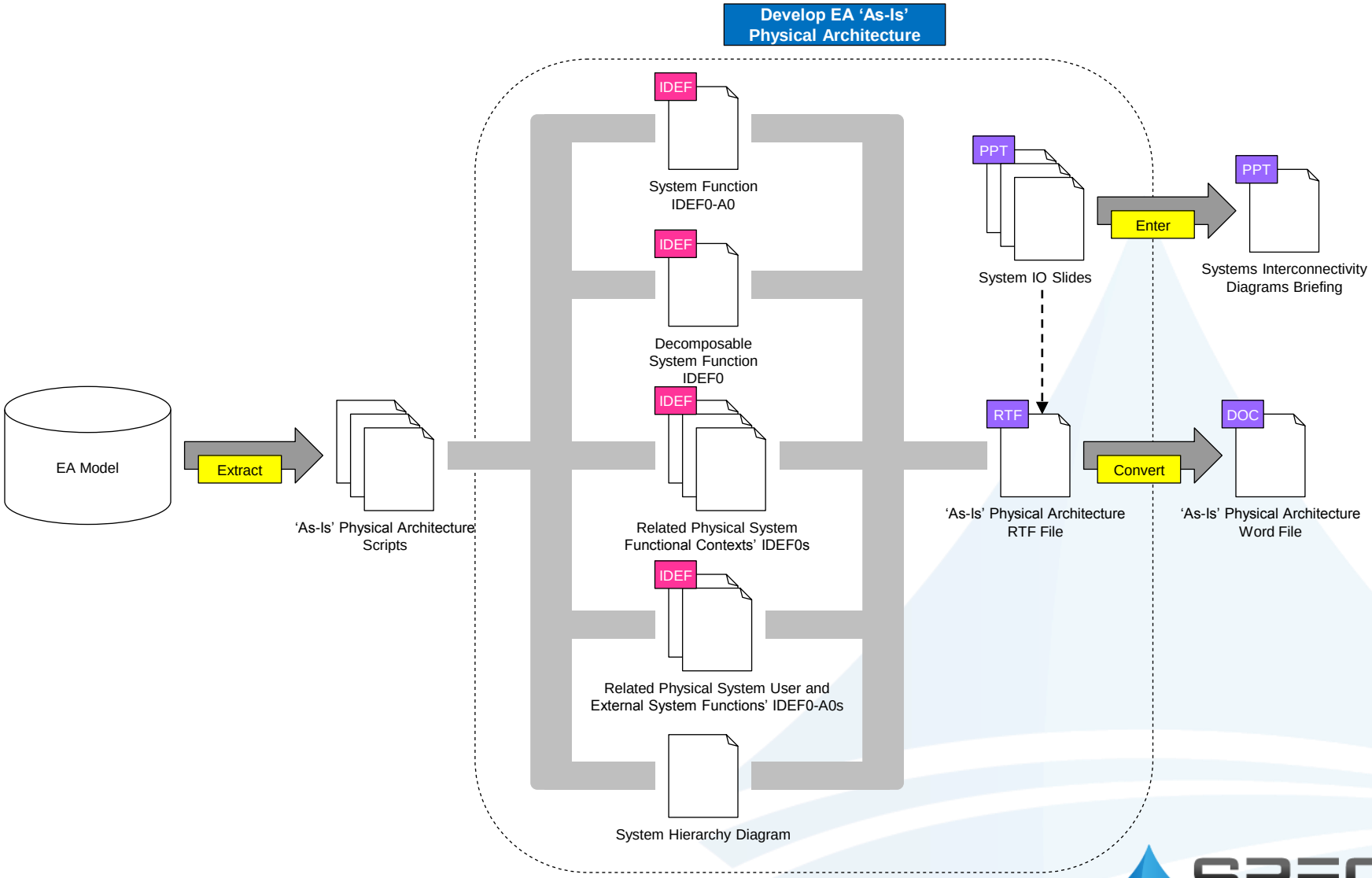
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Physical Architecture Model Rendering



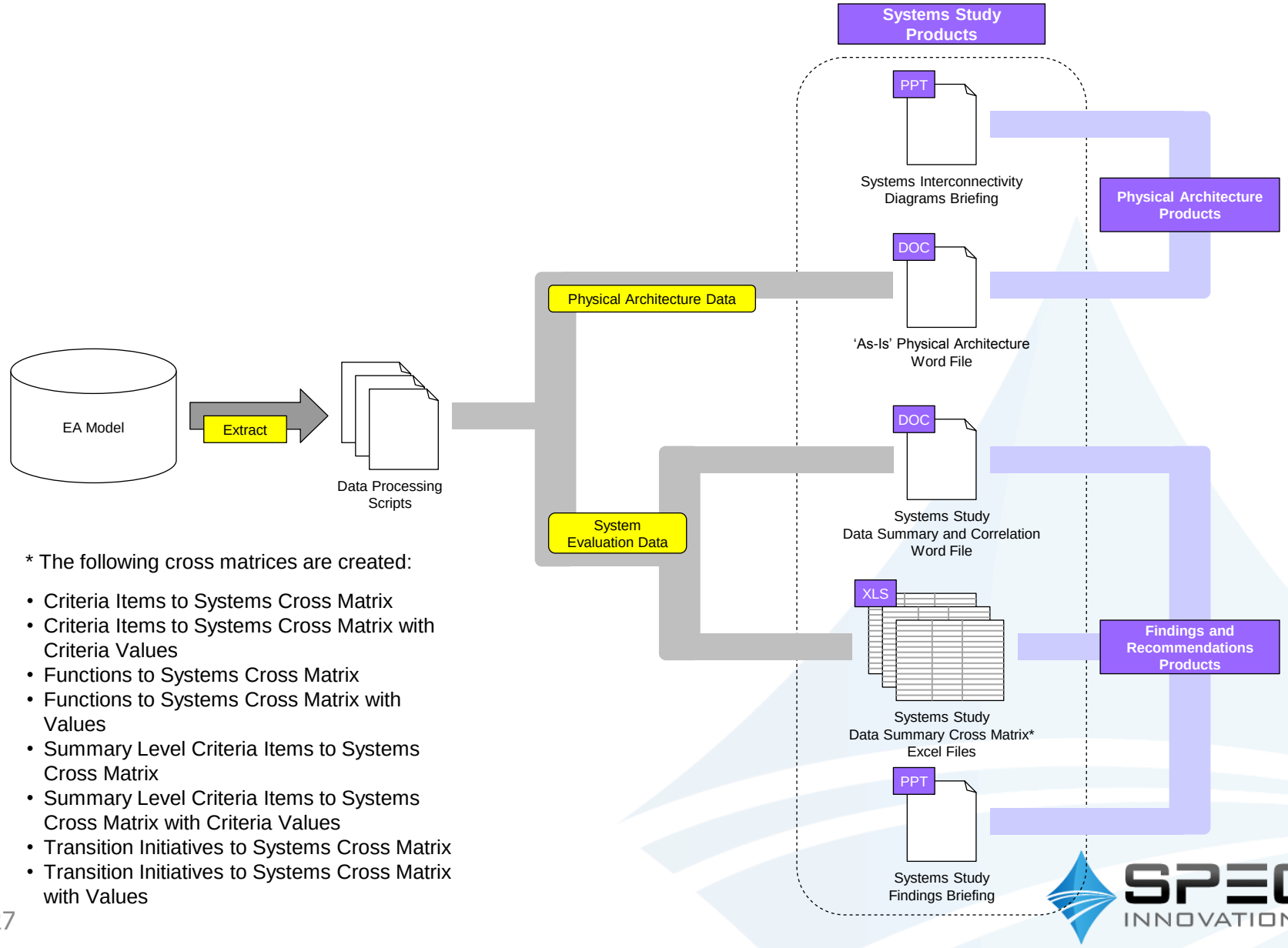
© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Physical Architecture Document Creation



© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Systems Study Product Creation



* The following cross matrices are created:

- Criteria Items to Systems Cross Matrix
- Criteria Items to Systems Cross Matrix with Criteria Values
- Functions to Systems Cross Matrix
- Functions to Systems Cross Matrix with Values
- Summary Level Criteria Items to Systems Cross Matrix
- Summary Level Criteria Items to Systems Cross Matrix with Criteria Values
- Transition Initiatives to Systems Cross Matrix
- Transition Initiatives to Systems Cross Matrix with Values

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

SUMMARY

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Summary

- Enterprise Architecture (EA) updates answer questions regarding the state and direction of the enterprise.
- Systems Study findings show how existing systems might be leveraged to implement the desired processes and changes as defined in the Updated EA.
- Systems Study data should be stored in the architecture database and mapped to the EA and Transition Initiatives.

SPEC INNOVATIONS

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

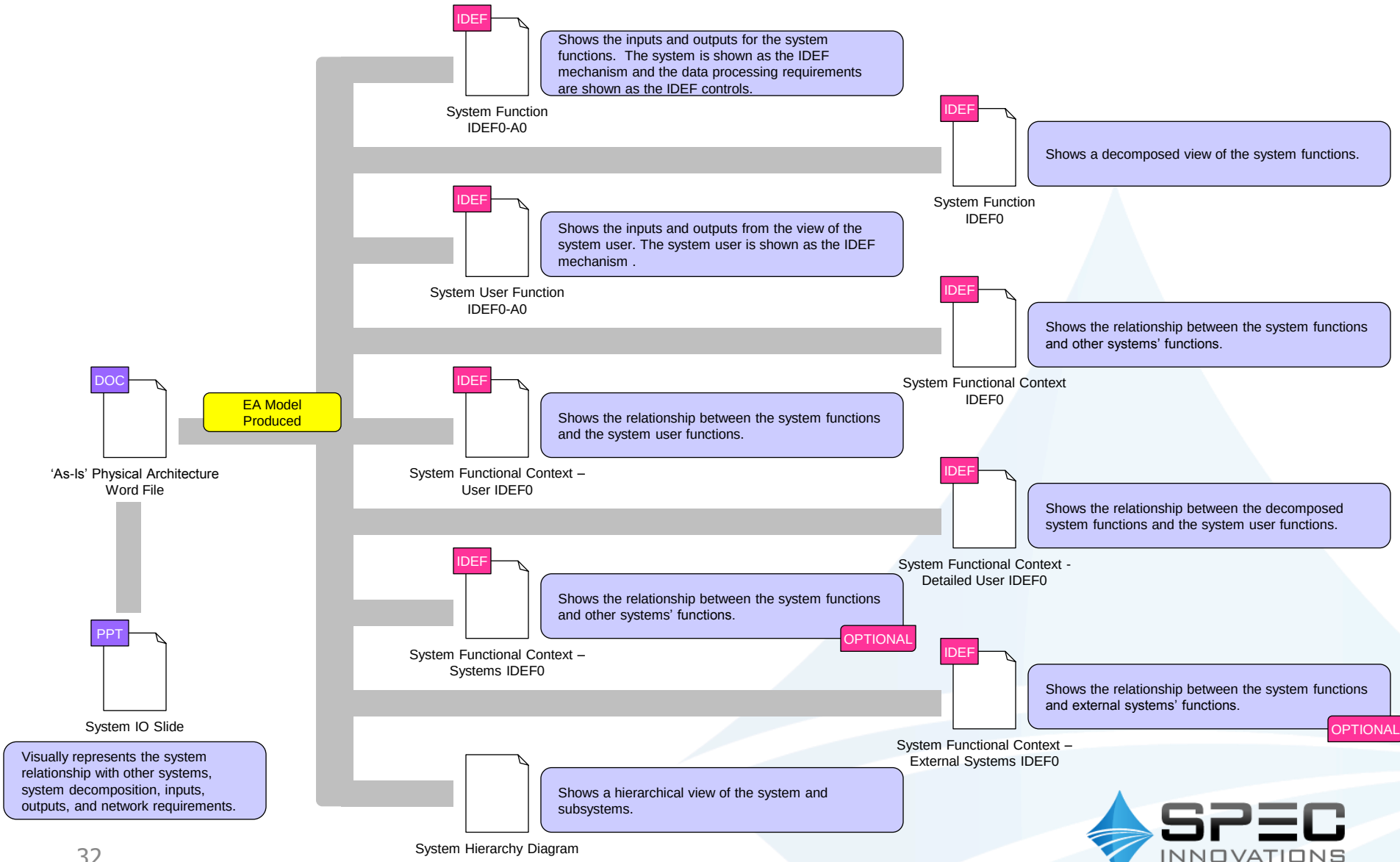
BACKUP SLIDES

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Enterprise State and Direction Questions

	Question	Architectural Product / Product Comparison
Q1	What is the current process?	Updated EA 'As-Is' Functional Architecture
Q2	What is the desired process?	Updated EA 'To-Be' Functional Architecture
Q3	How effective were past policy actions?	Previous EA 'To-Be' Functional Architecture / Updated EA 'As-Is' Functional Architecture Delta
Q4	What needs to change?	Updated EA 'As-Is' Functional Architecture / Updated EA 'To-Be' Functional Architecture Delta
Q5	What is being done differently?	Previous EA 'As-Is' Functional Architecture / Updated EA 'As-Is' Functional Architecture Delta
Q6	How has the vision changed?	Previous EA 'To-Be' Functional Architecture / Updated EA 'To-Be' Functional Architecture Delta
Q7	How to implement changes?	Updated EA Transition Plan
Q8	What is used to implement current process?	Updated Systems 'As-Is' Physical Architecture
Q9	What can be used to implement changes?	Updated Systems Study Findings

SPEC INNOVATIONS

© 2011 Systems and Proposal Engineering Company. All Rights Reserved

Physical Architecture Diagram Summary