Full Lifecycle Modeling: Capturing Evaluation and Performance Data in the Enterprise Architecture Knowledgebase

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SPEC INNOVATIONS

Overview

- Lifecycle Modeling Language Overview
- Measure of Performance Testing Data Manipulation
- Discrete Time Testing Data Manipulation
- Summary

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LIFECYCLE MODELING LANGUAGE (LML) OVERVIEW

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

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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

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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

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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

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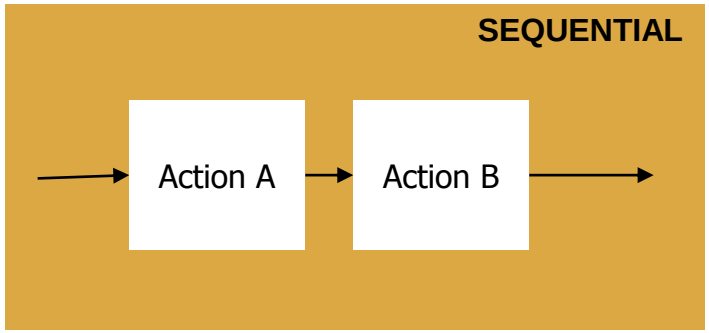
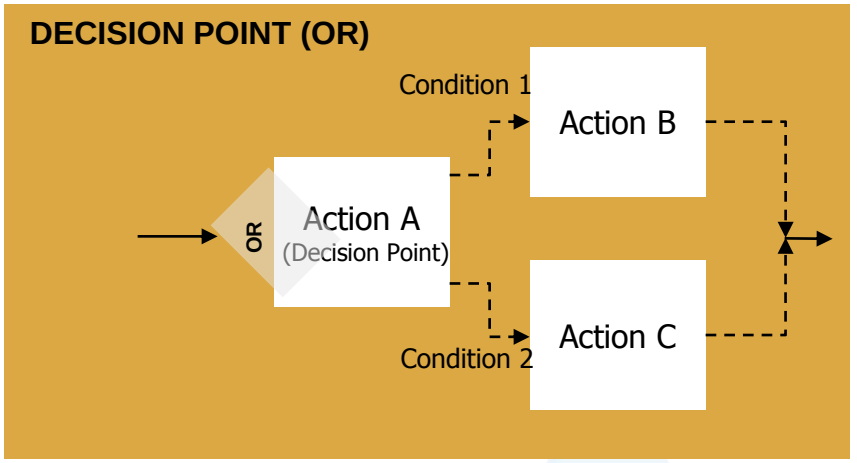
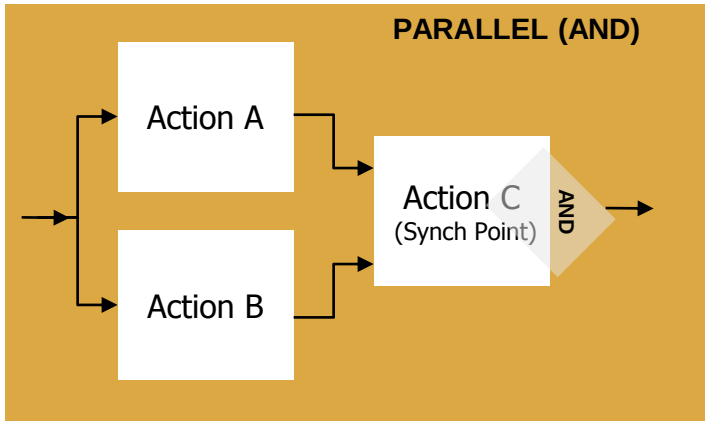
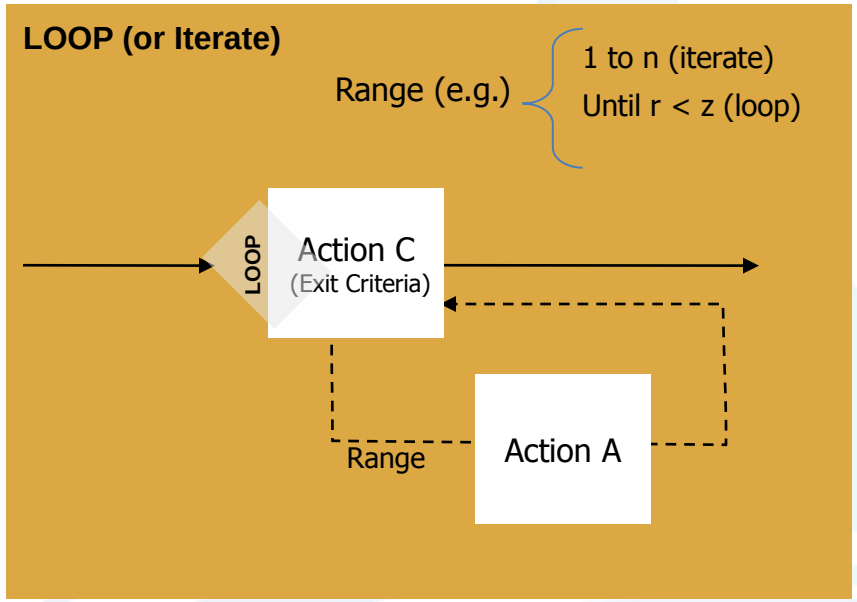
LML Logic





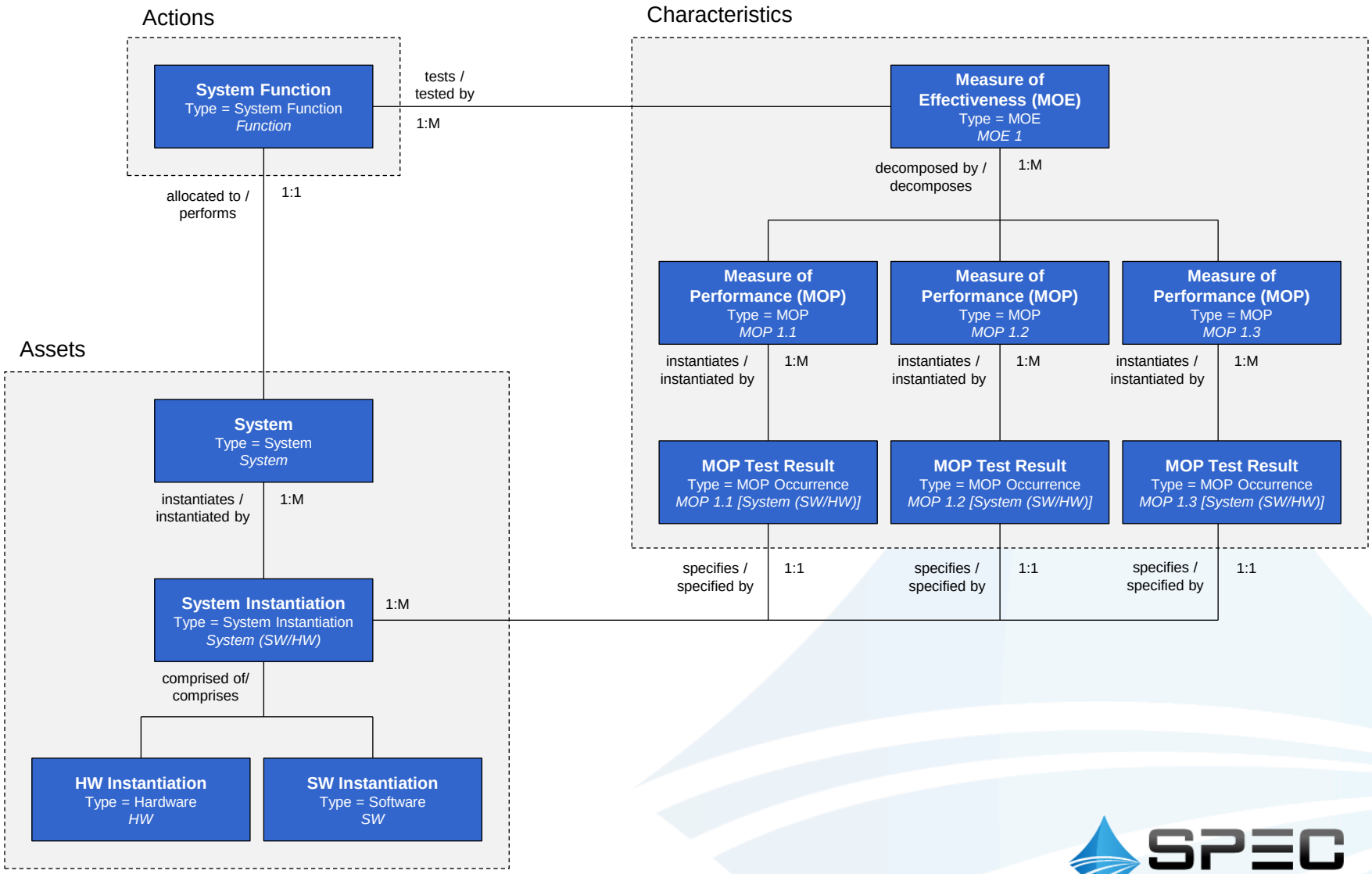




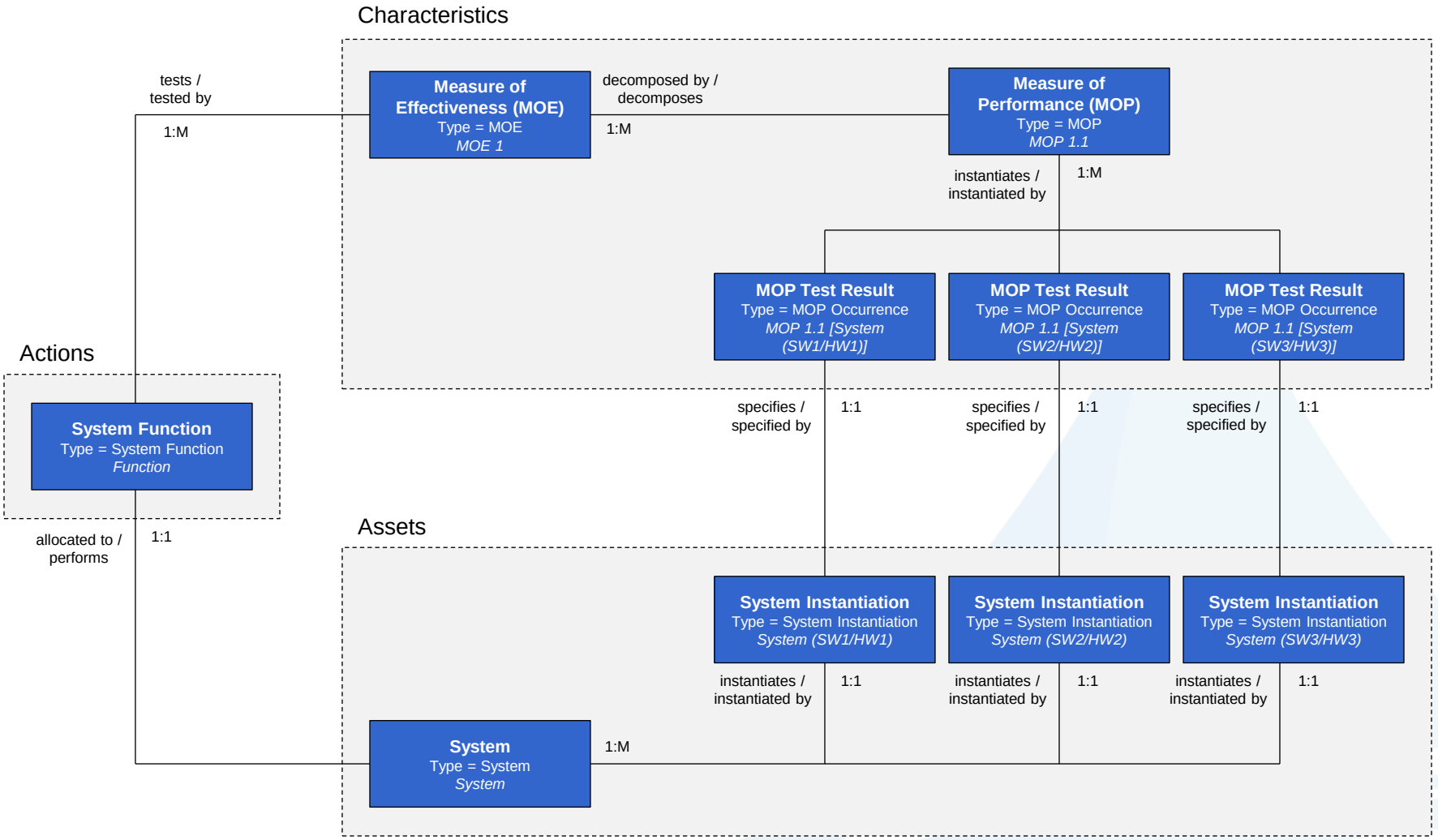
No constructs – only special types of Actions

MEASURE OF PERFORMANCE TESTING DATA MANIPULATION

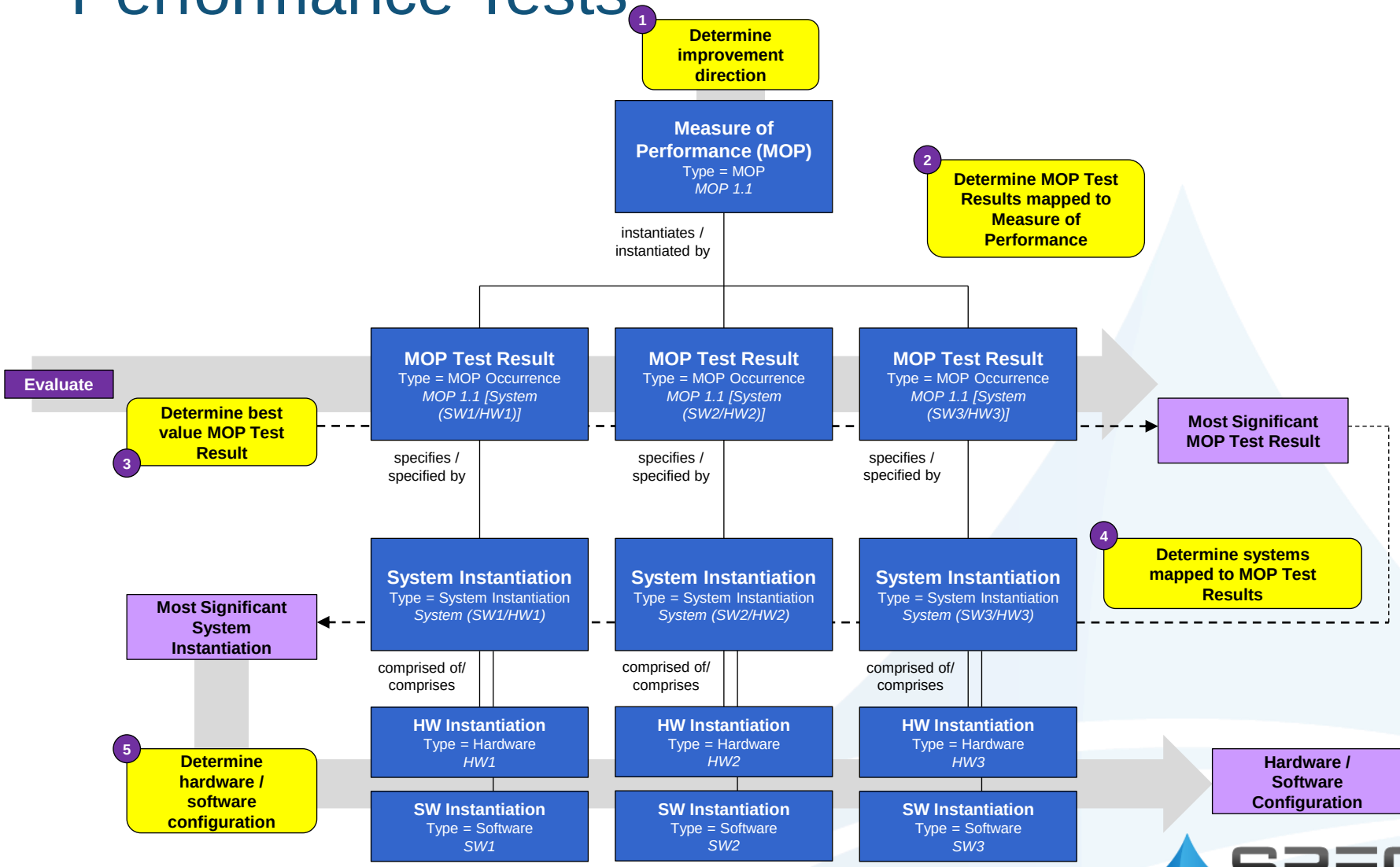
System Instantiation View



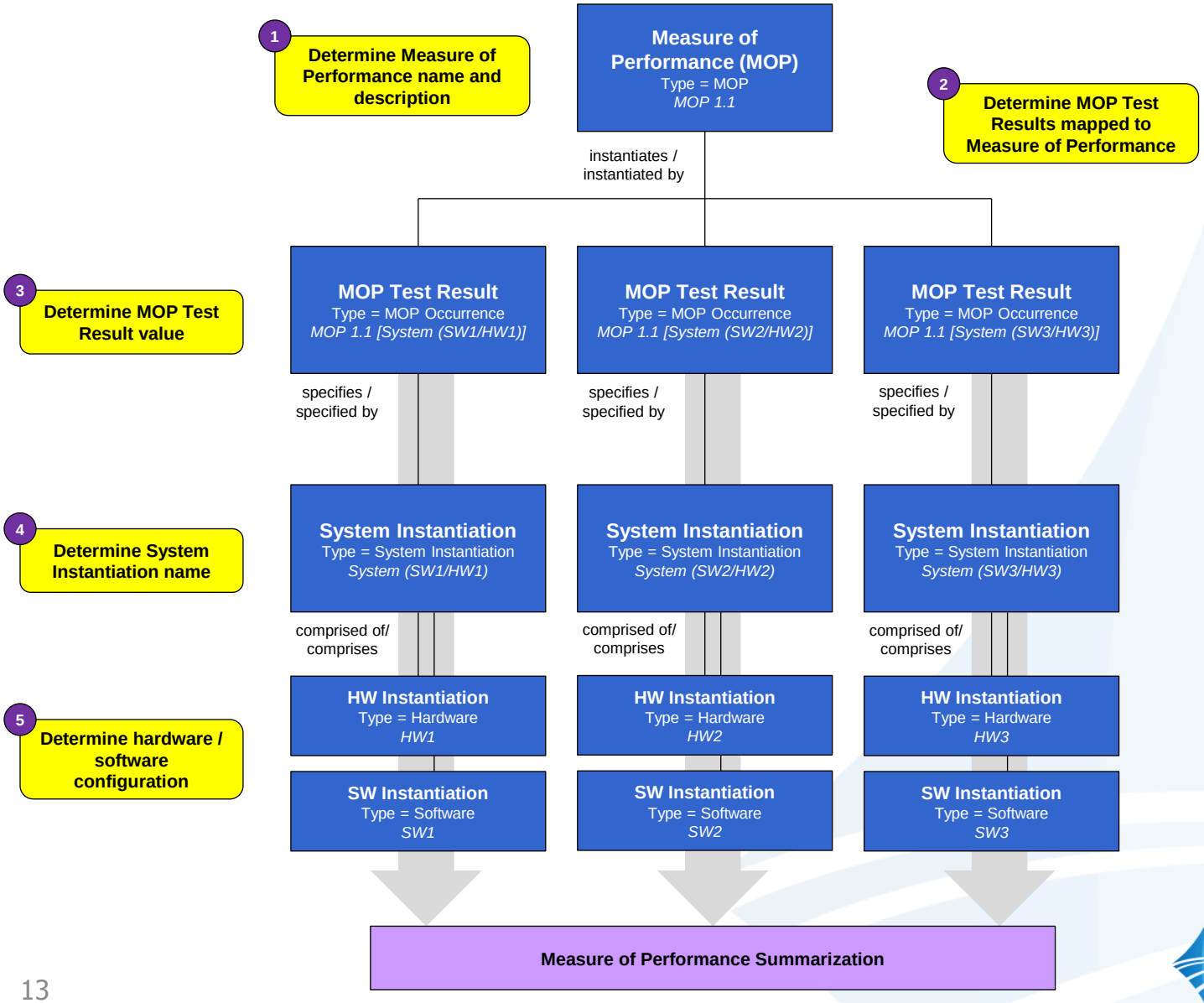
Measure of Performance (MOP) View



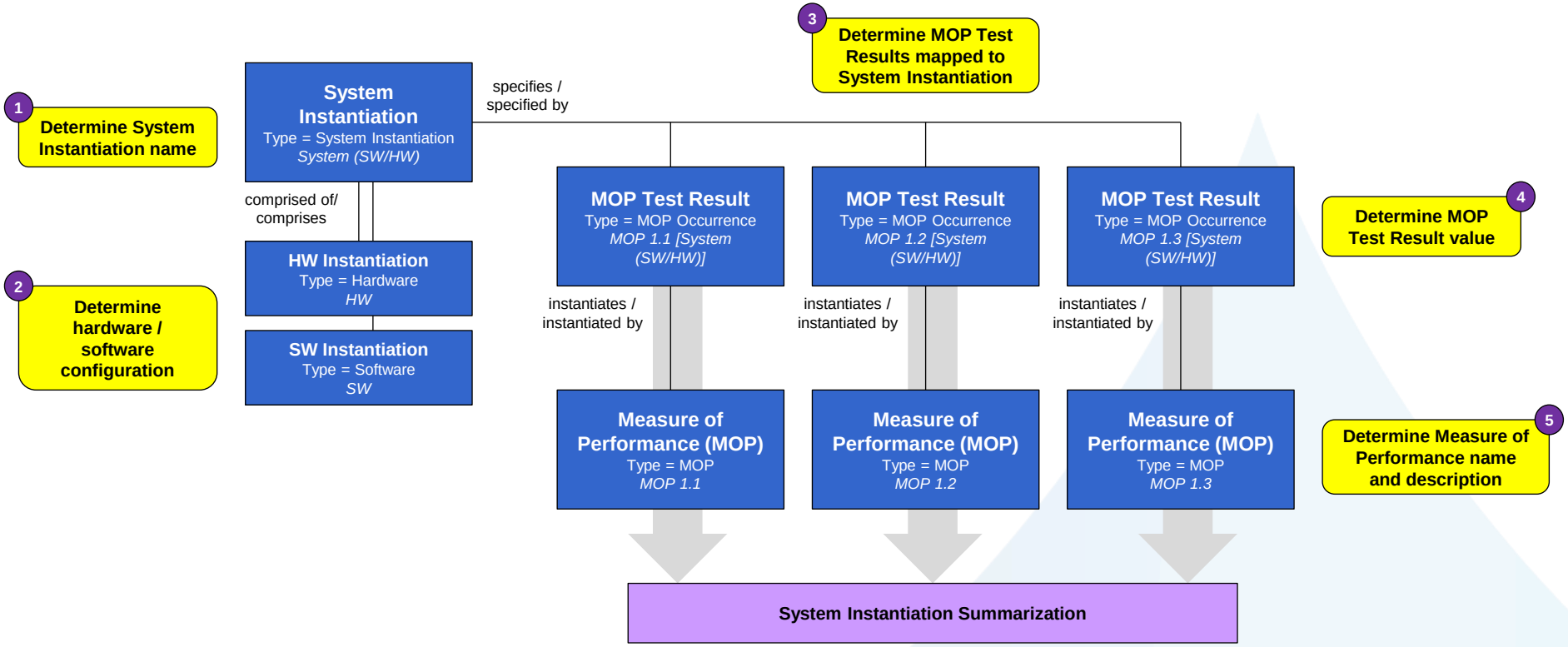
Determining Top Configuration for Measure of Performance Tests



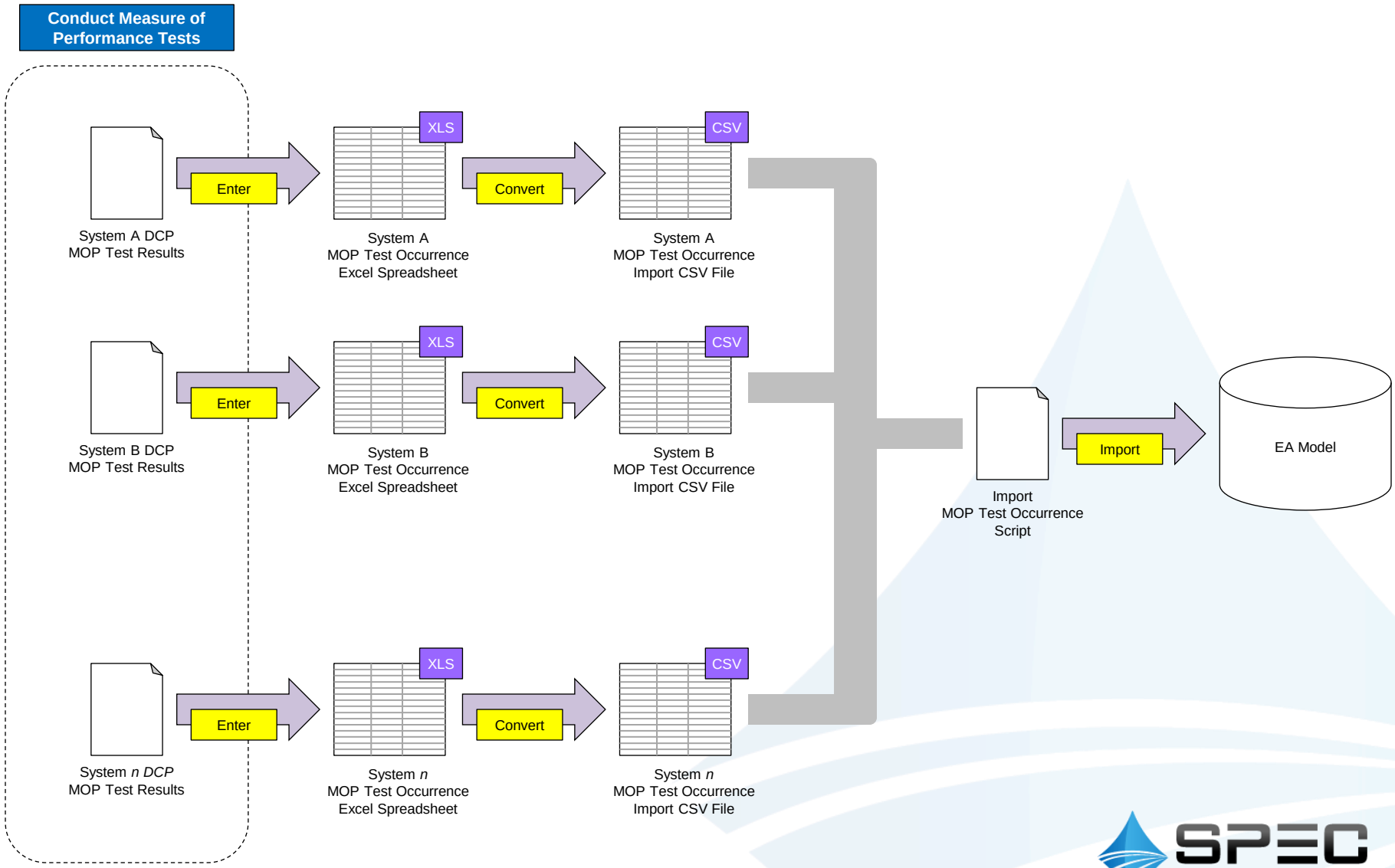
Measure of Performance Summarization



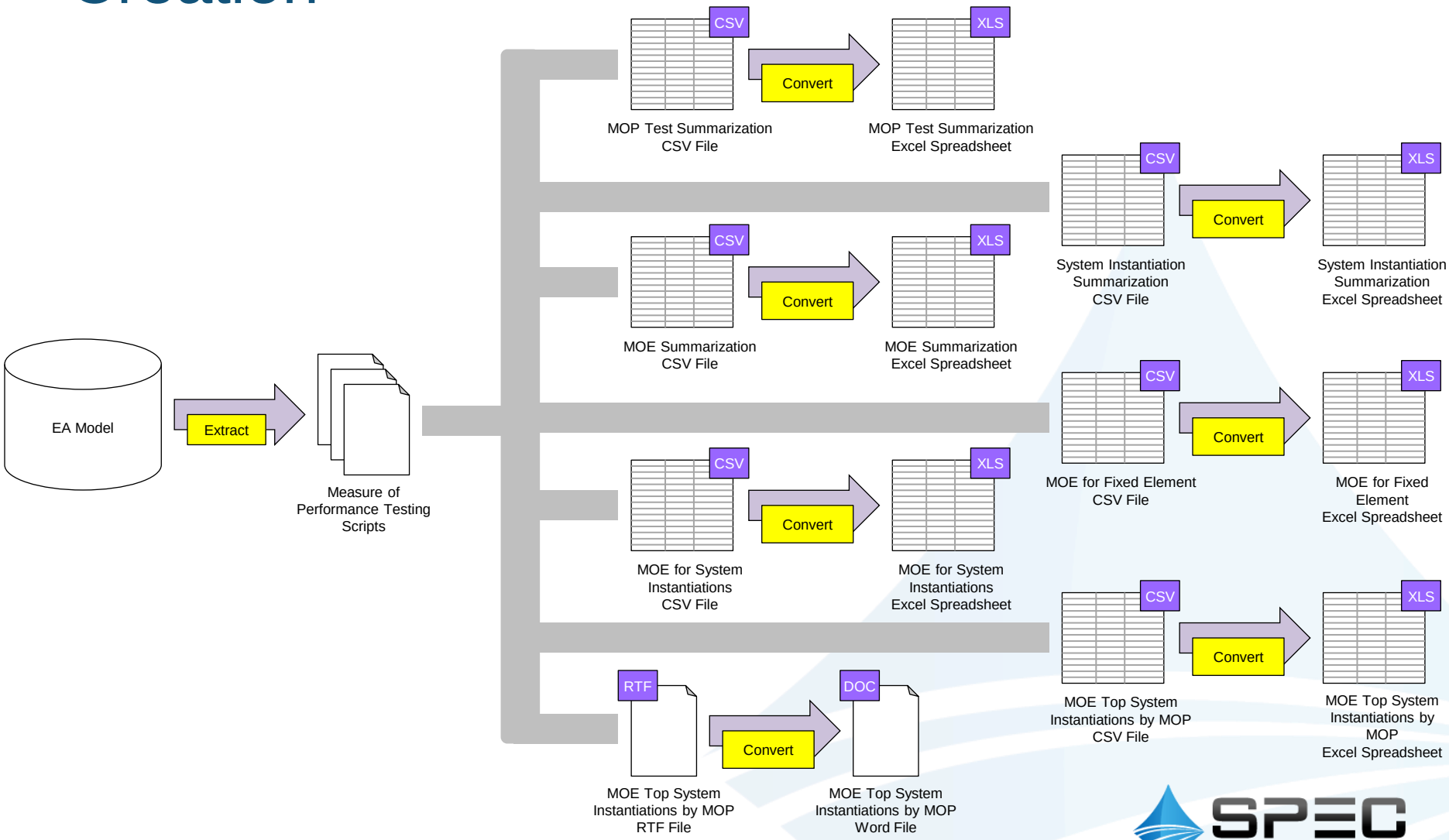
System Instantiation Summarization



DCP MOP Test Results

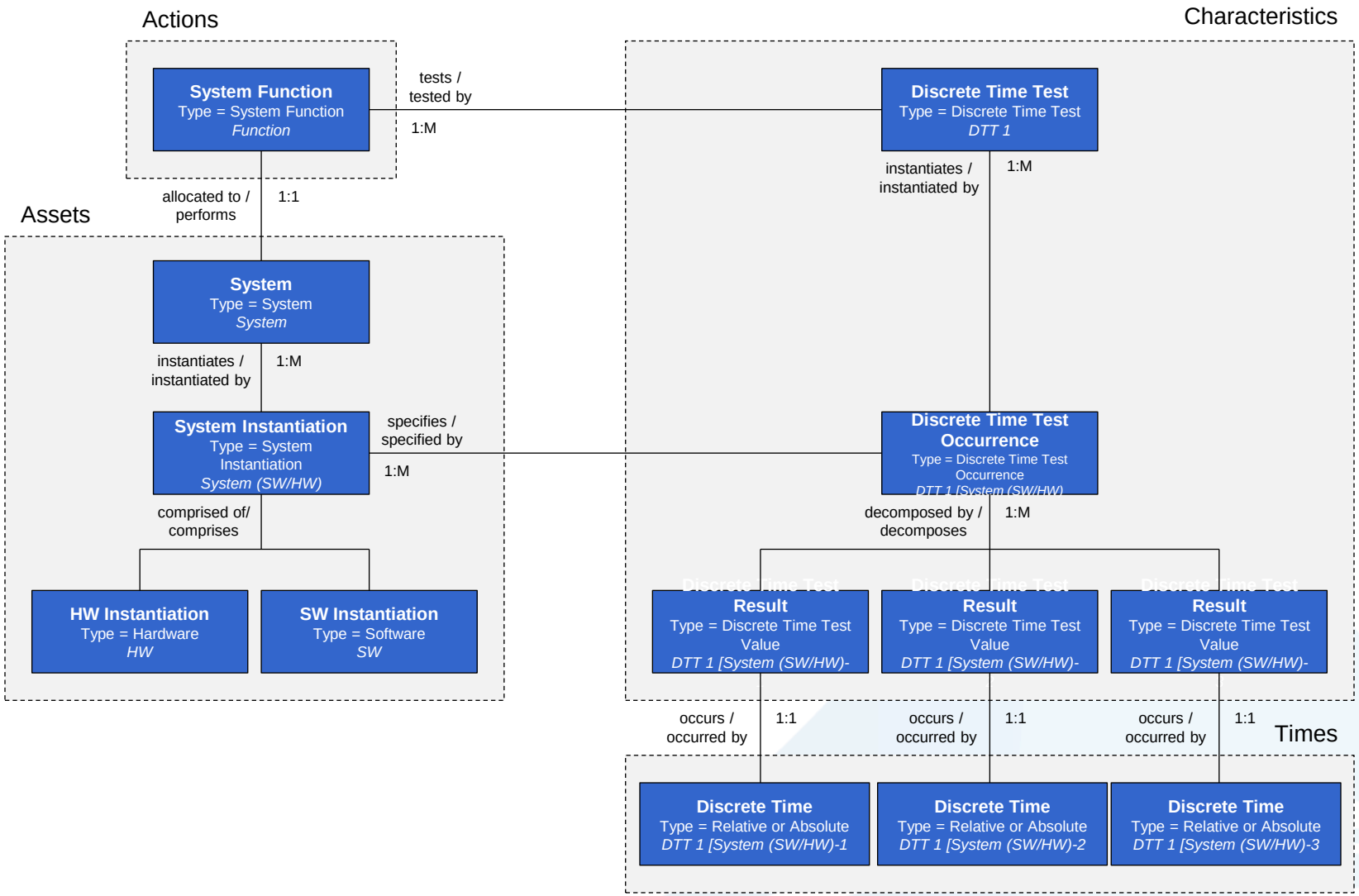


DCP Measure of Performance Document Creation

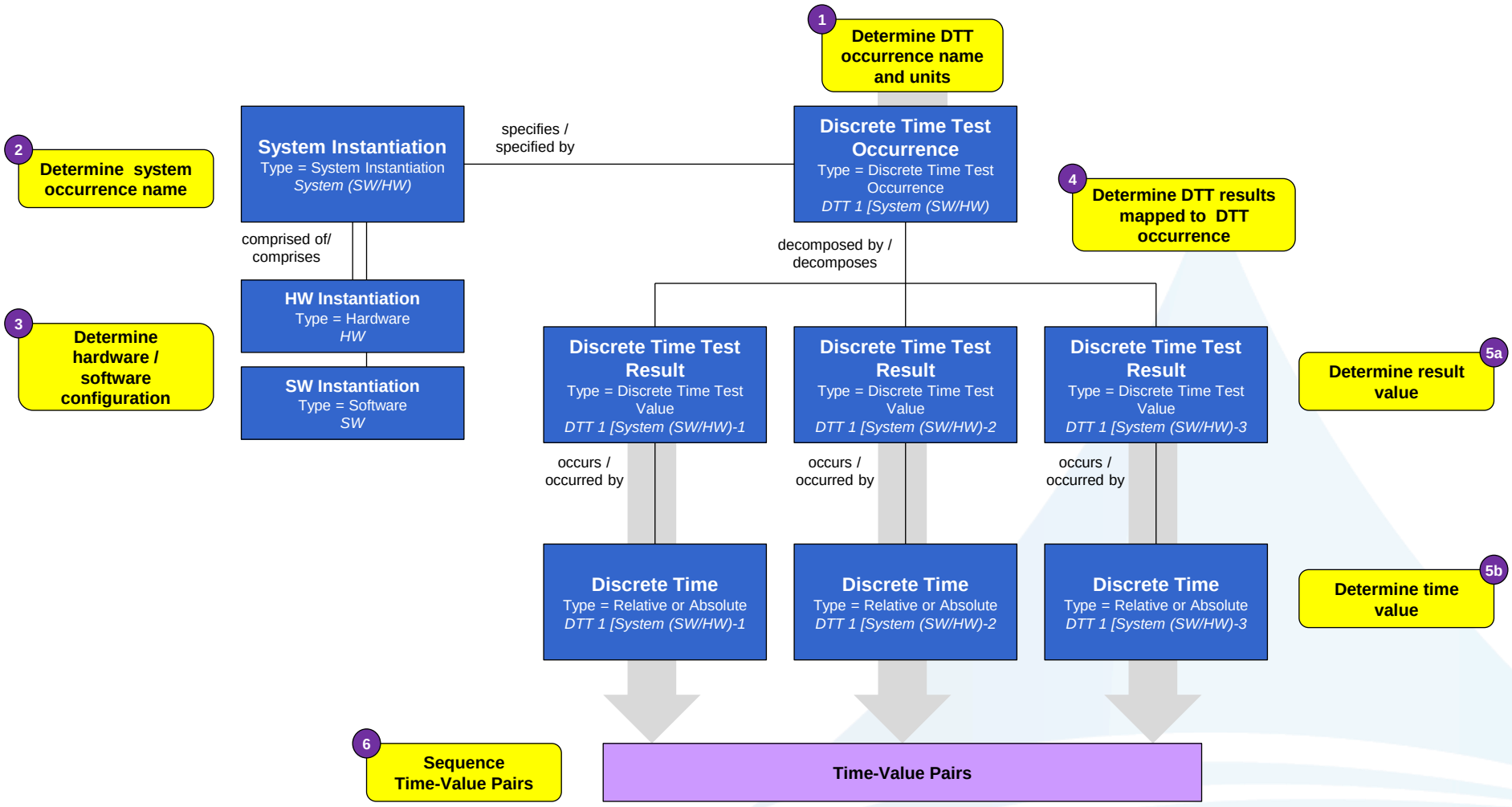


DISCRETE TIME TESTING DATA MANIPULATION

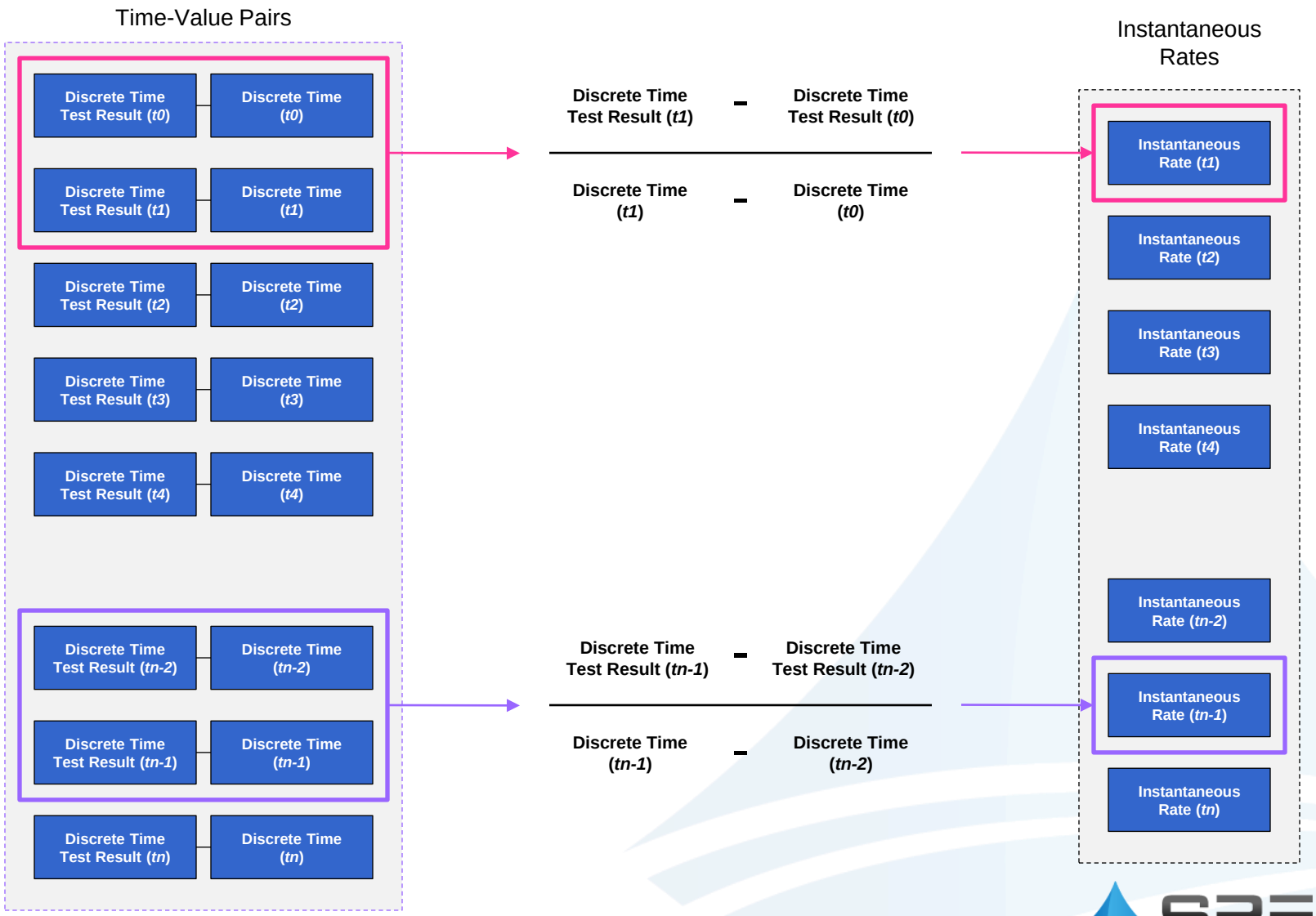
Discrete Time Test View



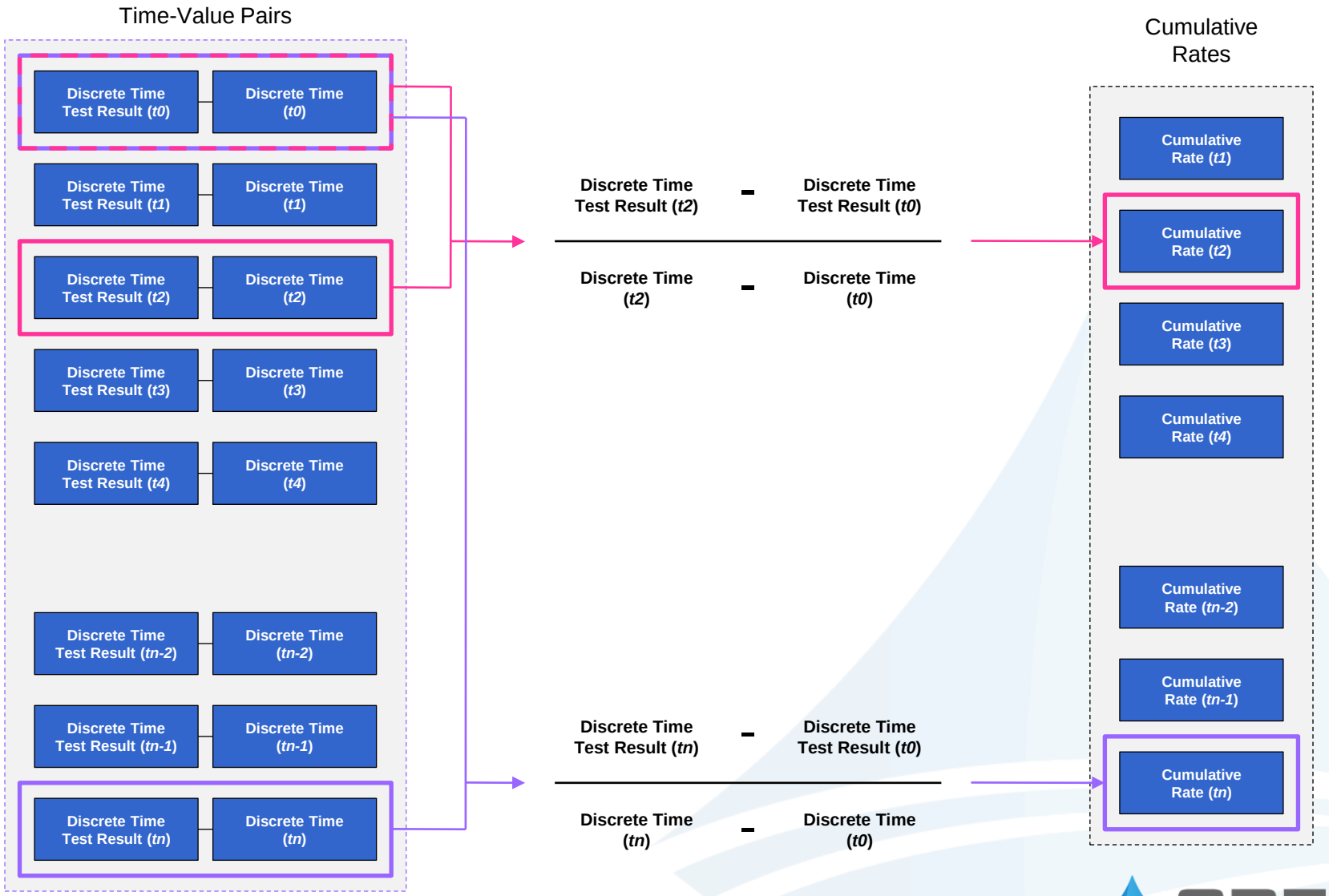
Extract Time-Value Pair Sequence



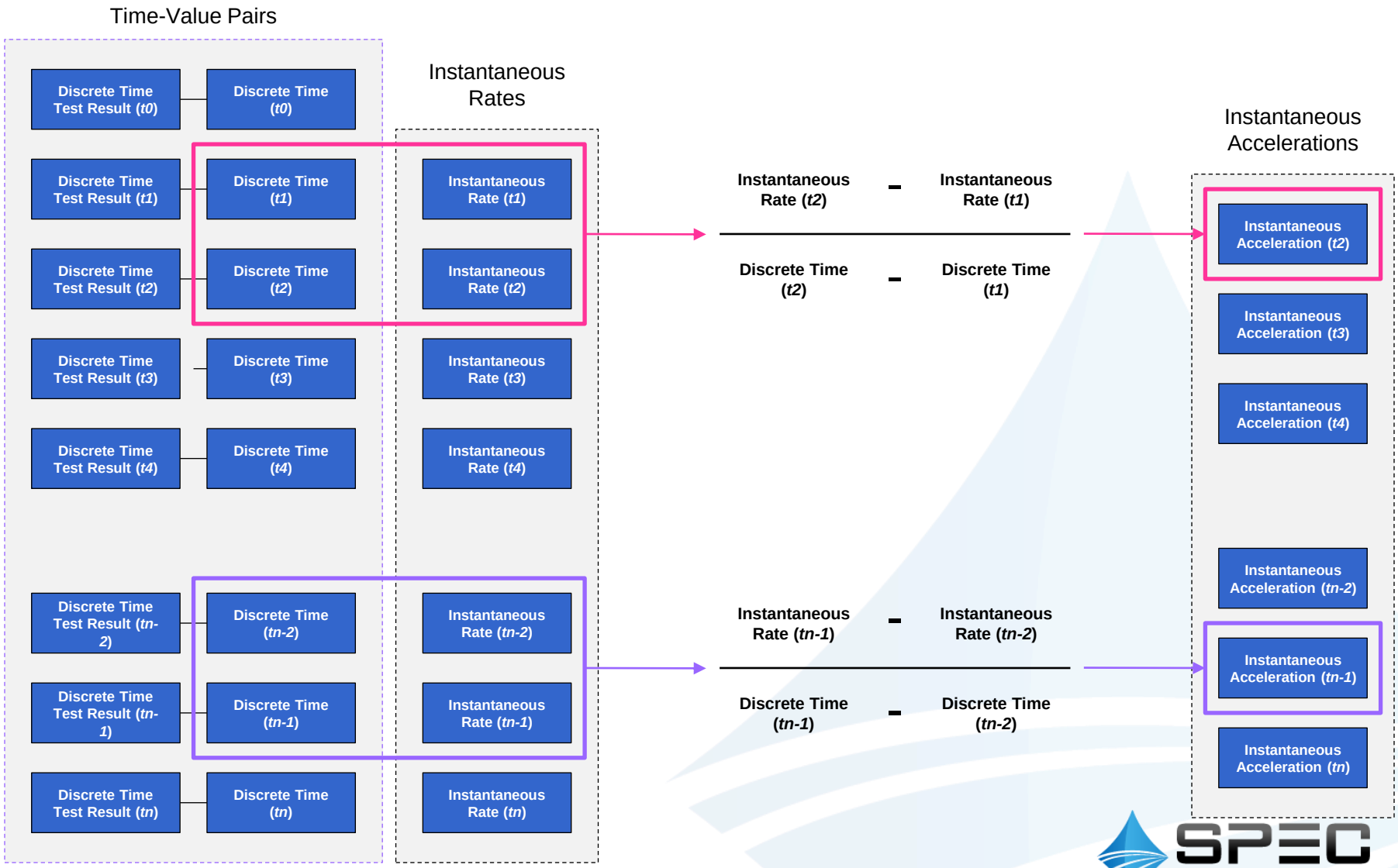
Instantaneous Rate Determination



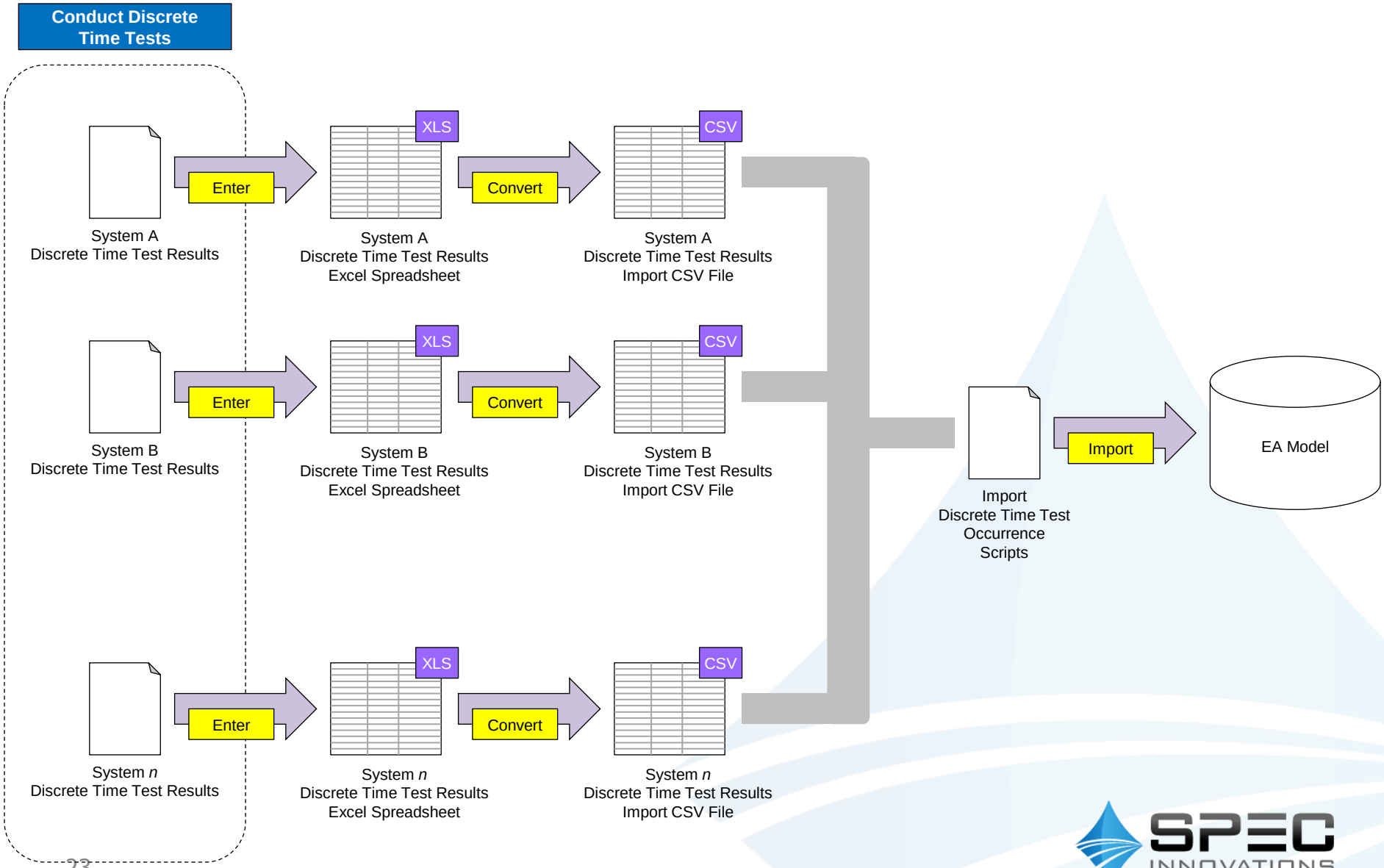
Cumulative Rate Determination



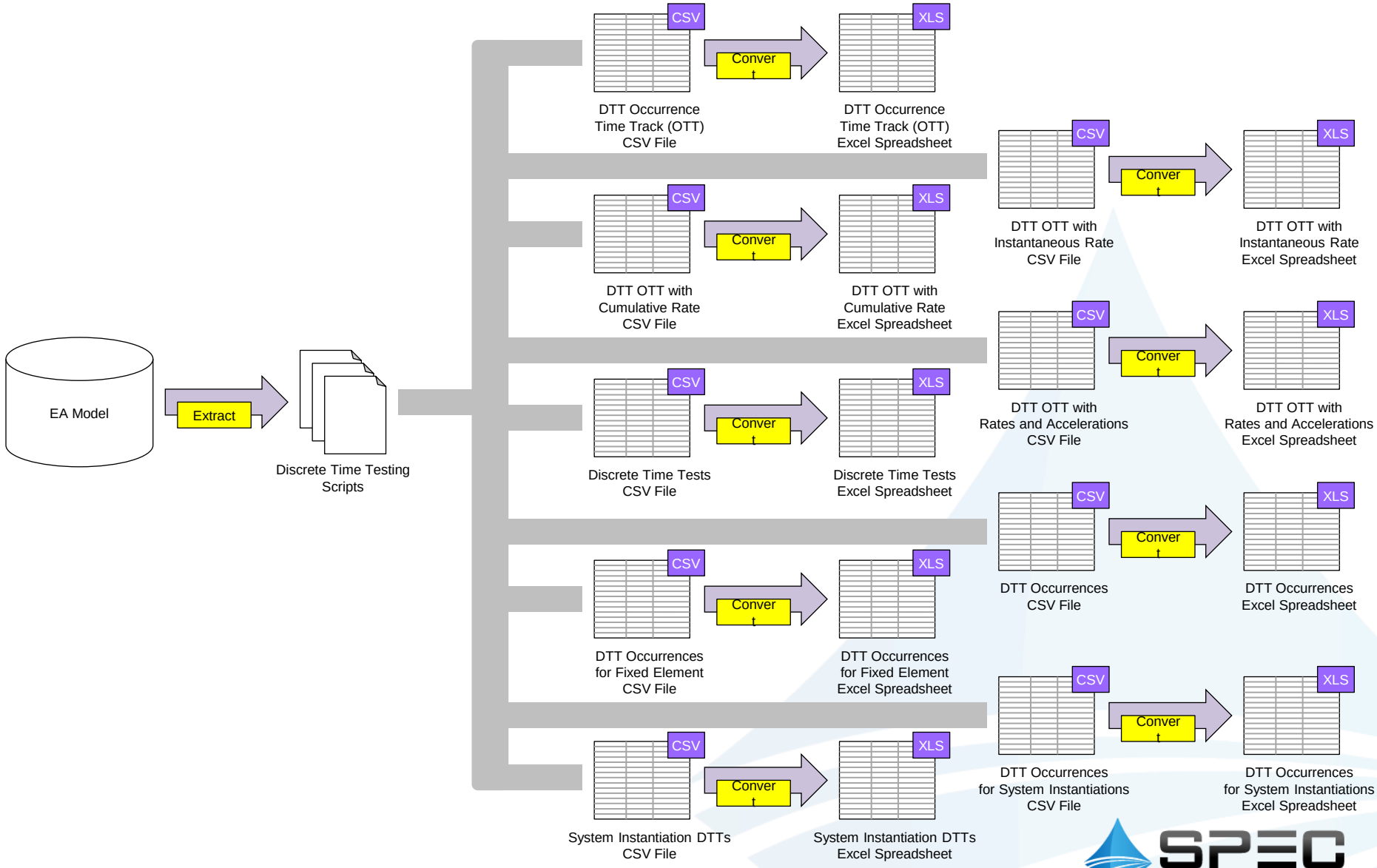
Instantaneous Acceleration Determination



Discrete Time Test Results



Discrete Time Test (DTT) Document Creation



SUMMARY

Summary

- Evaluation and performance data can be captured in Enterprise Architecture (EA) models
- End-to-end traceability can be ensured by capturing the verification portion of the system development lifecycle
- Improved LML schema (next slides)

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LML Taxonomy – Adjustments for T&E

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

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Technical Measurement Subclass

- Adds attributes to the Characteristic Class
  - Improvement Direction: indicates the direction of improvement
  - Objective Value : the goal for this element.
  - Projected Value: expected value to be achieved.
  - Threshold Value: minimum acceptable value
  - Tolerance: percentage of the value that forms the positive and negative tolerance bands.
  - Type: COI, Criteria, Discrete Time Test, Discrete Time Test Value, KPP, MOE, MOP, MOS, Technical Measurement, TPM, TPM Plan: describes various kinds of Technical Measurements

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