



Universität Stuttgart

IPVS

TOSCA4Mashups

Enhanced Method for
On-Demand Data Mashup Provisioning

**Pascal
Hirmer &
Bernhard
Mitschang**

TOSCA4Mashups

Motivation

Motivation (I)

The Big Data Problem

- Increasing amount of data
- Data sources are oftentimes heterogeneous, distributed, and dynamic
- Coping with the *Big Data Problem* enables higher efficiency, effectiveness for problem-solving and leads to higher profits

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 - Flexible modeling and execution of data integration and processing scenarios based on non-functional user requirements

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Details: PHD Poster Session 😊

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Basic Concepts

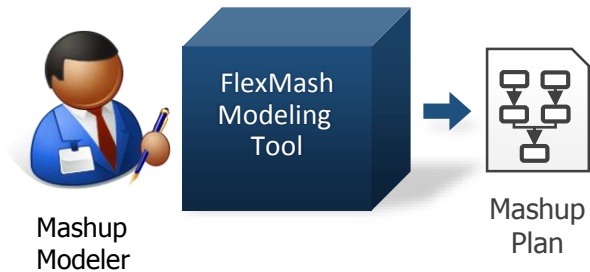
FlexMash: How does it work?

FlexMash – How does it work? (I)

The FlexMash method

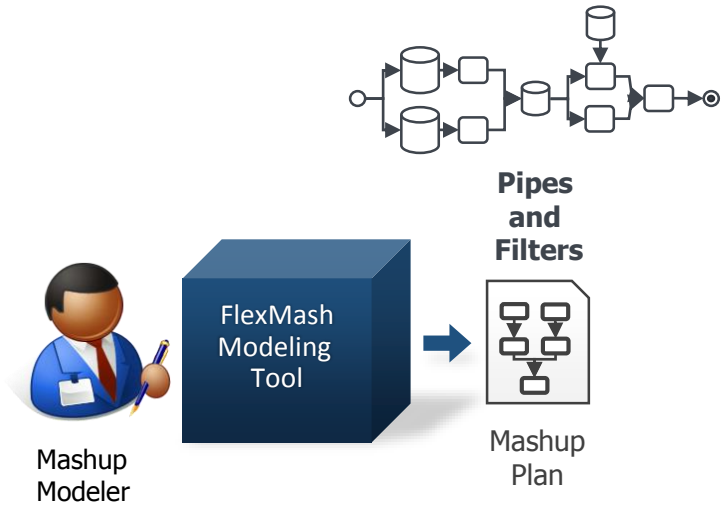
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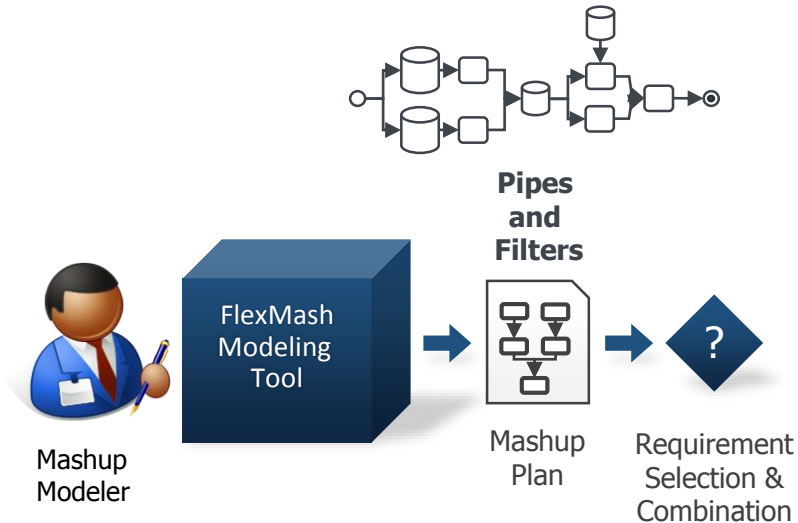
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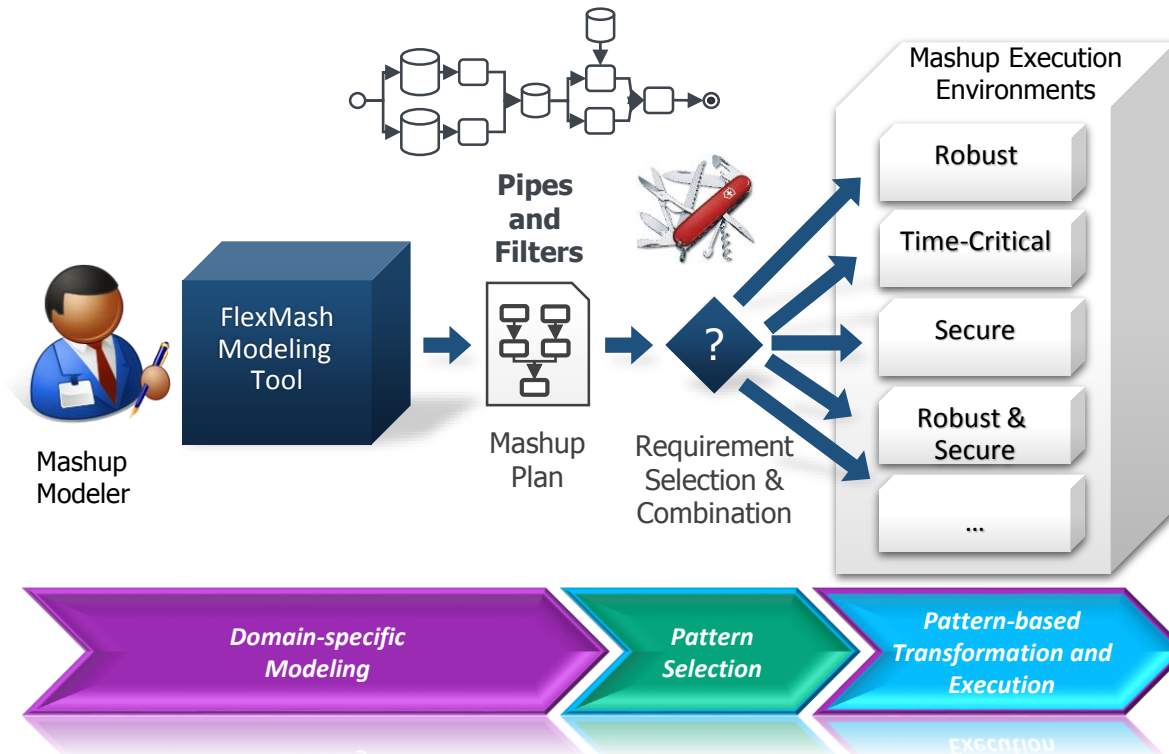
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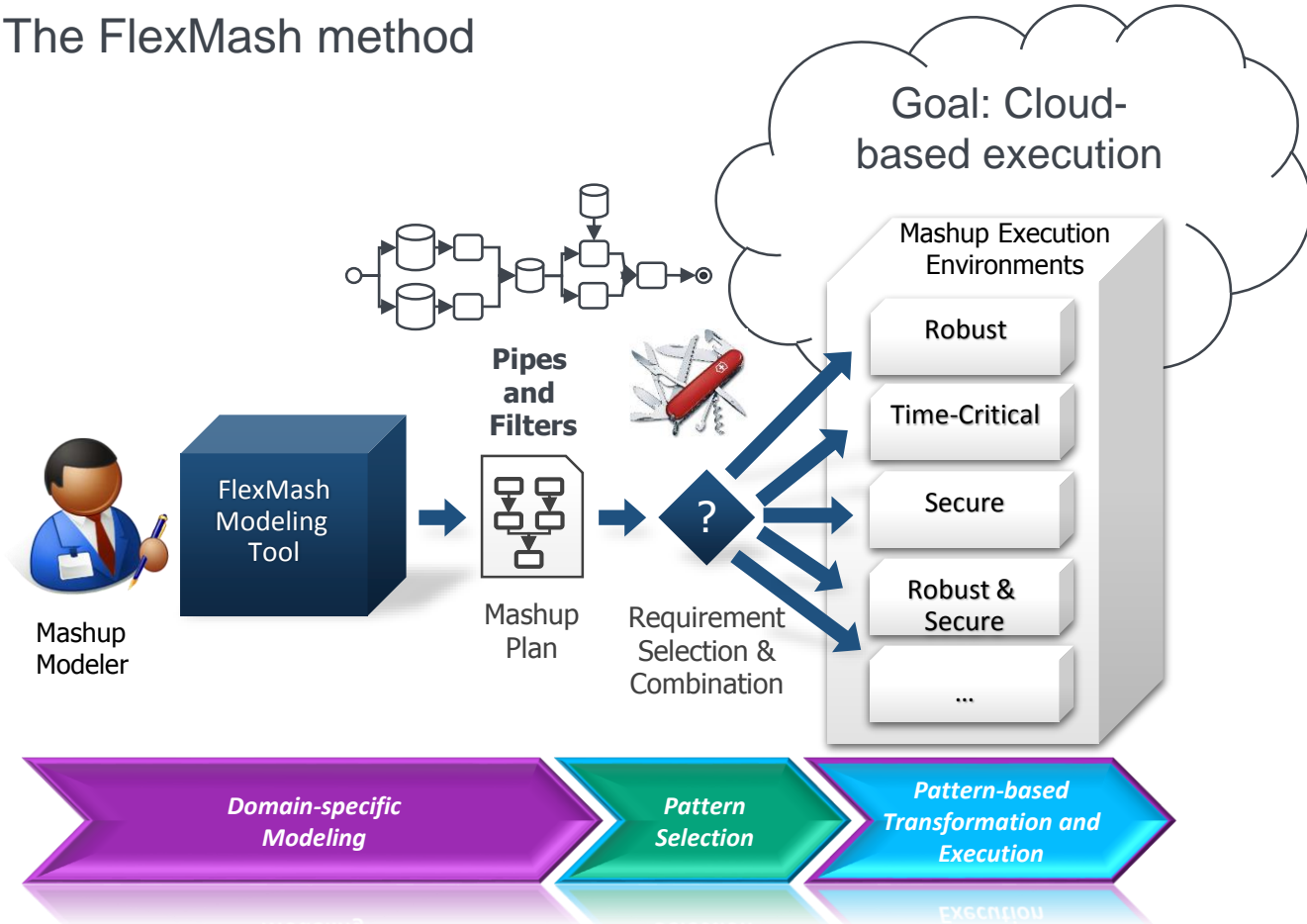
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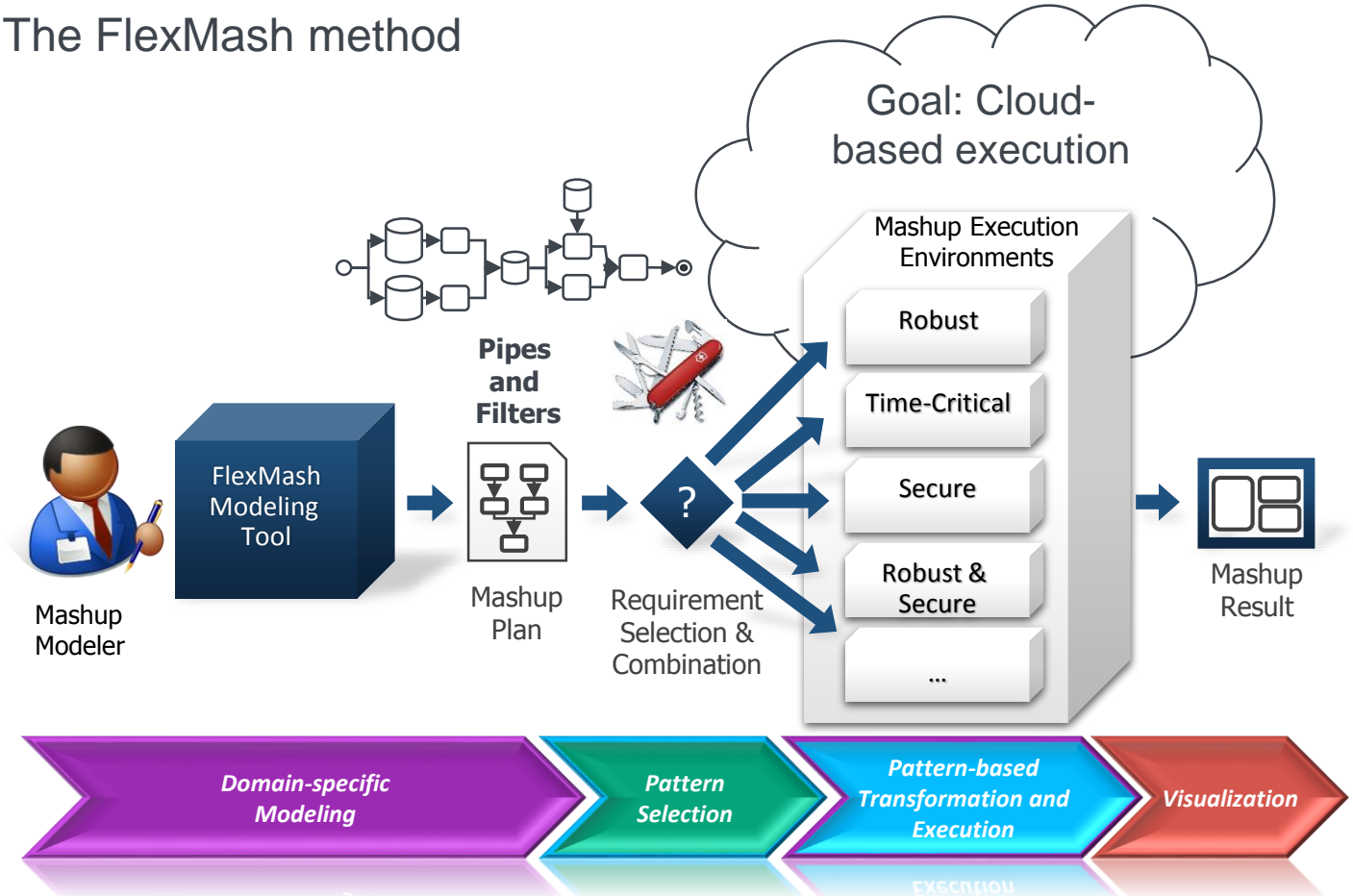
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TOSCA4Mashups

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TOSCA4Mashups

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- **Solution:** TOSCA4Mashups
 - Using the Topology and Orchestration Specification for Cloud Applications for on-demand provisioning of data mashup components

Basic Concepts

TOSCA

Basic Concept

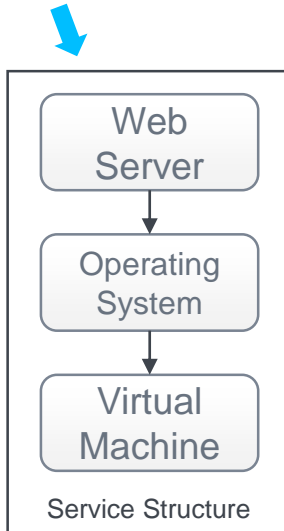
OASIS TOSCA

Topology and Orchestration Specification for Cloud Applications

Basic Concept

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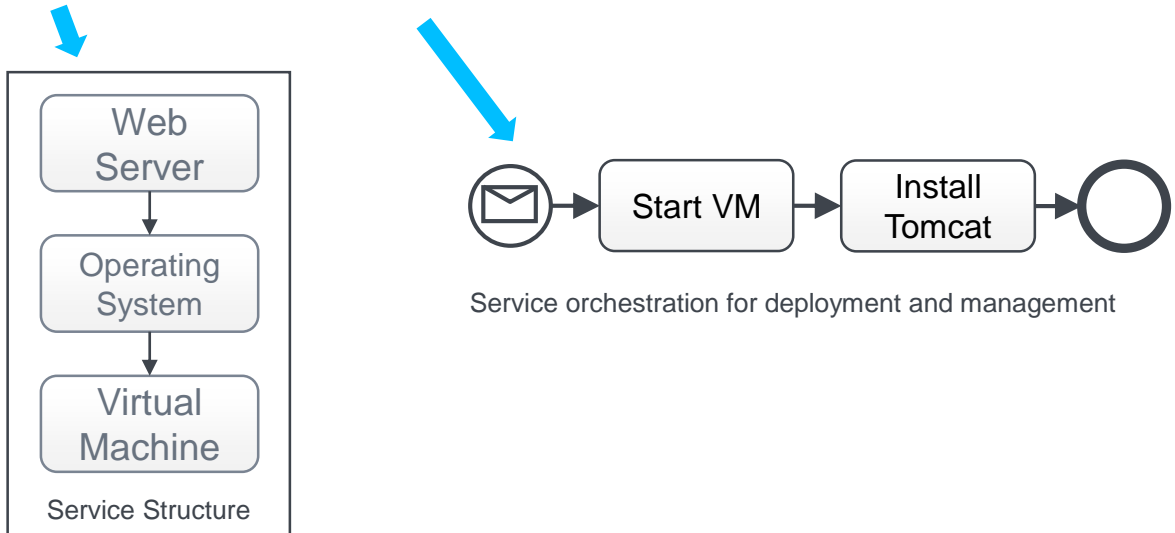
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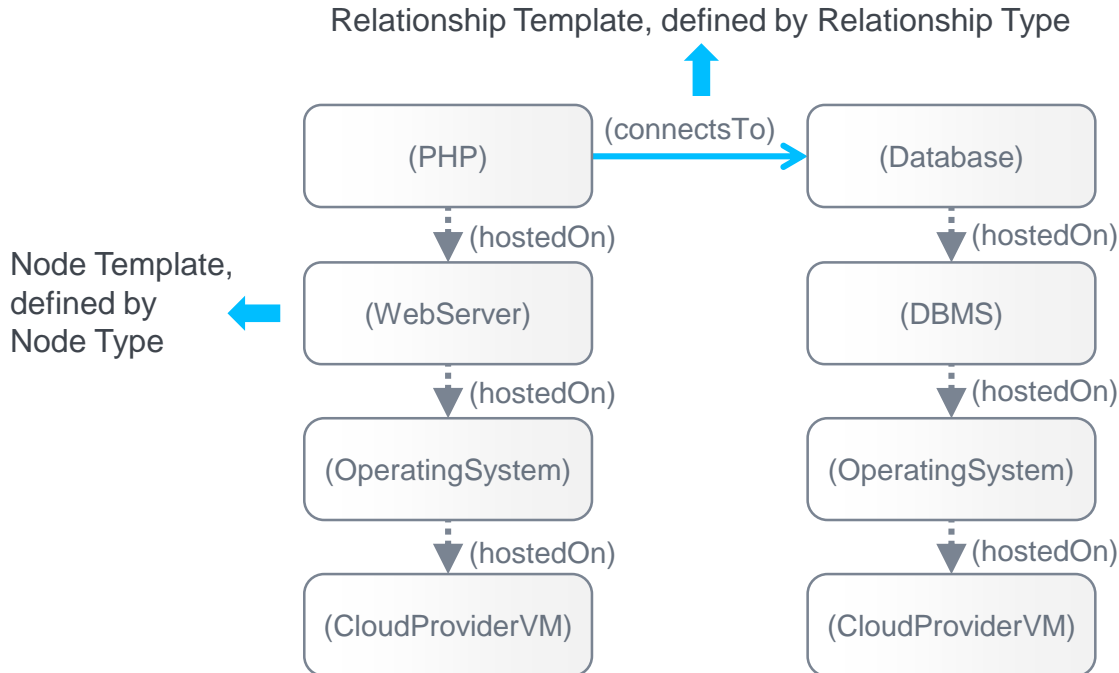
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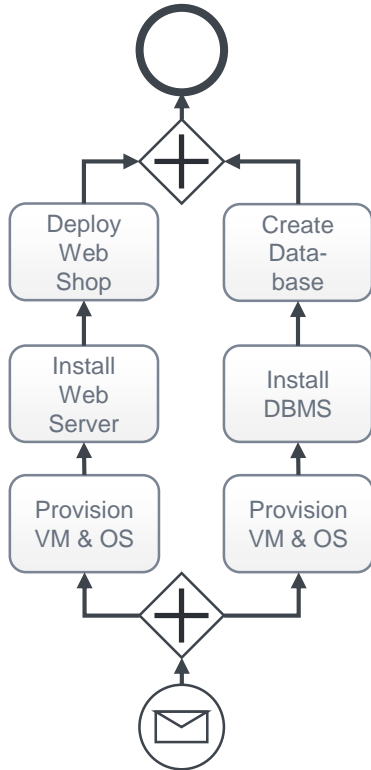
Basic Concept

Example: TOSCA Topology

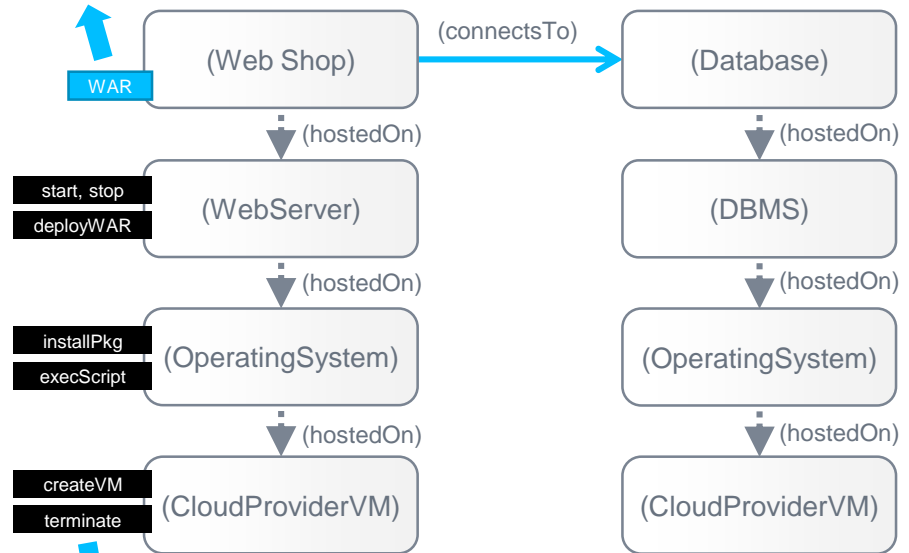


Basic Concept

Example: Provisioning Plan and TOSCA Topology Template



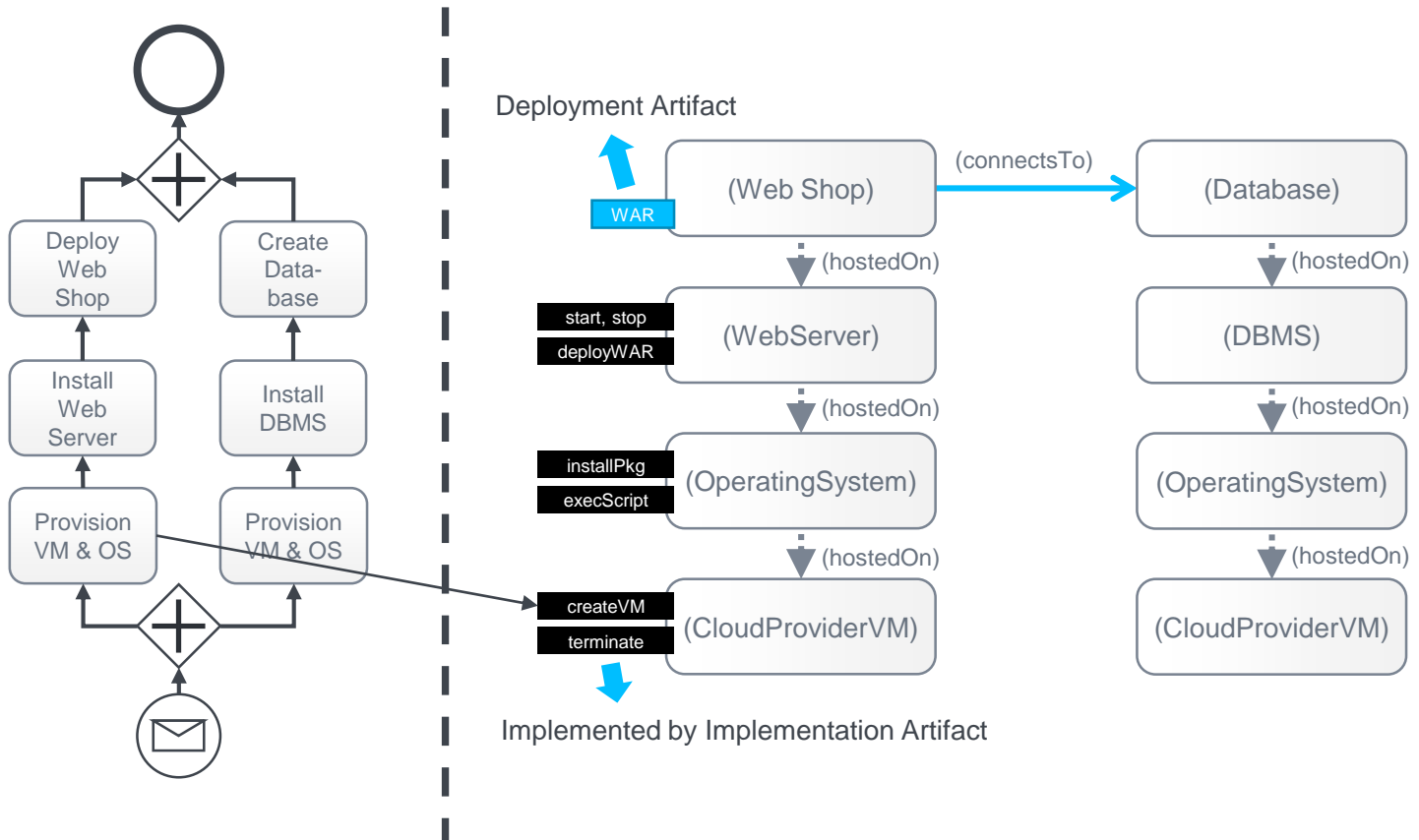
Deployment Artifact



Implemented by Implementation Artifact

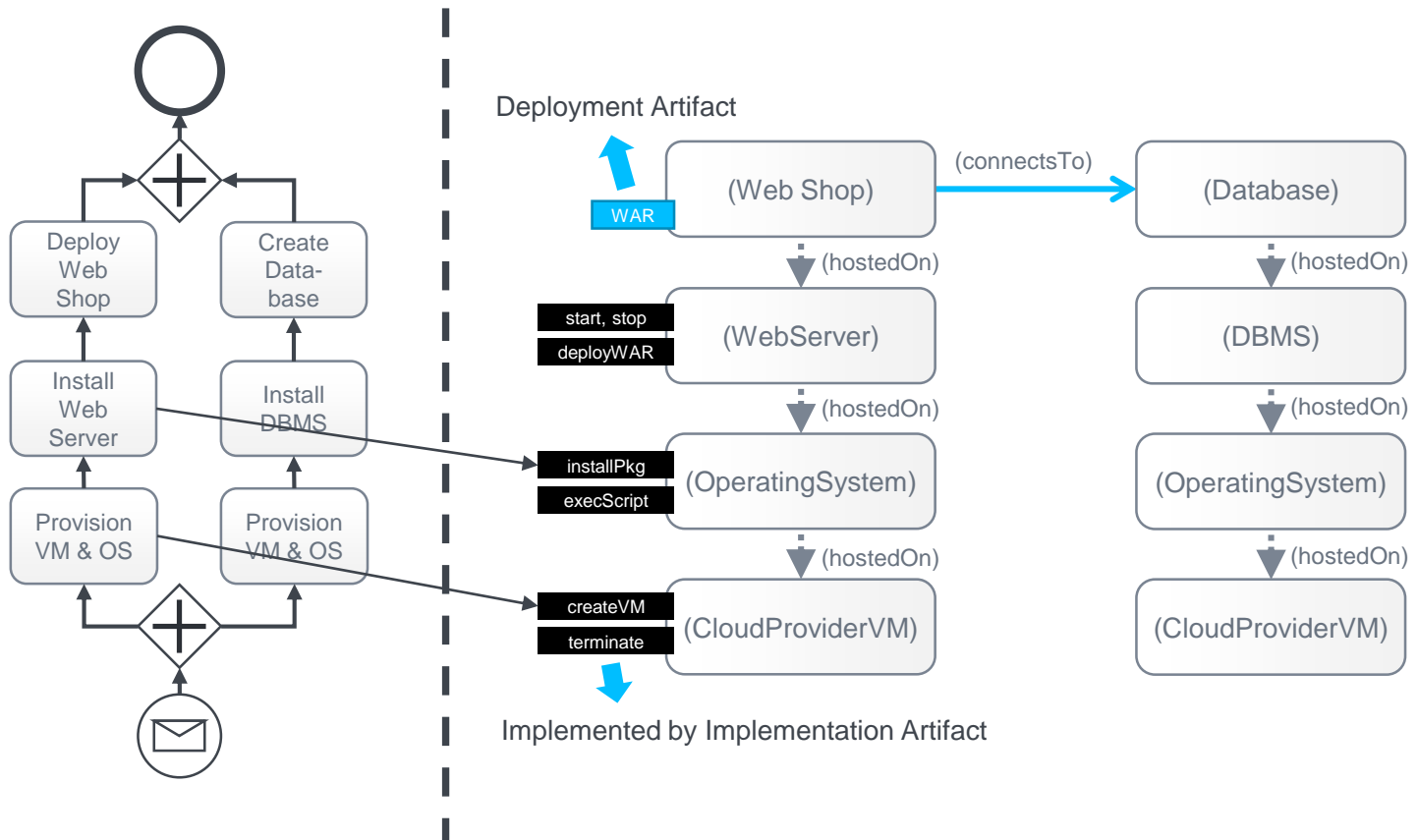
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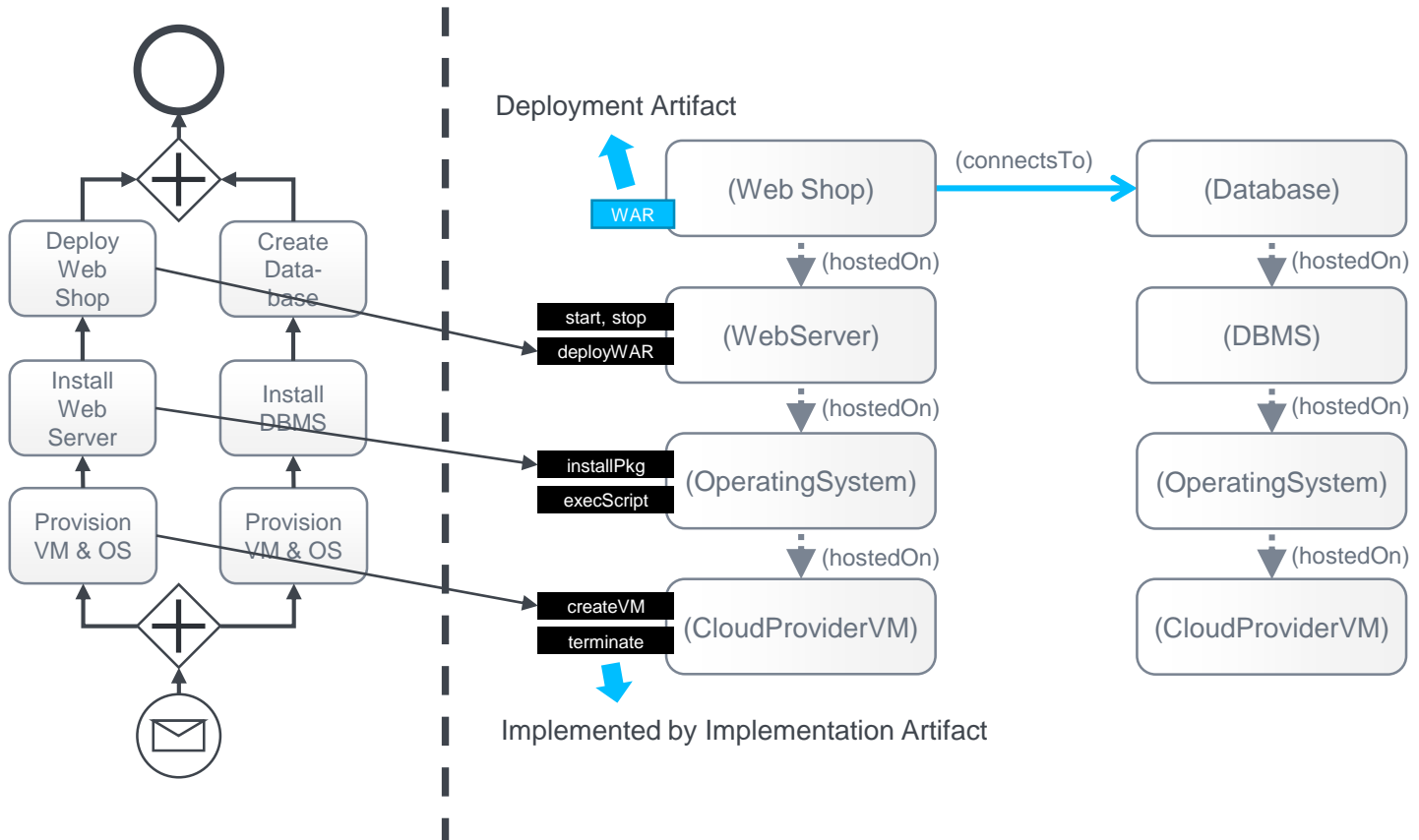
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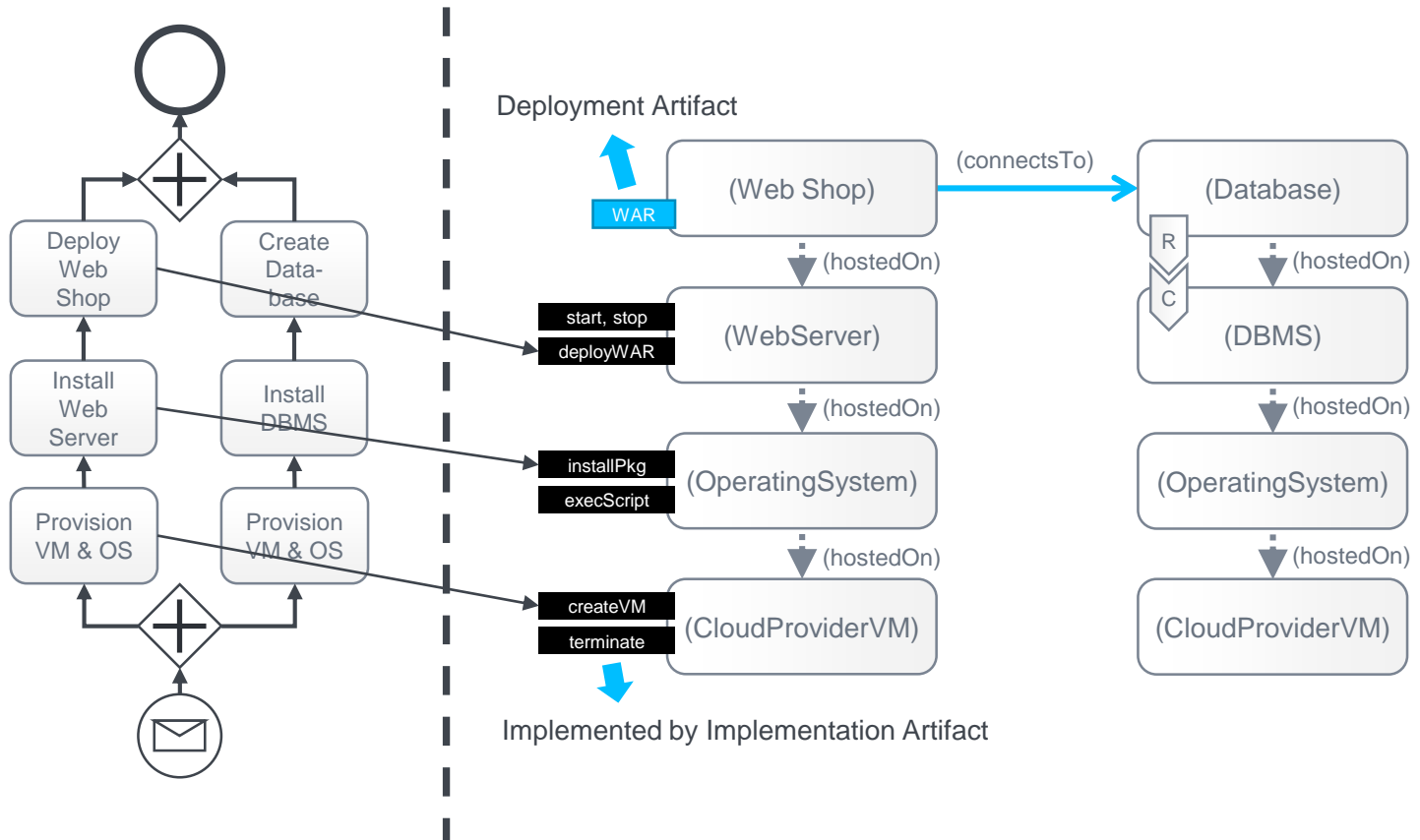
Basic Concept

Example: Provisioning Plan and TOSCA Topology Template



Basic Concept

Example: Provisioning Plan and TOSCA Topology Template



Basic Concept

OASIS TOSCA: Cloud Service Archive (CSAR)

- CSAR: contains all necessary components for provisioning of an application (topology, build plan, binaries,...)
- Structure:
 - TOSCA-Metadata
 - Definitions
 - Arbitrary folders, e.g., for:
 - Build Plan
 - Imported declarations
 - Artifacts

Basic Concept

OASIS TOSCA: TOSCA Runtime

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 - Declarative: based on topology
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 - Plan generator combines declarative and imperative approach

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Also remember Monday's tutorial!

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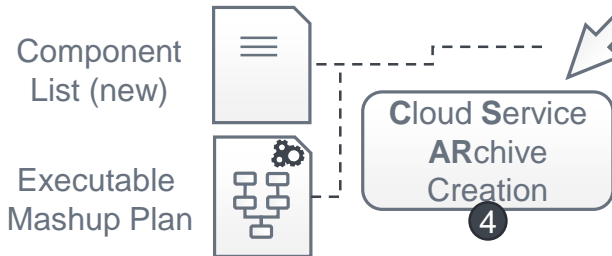
Existing FlexMash method steps

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Extended TOSCA4Mashups method steps

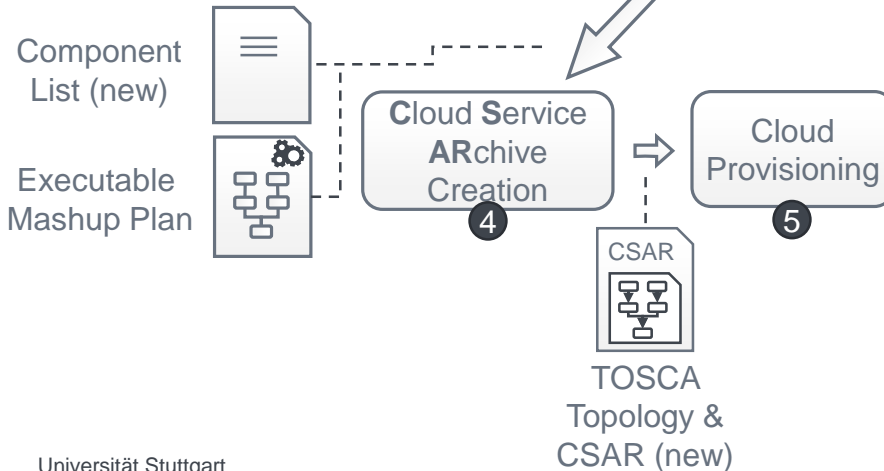


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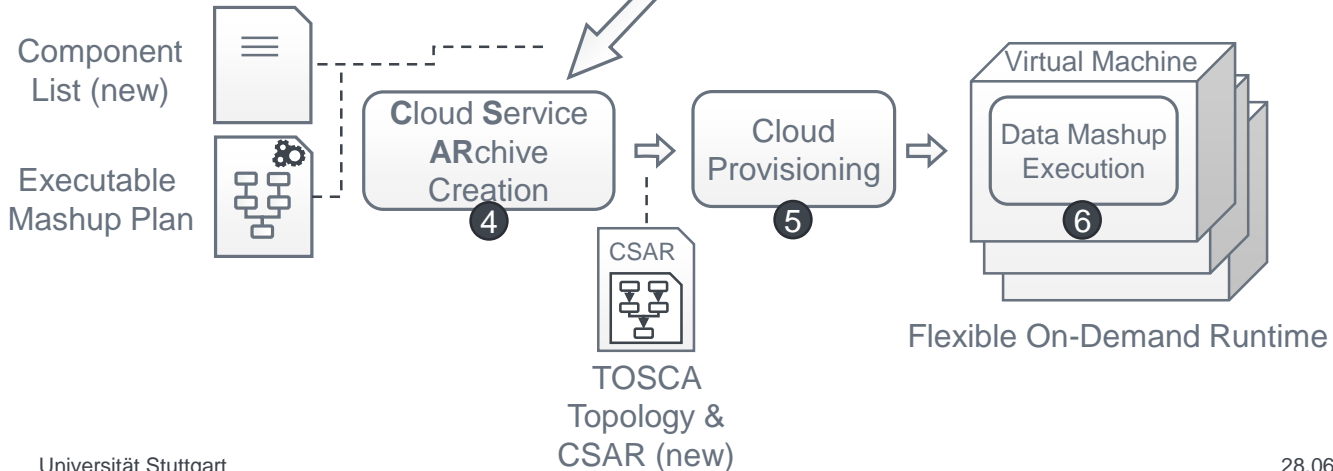


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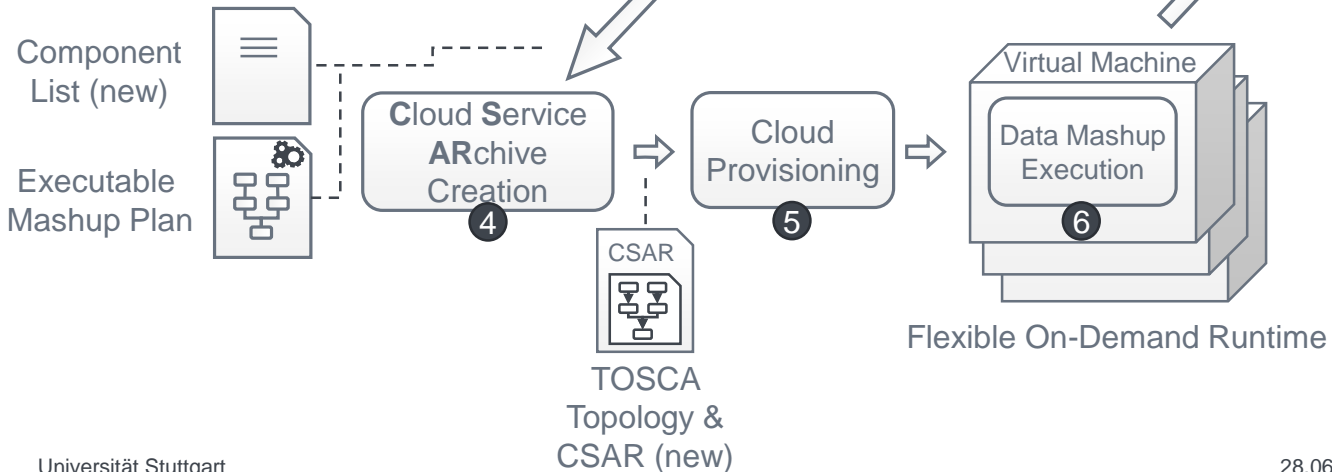


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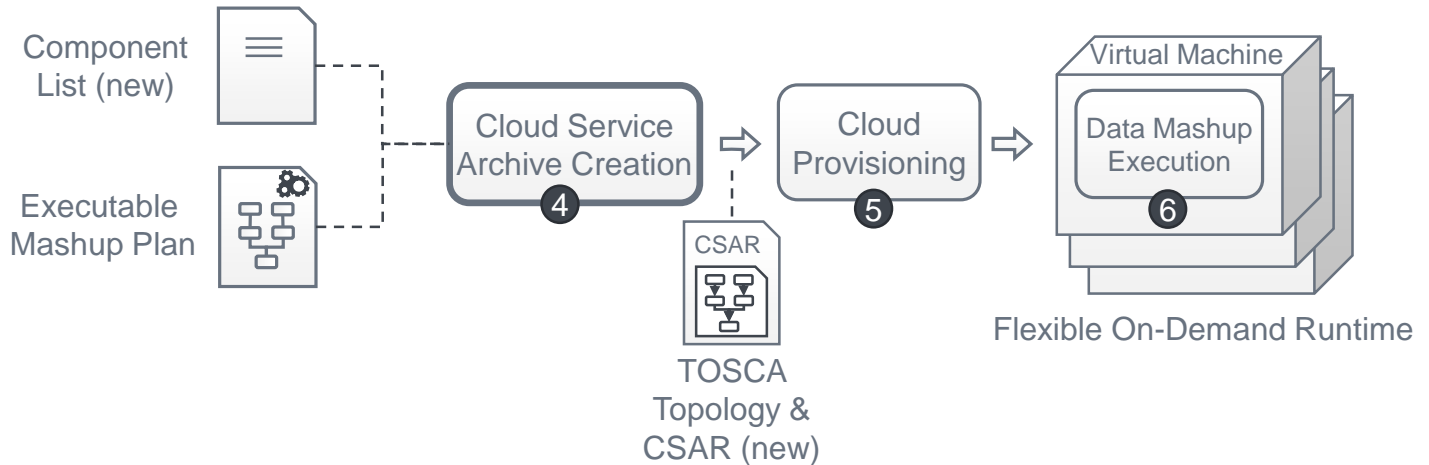
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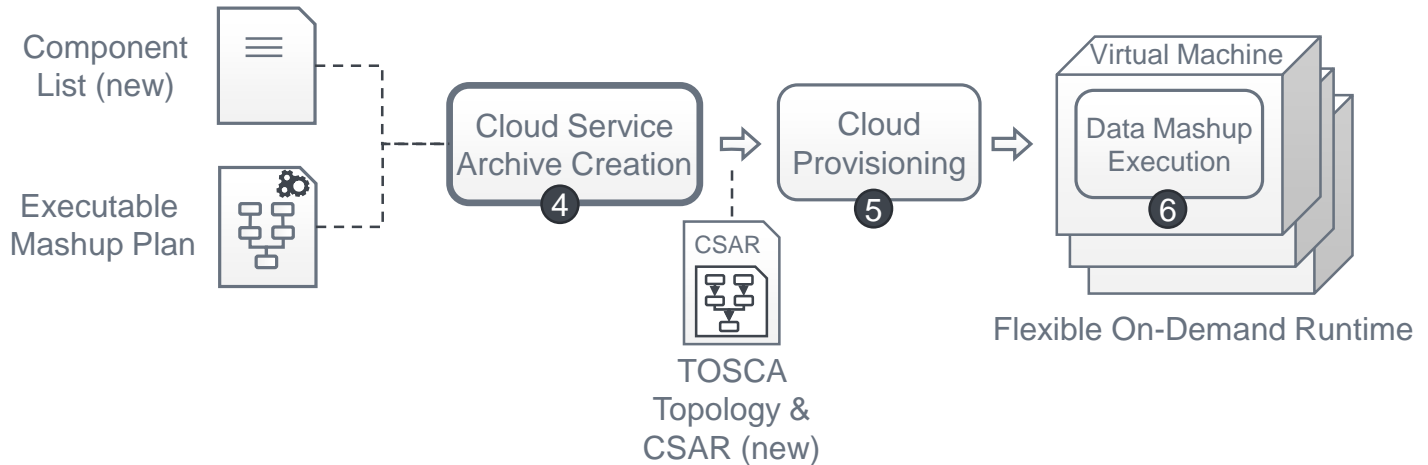
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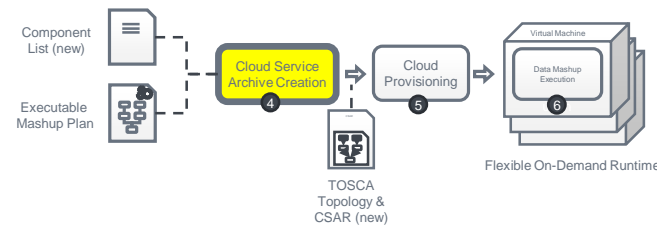
Extended Method Steps



We will achieve full automation of software component deployment based on TOSCA

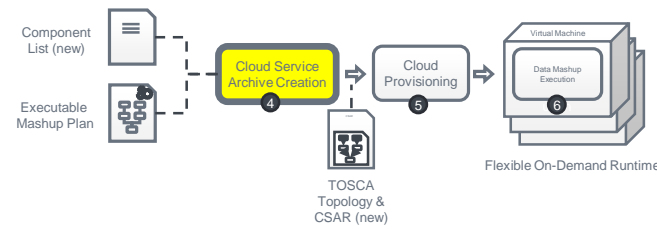
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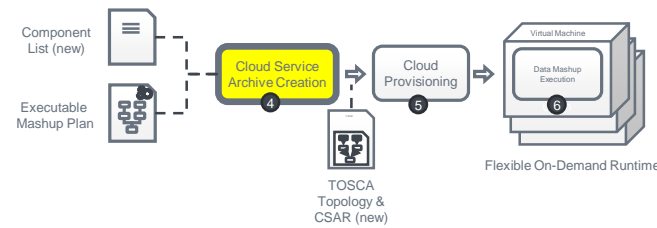


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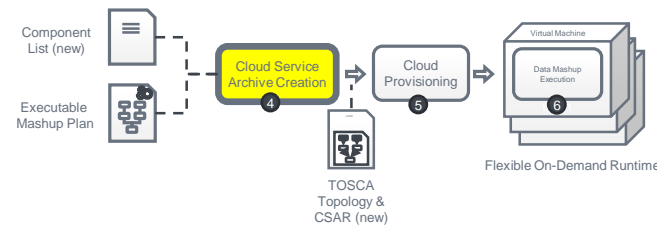
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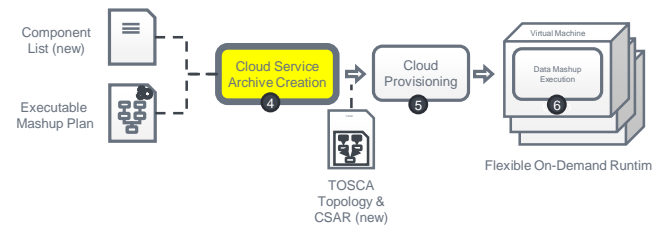
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The TOSCA4Mashups Approach

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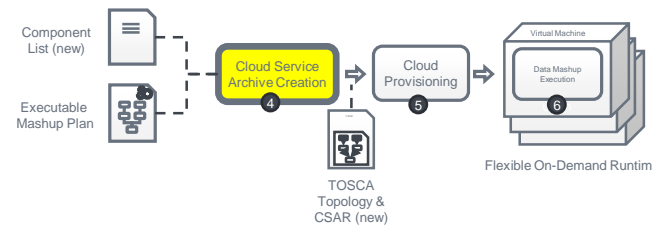


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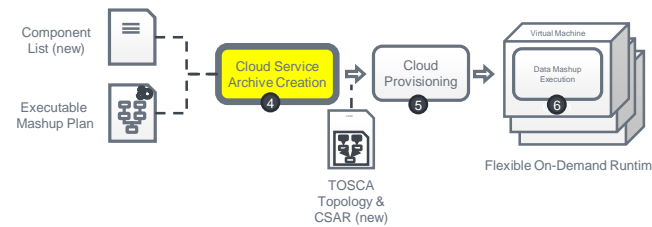


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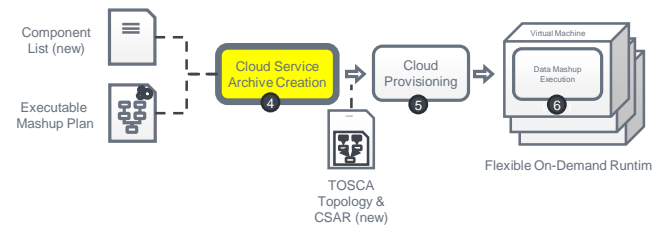


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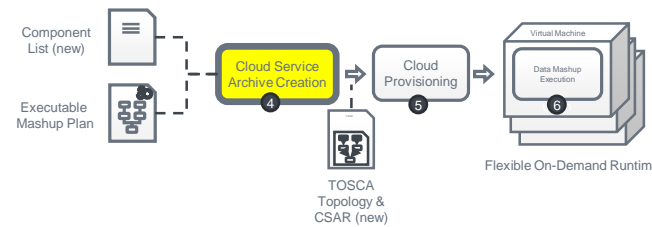


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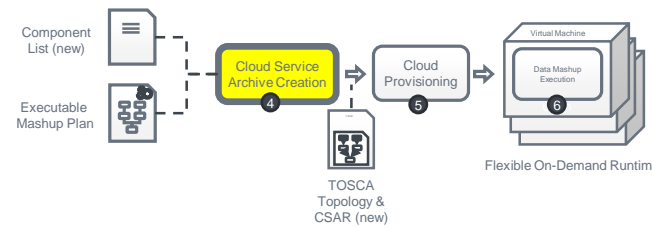
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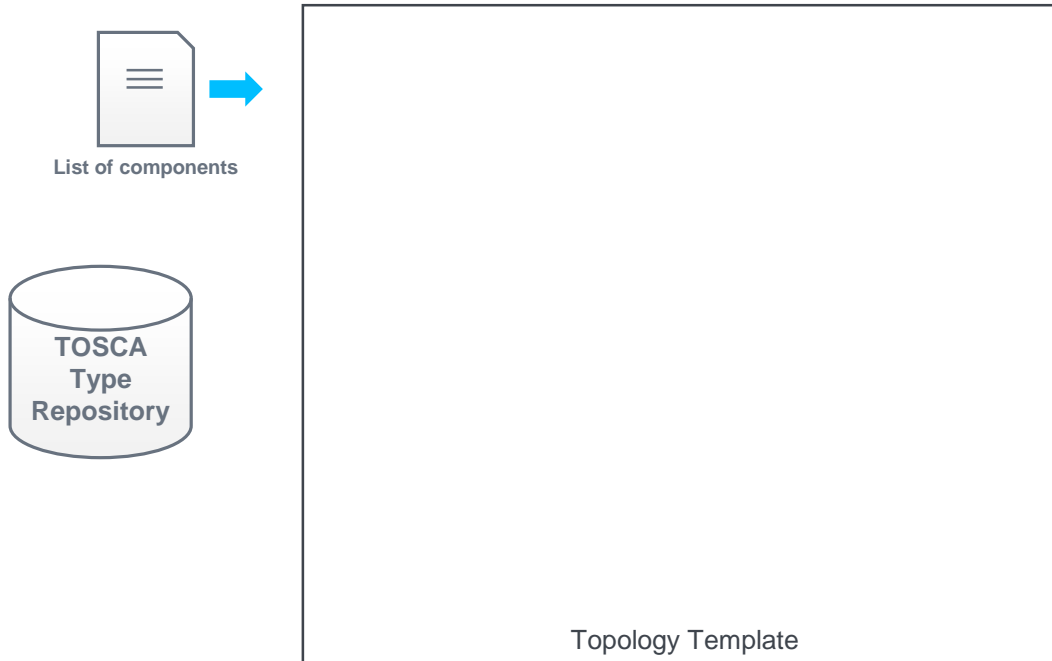
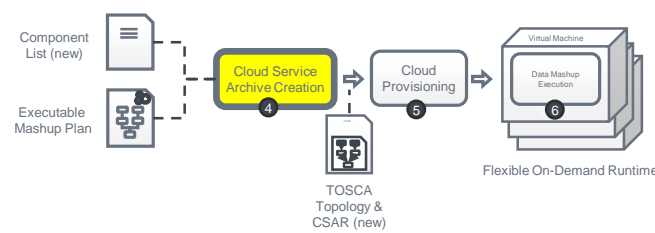
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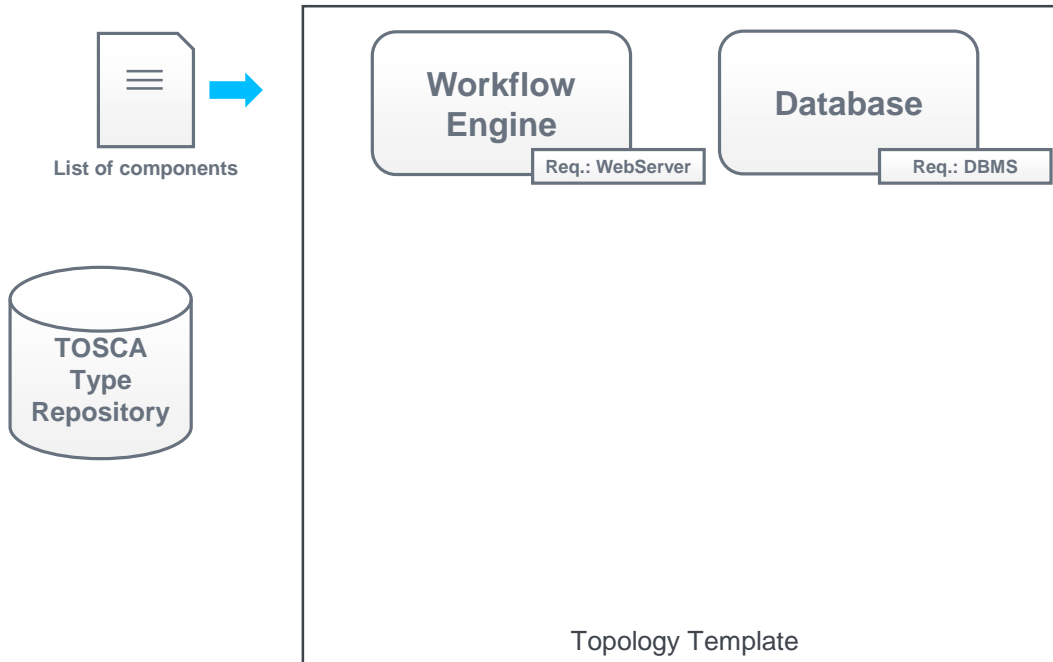
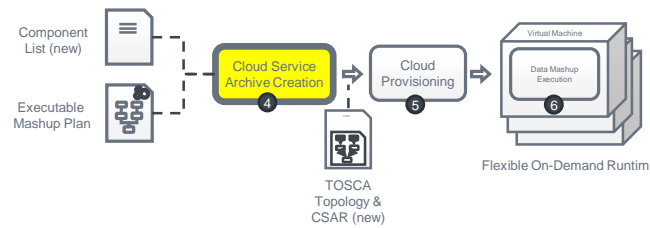
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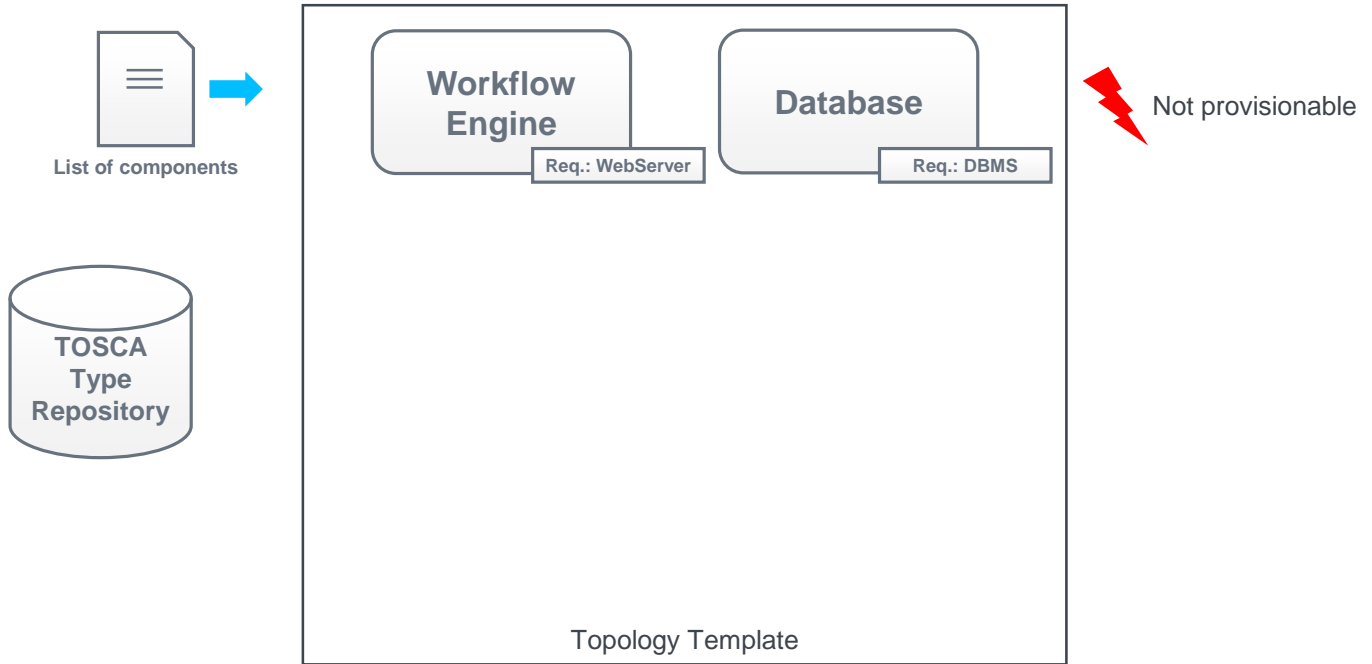
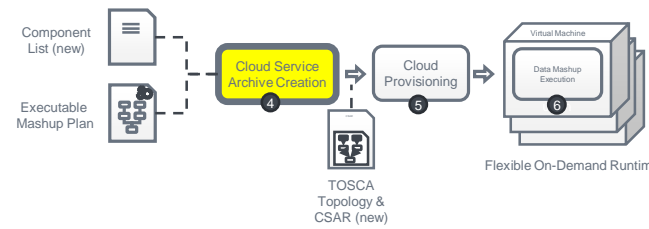
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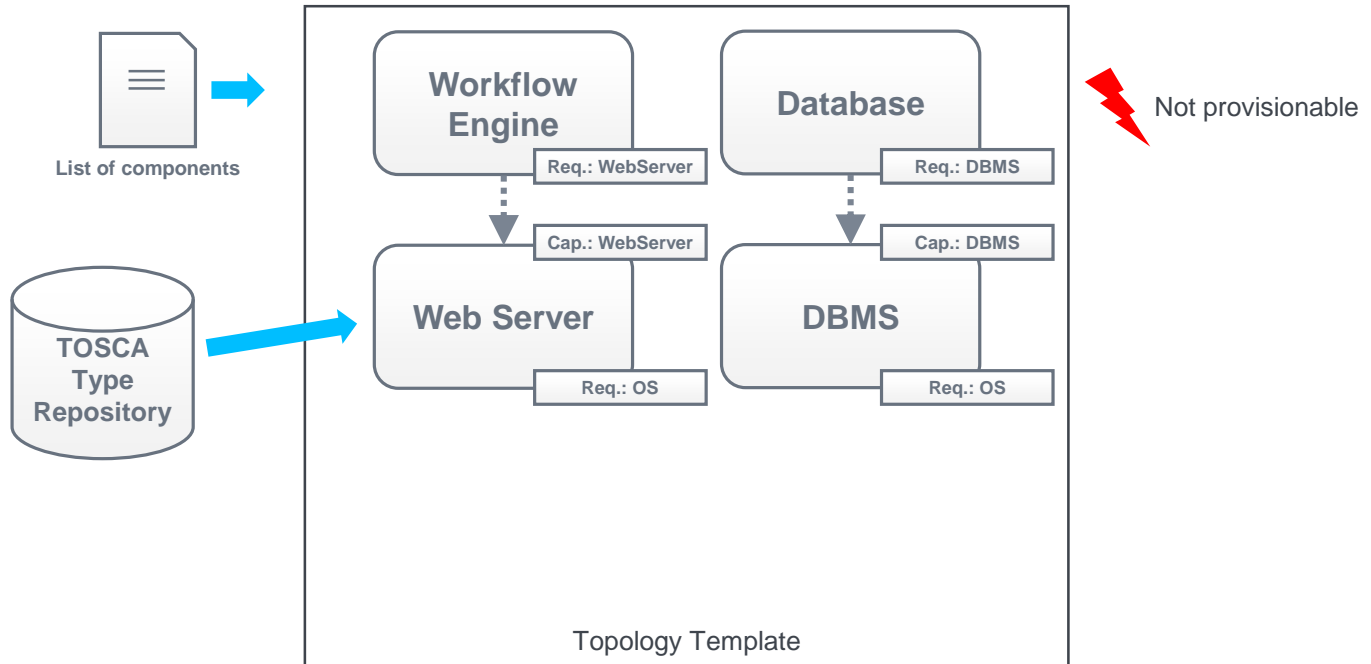
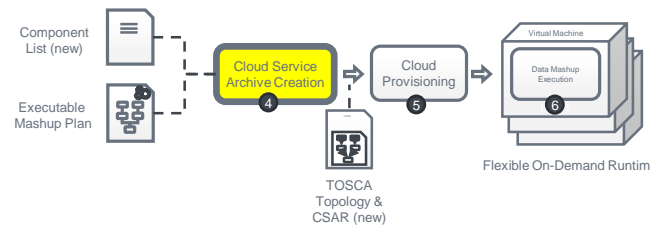
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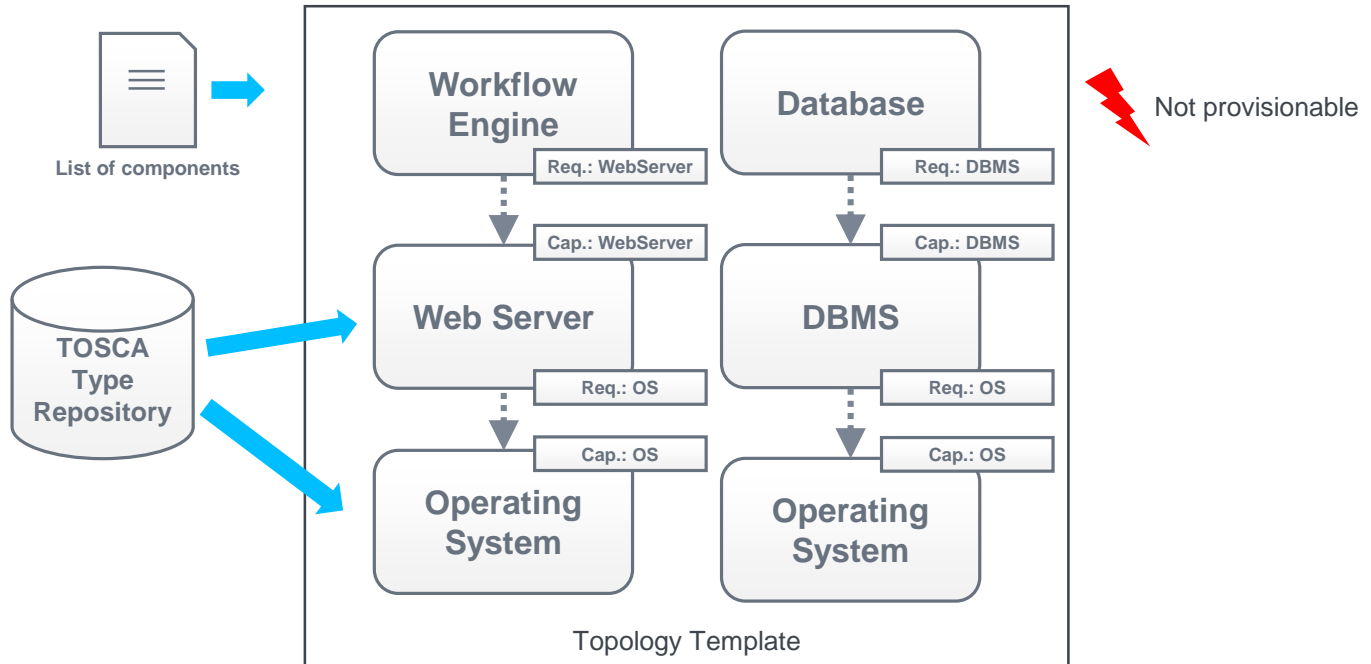
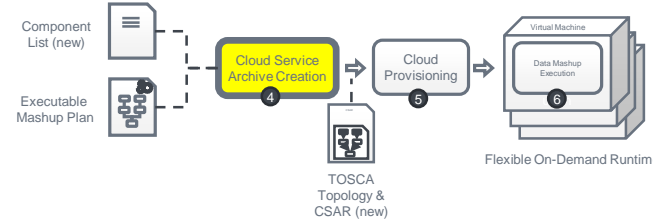
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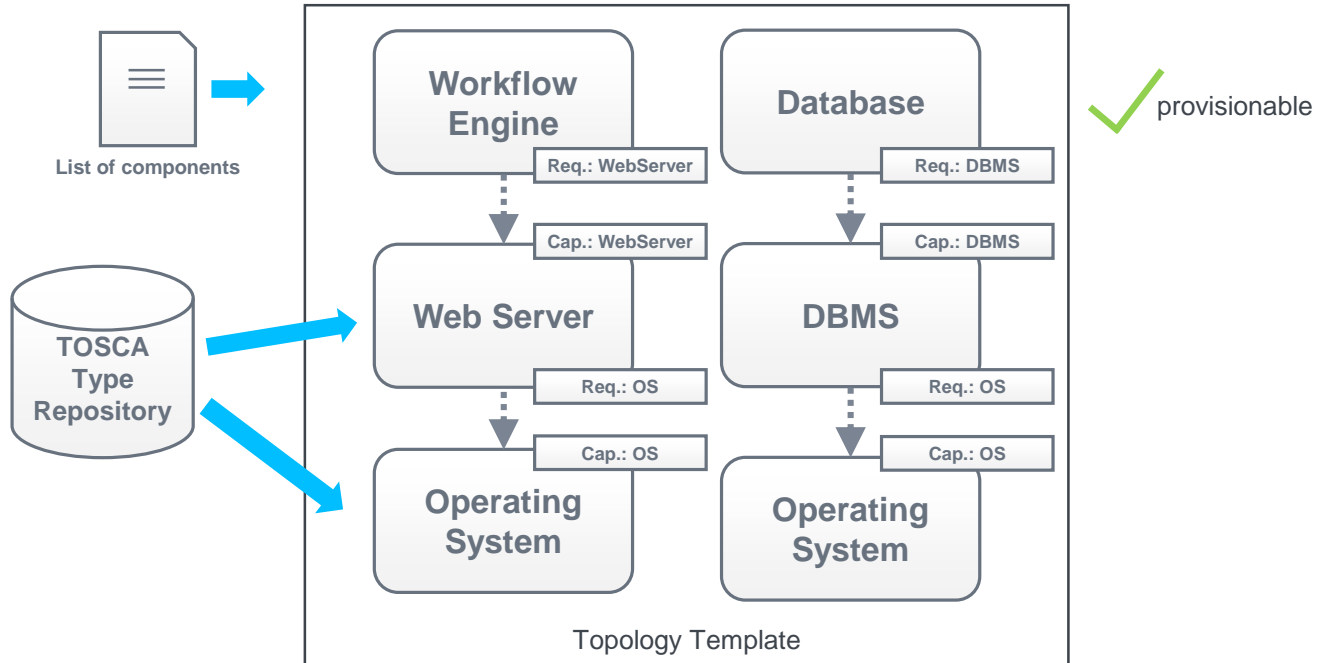
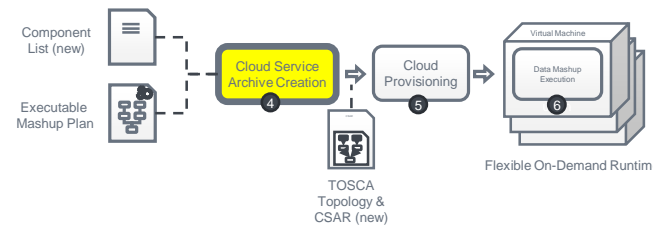
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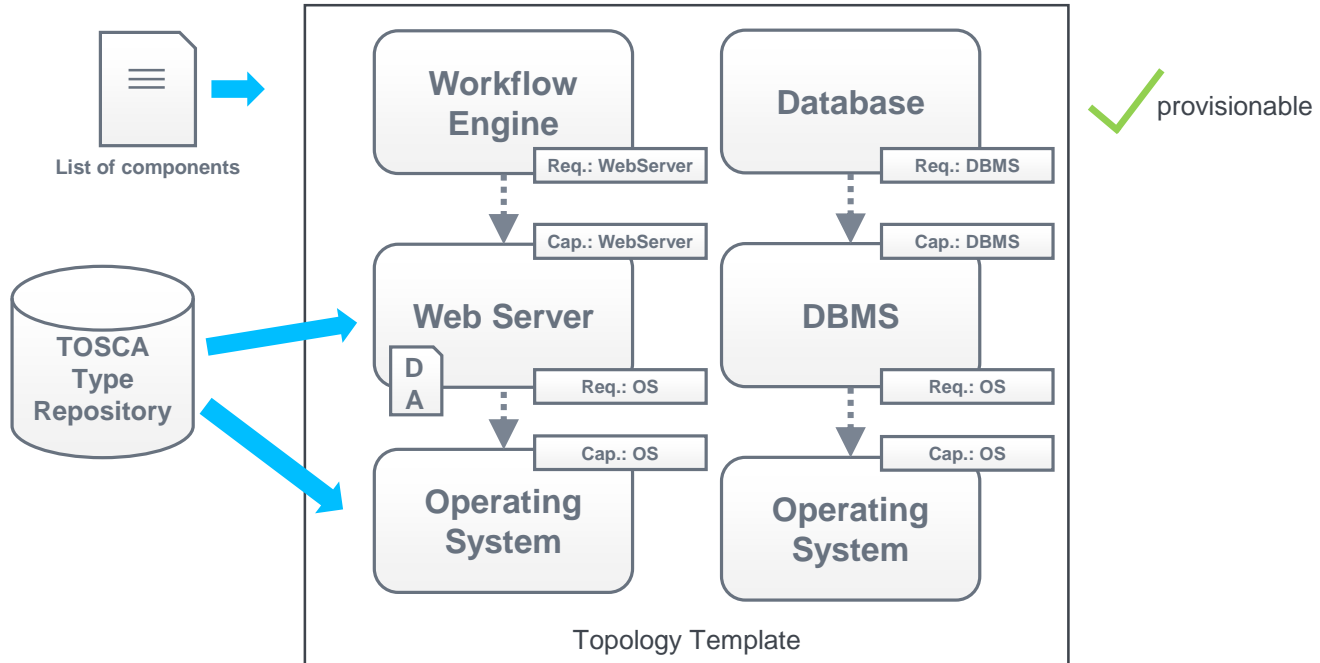
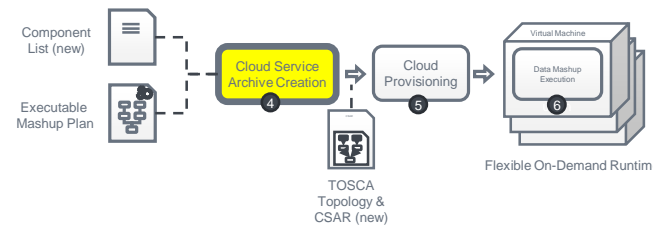
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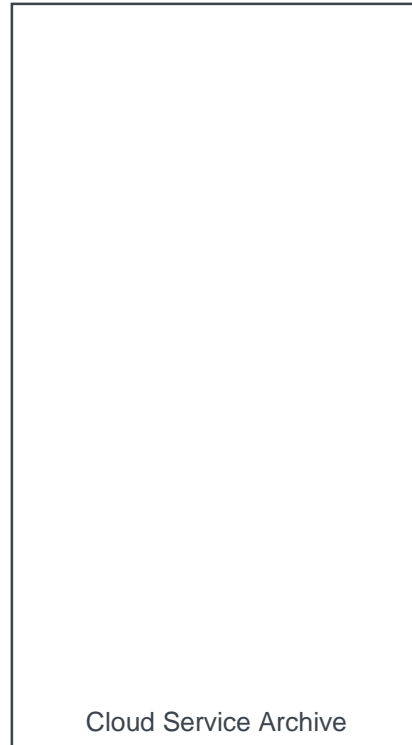
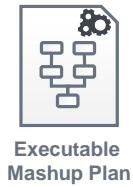
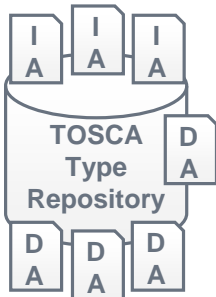
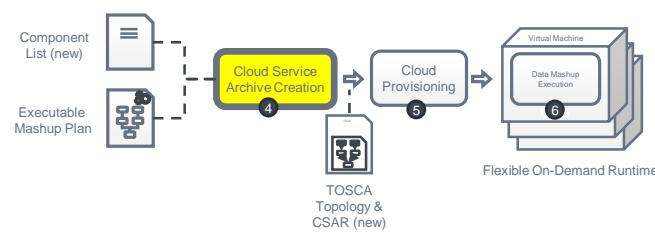
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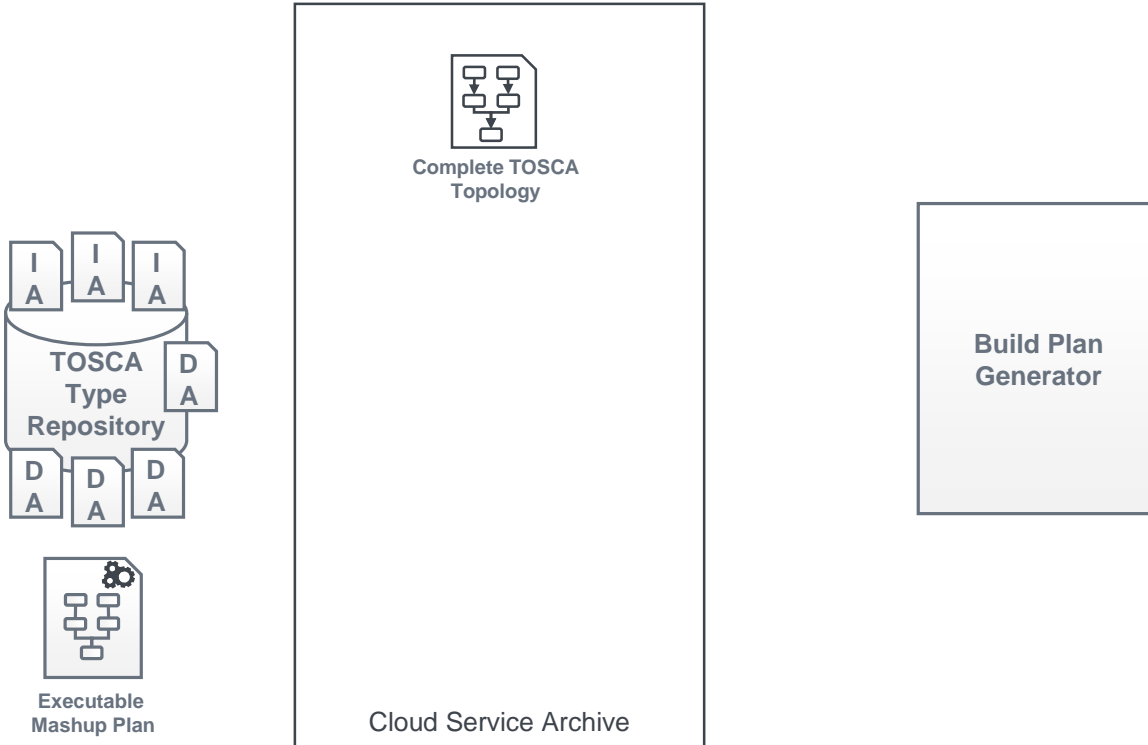
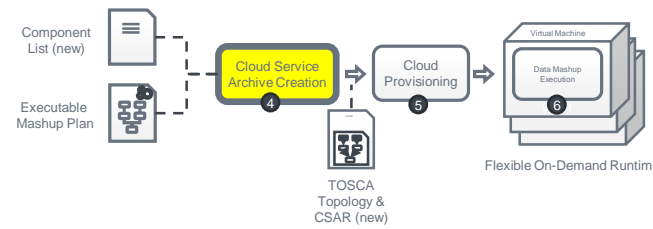
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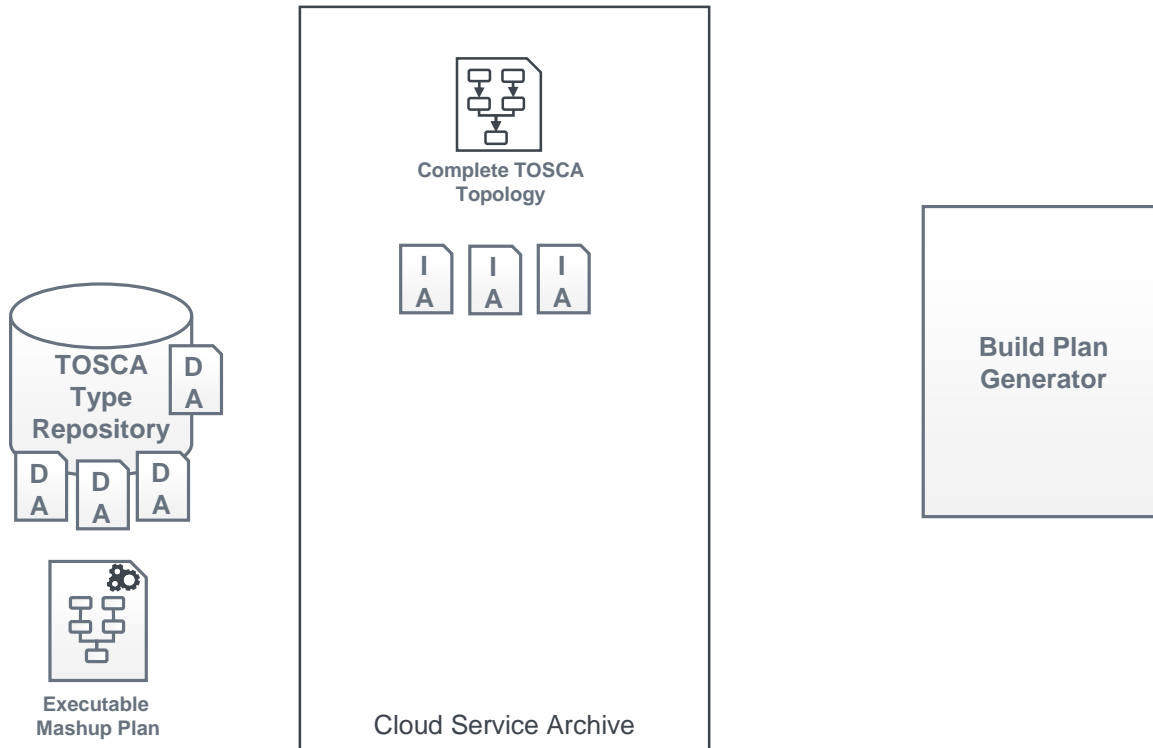
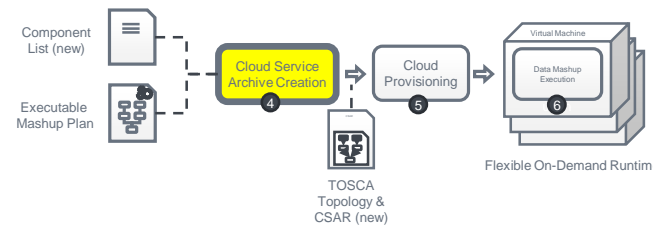
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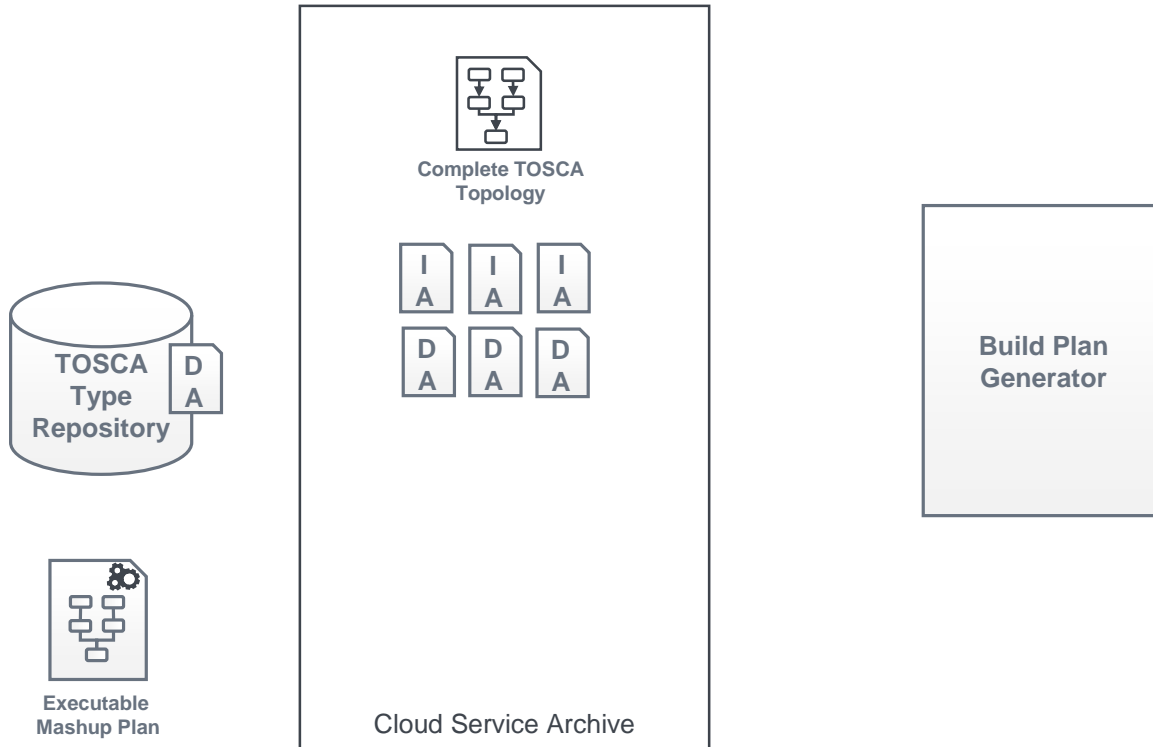
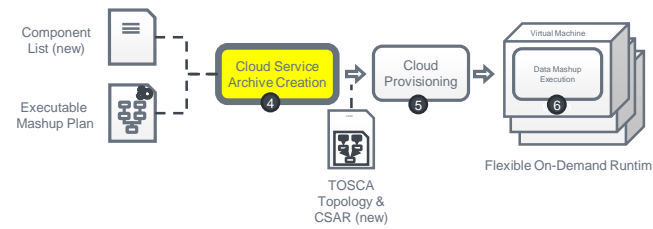
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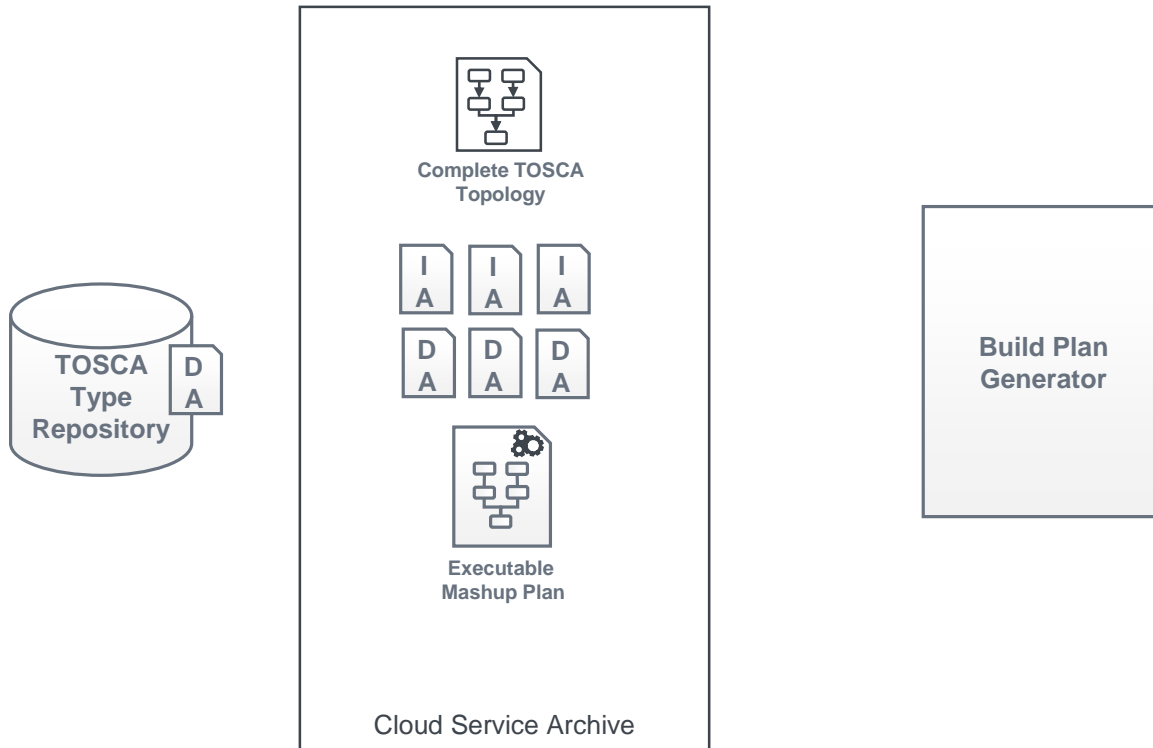
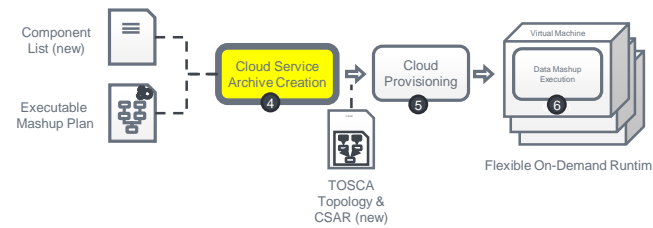
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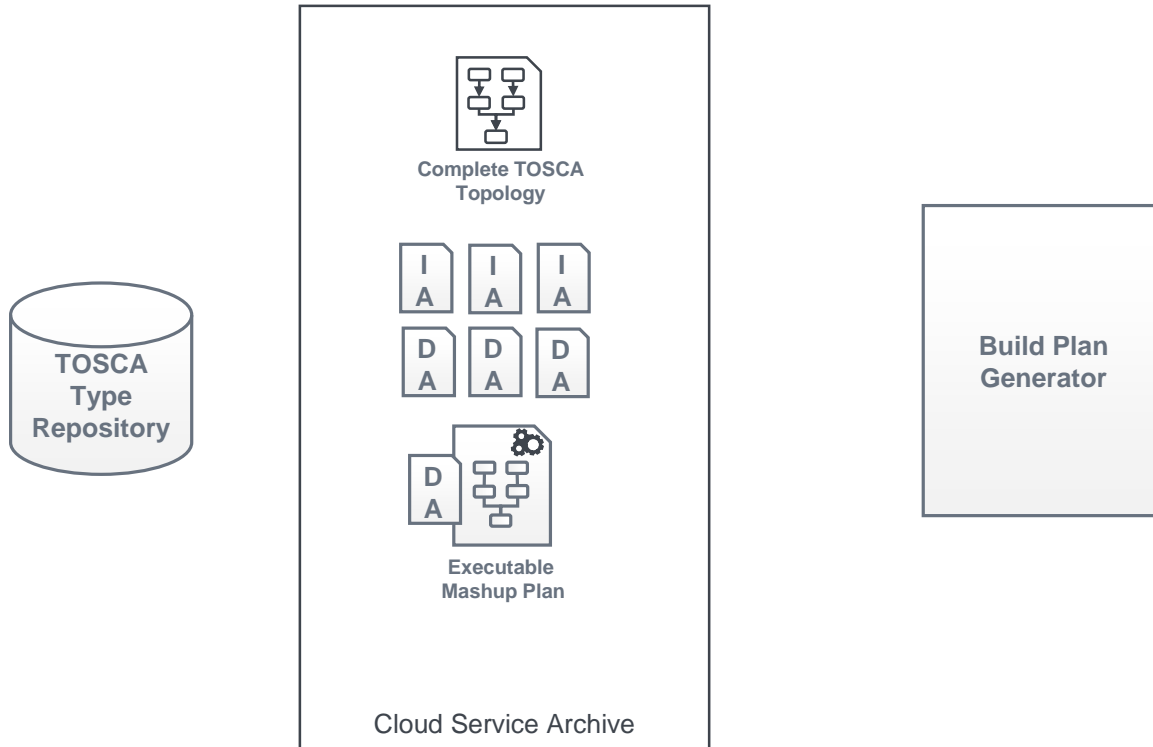
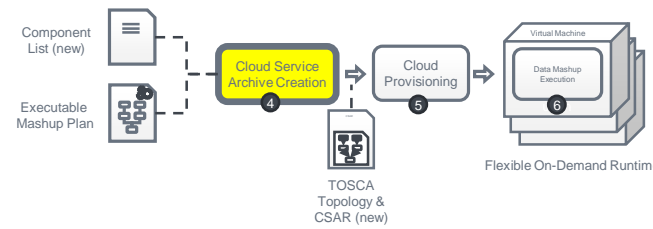
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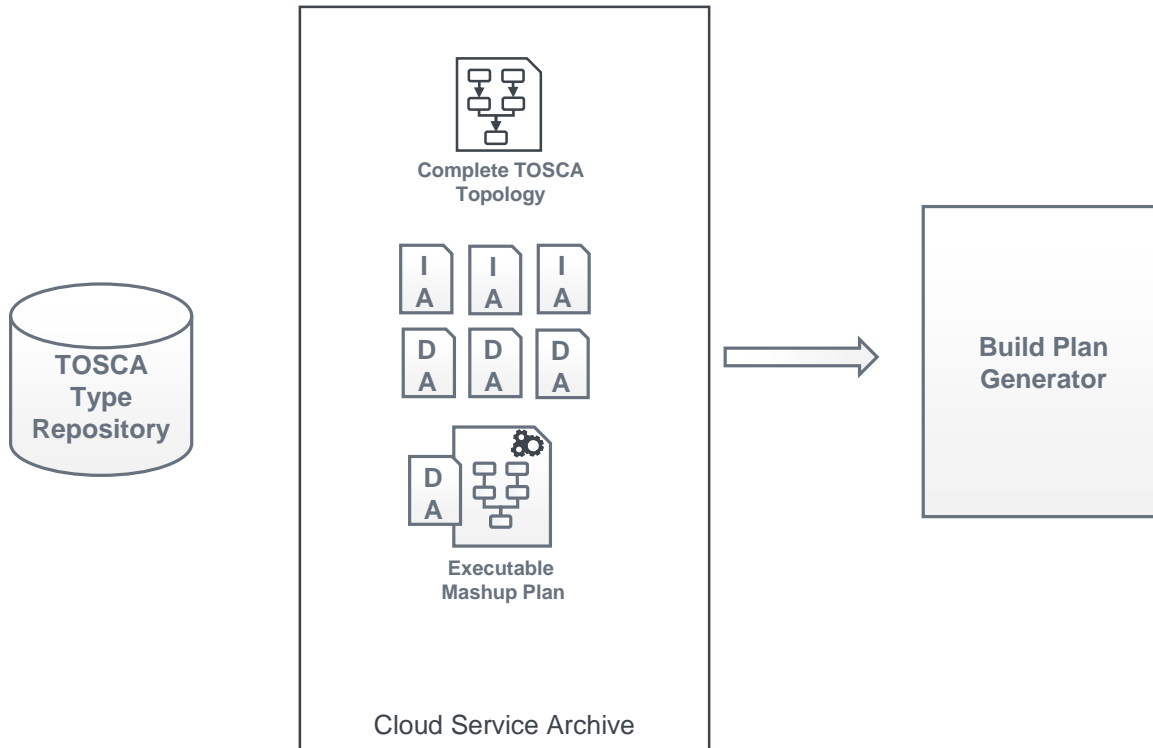
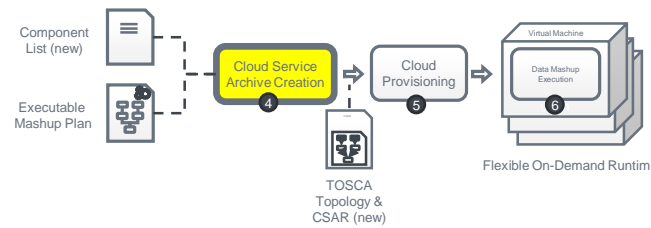
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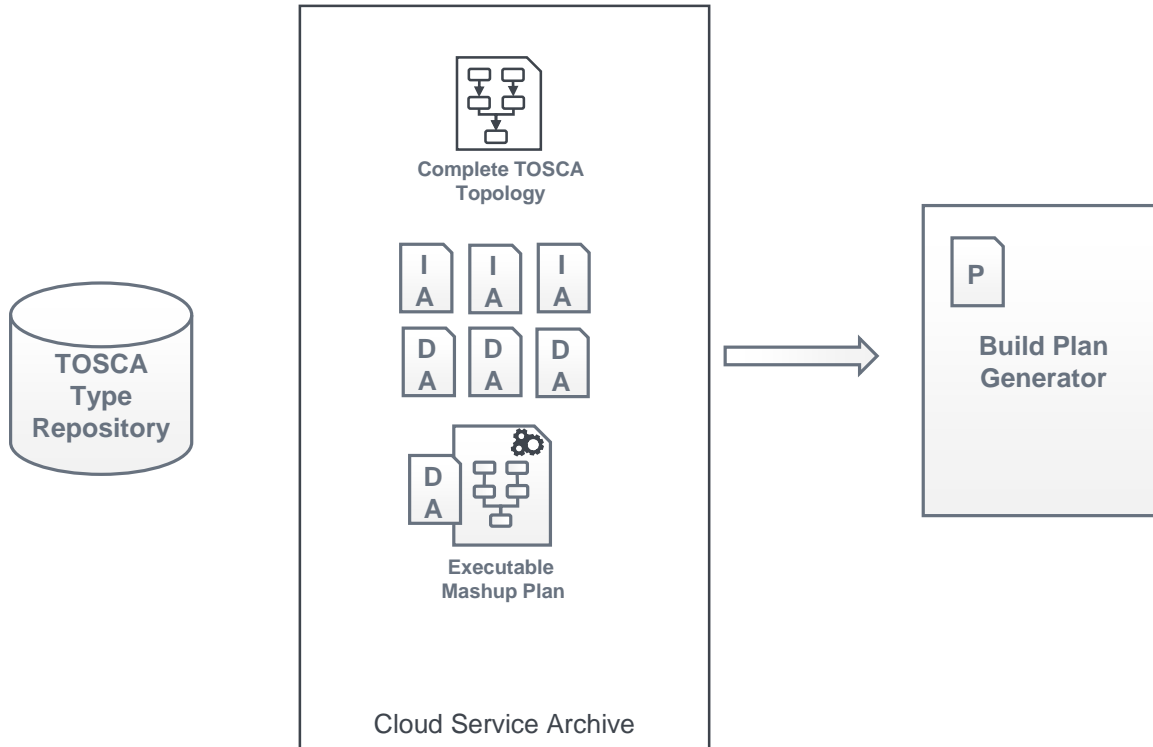
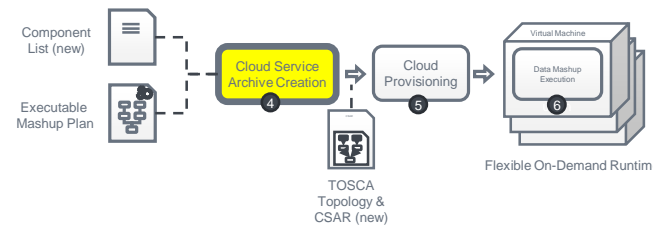
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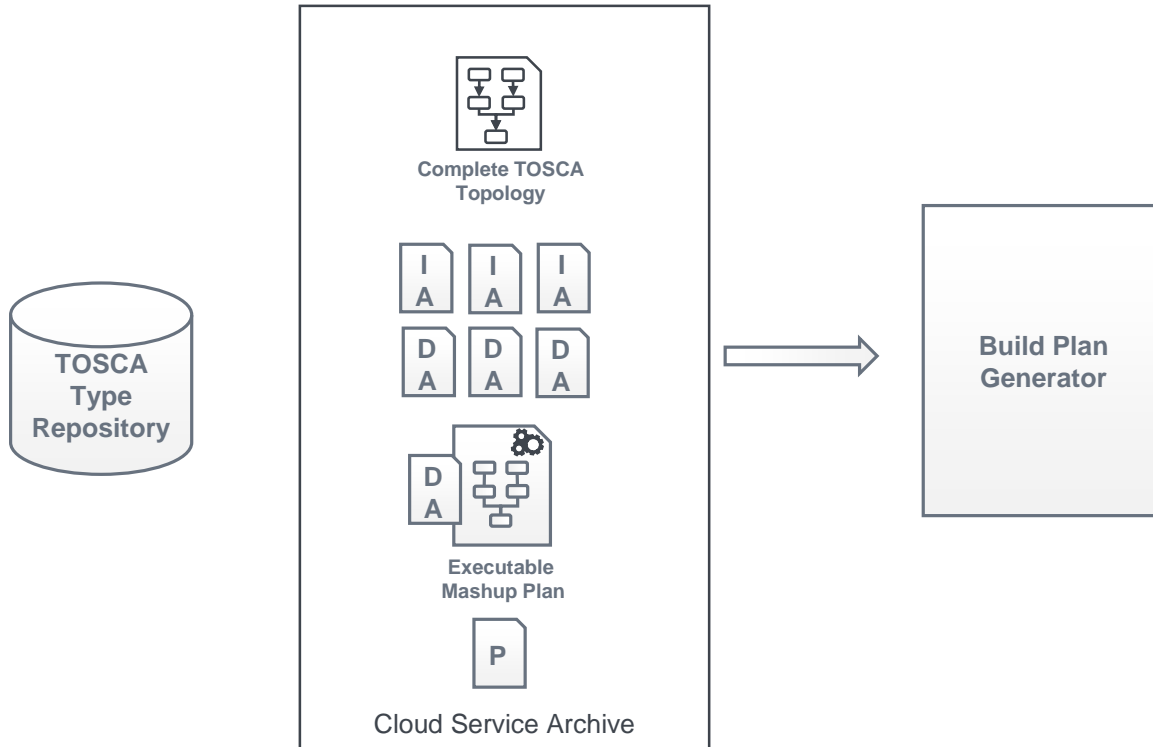
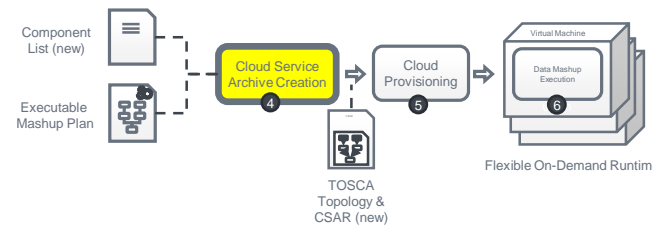
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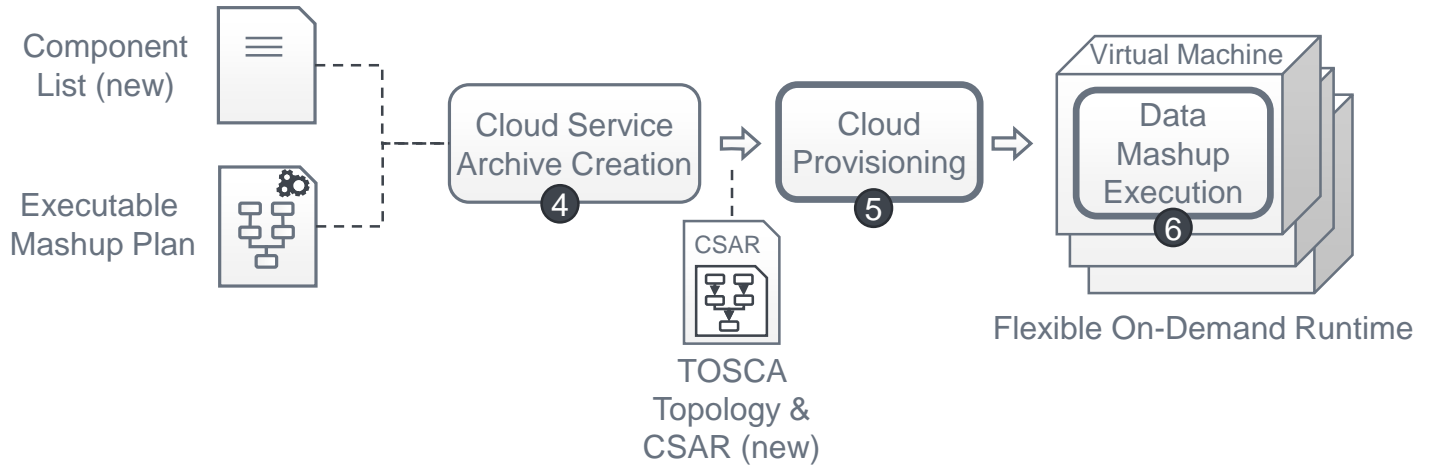
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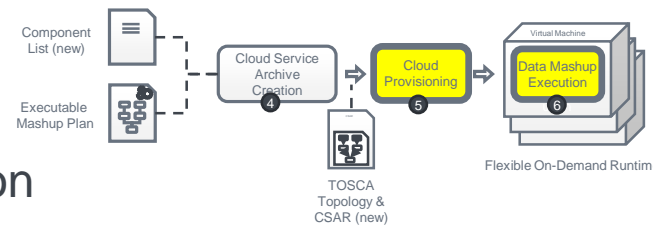
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Extended Method Steps



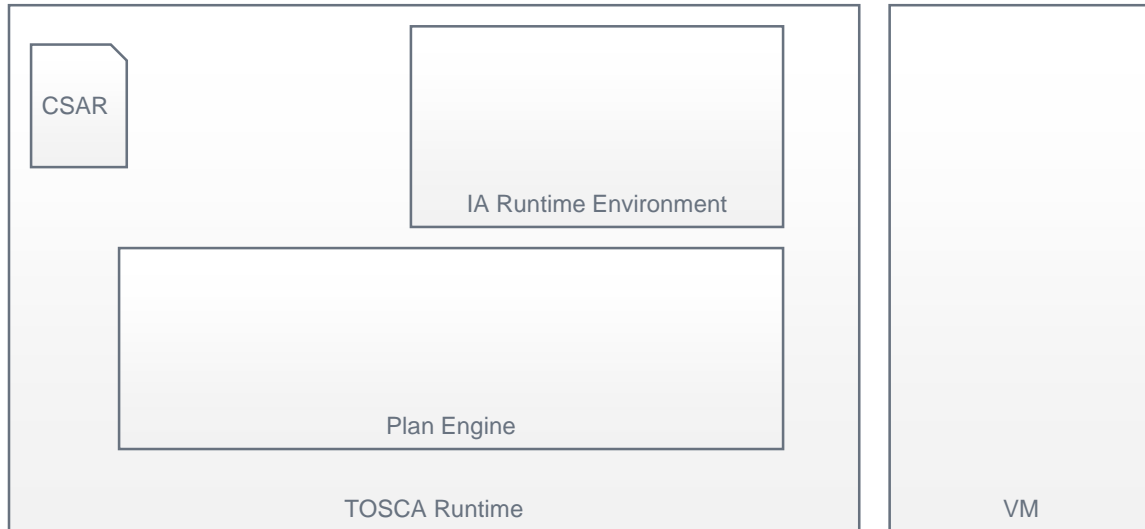
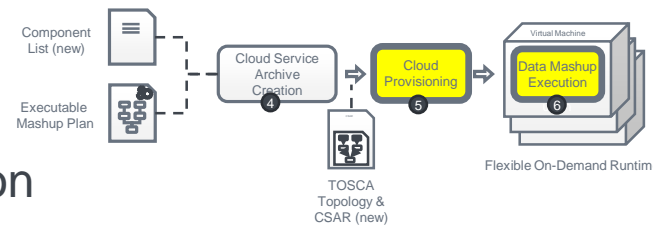
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Cloud Provisioning and Mashup execution



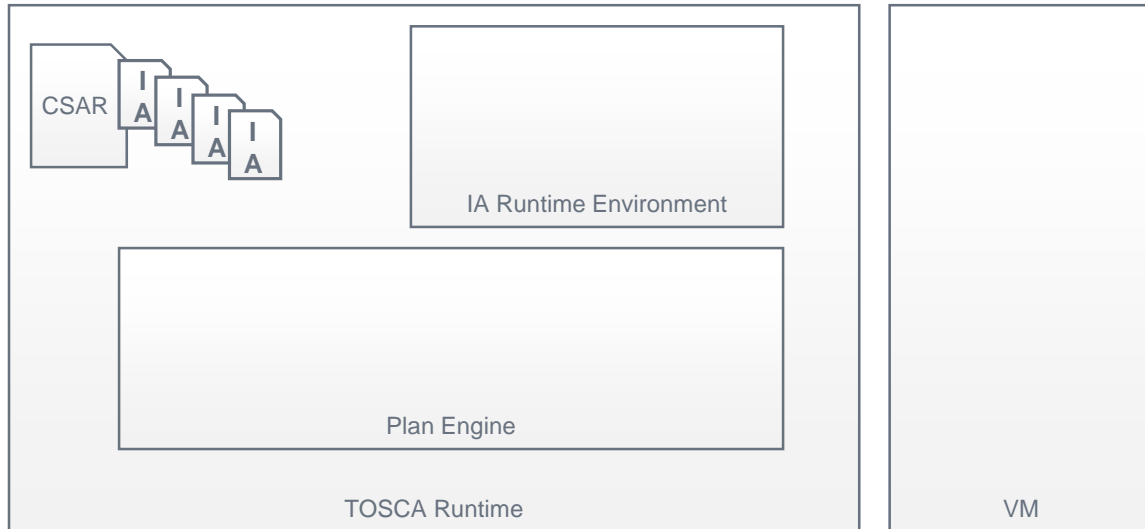
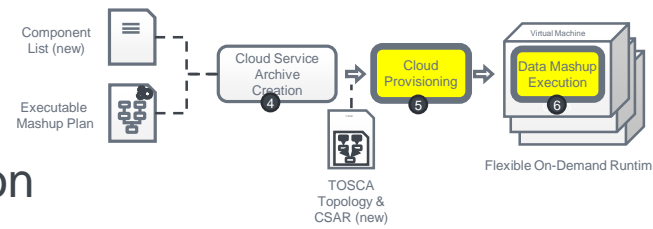
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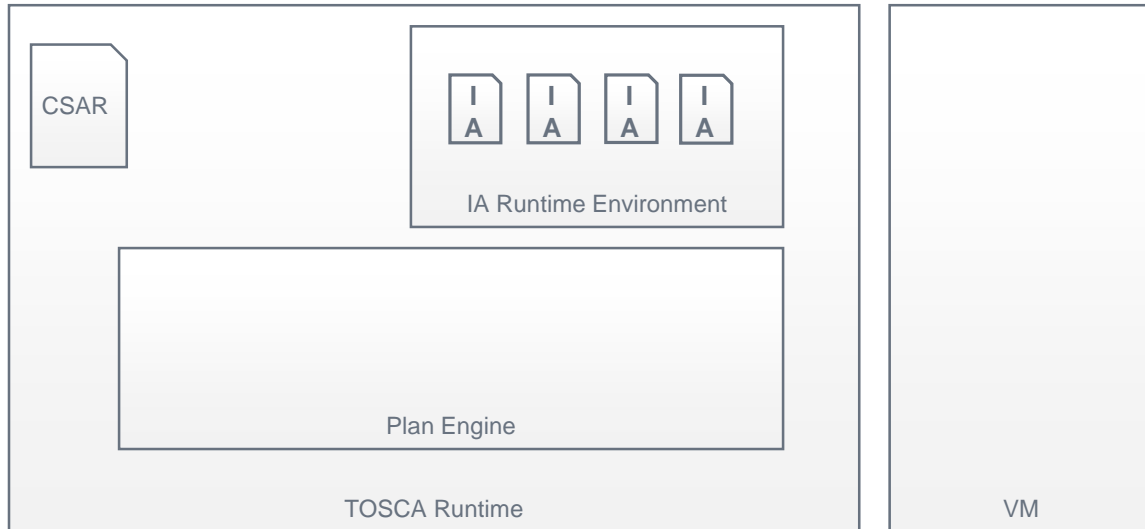
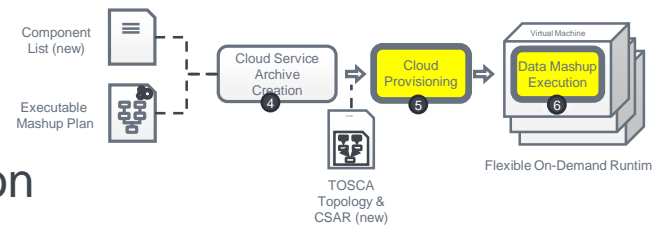
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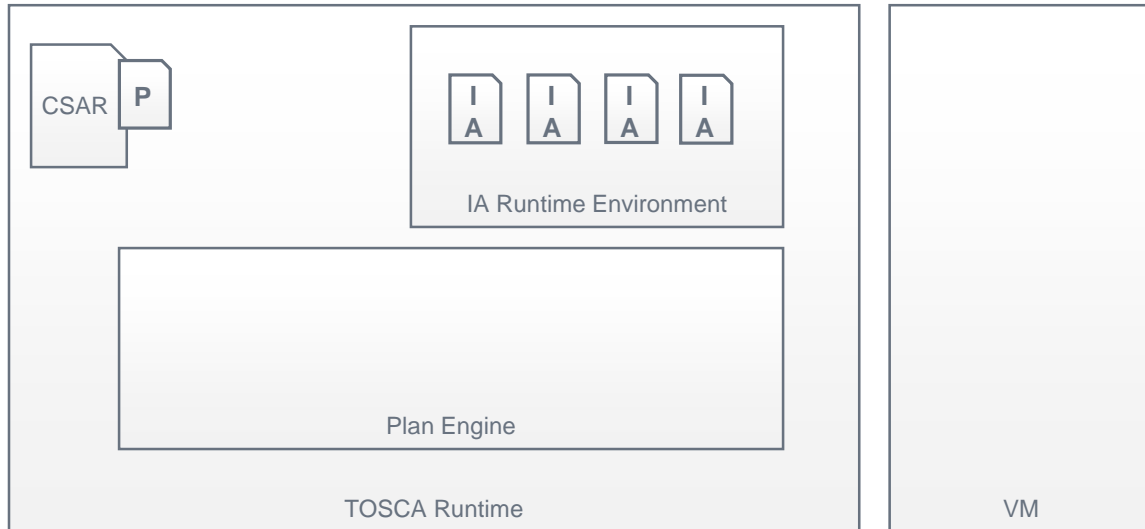
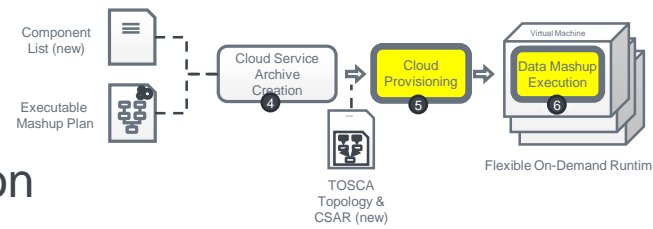
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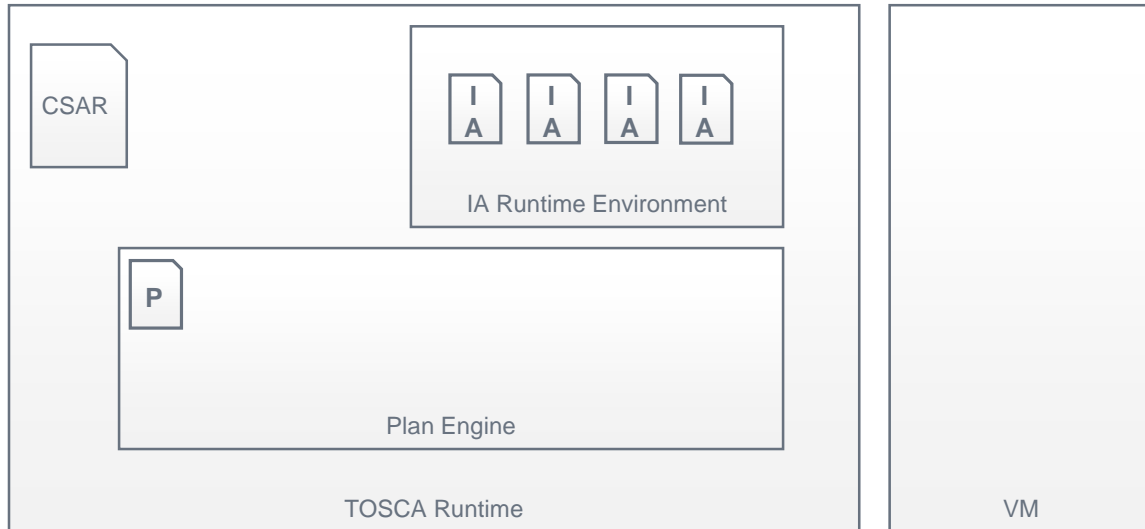
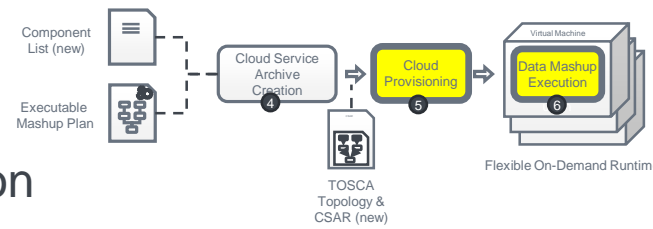
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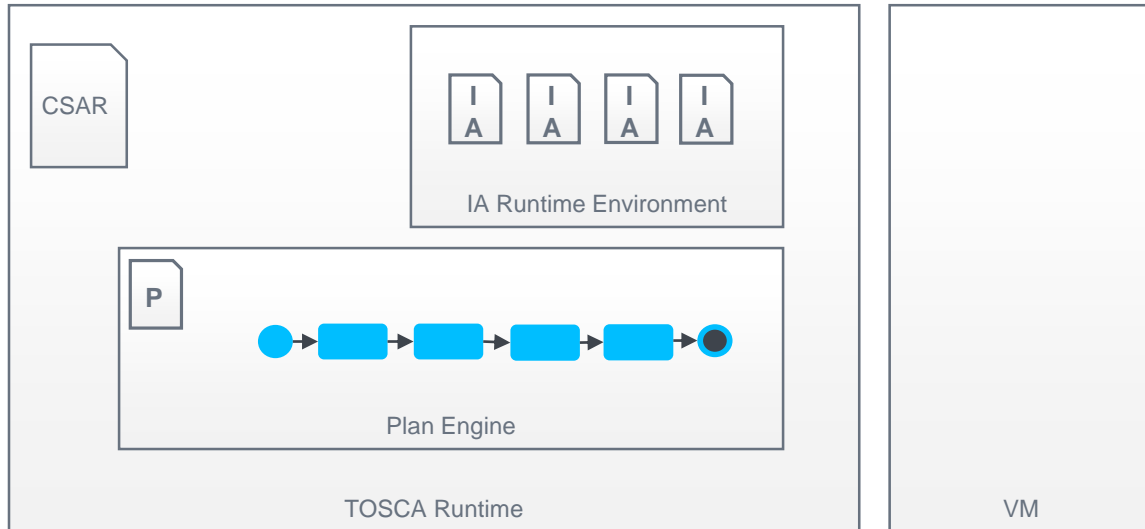
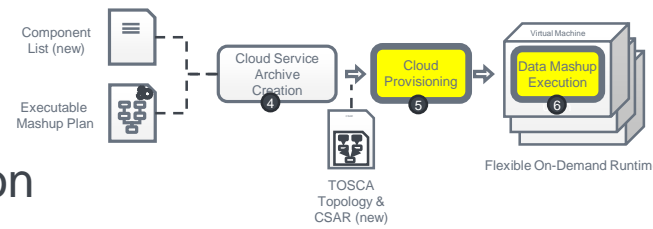
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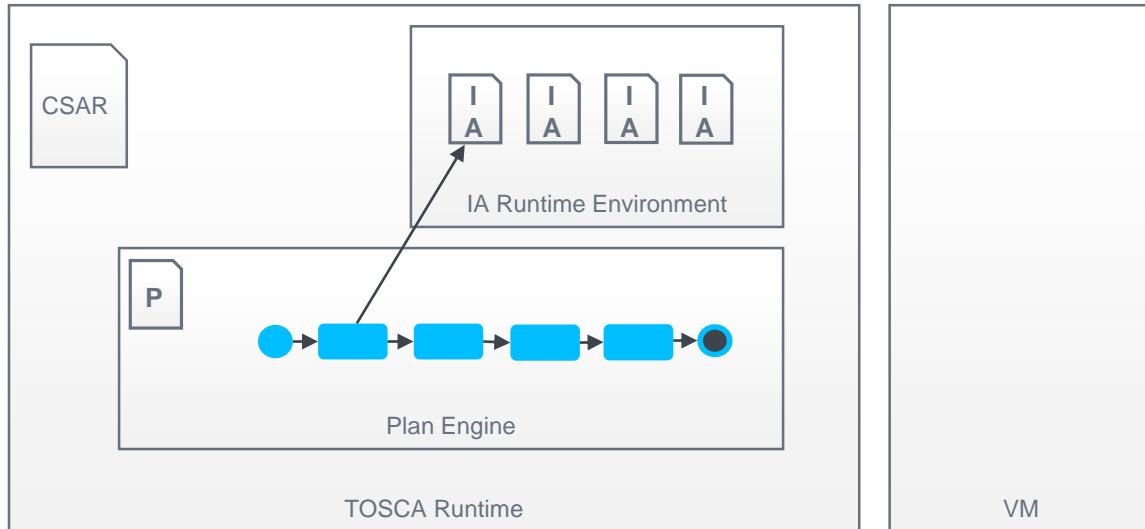
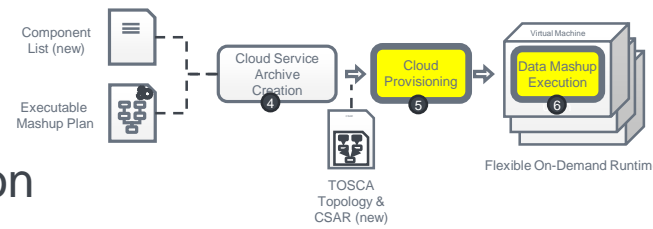
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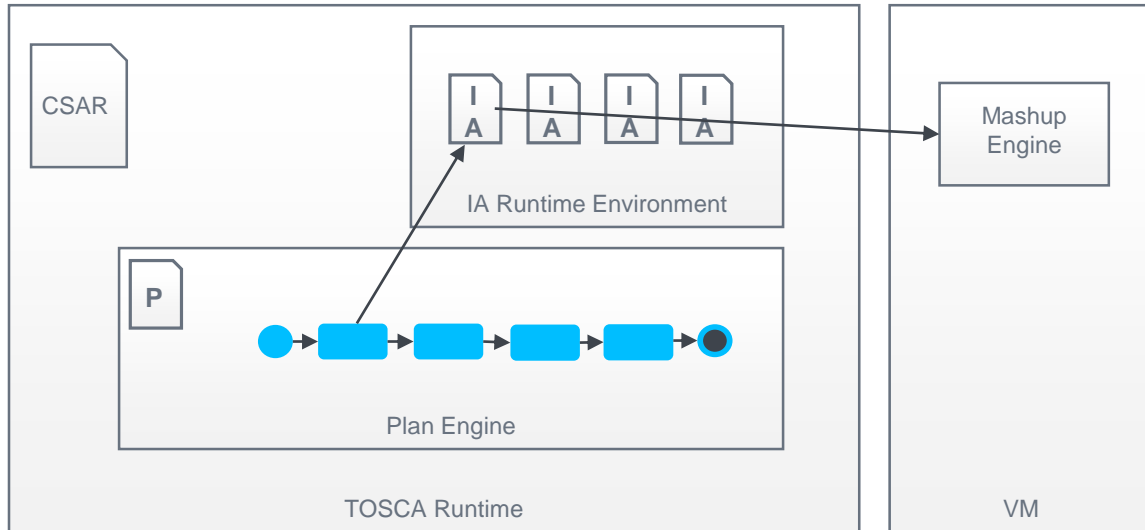
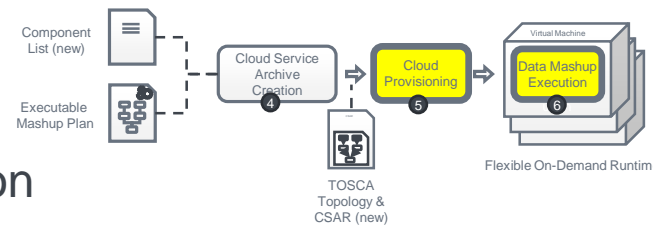
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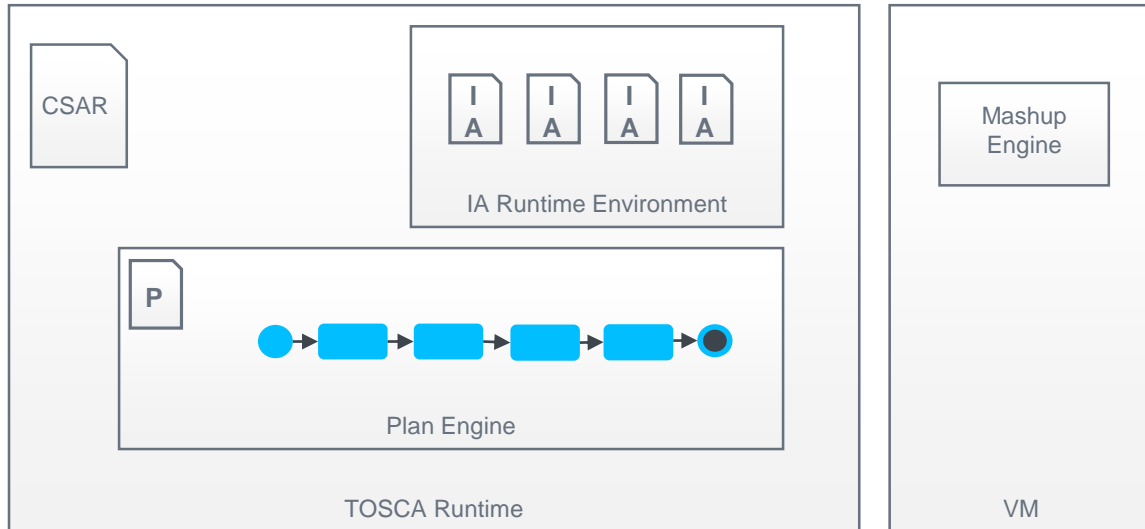
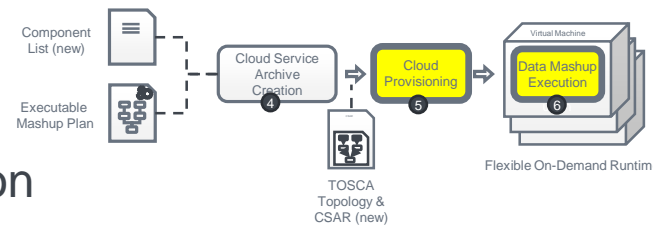
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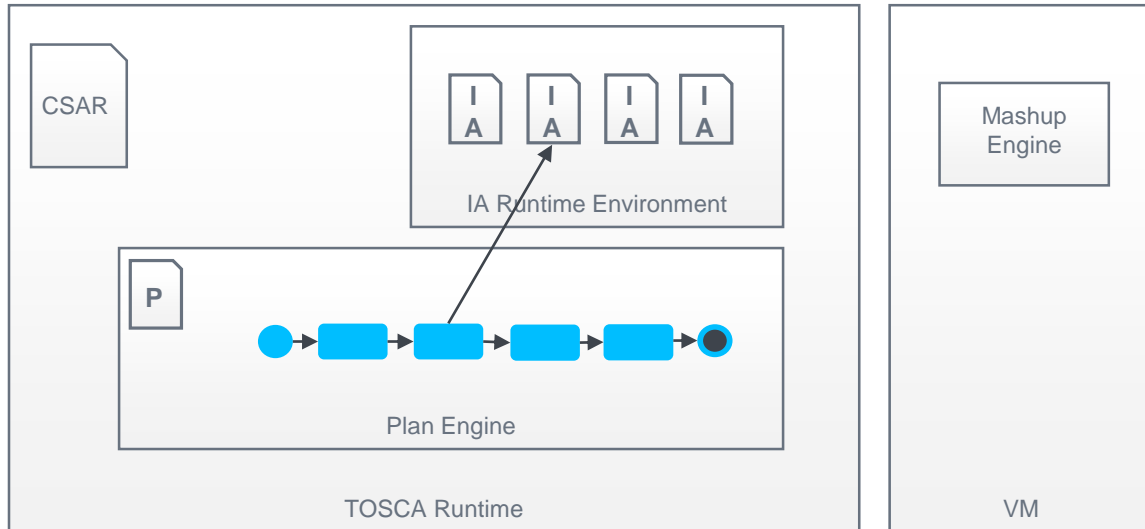
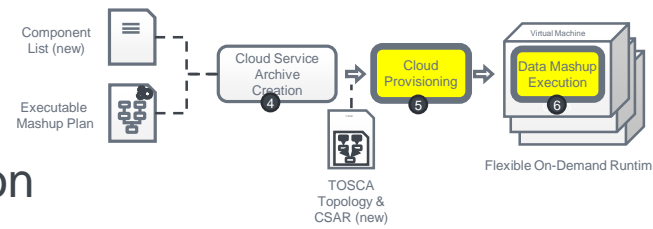
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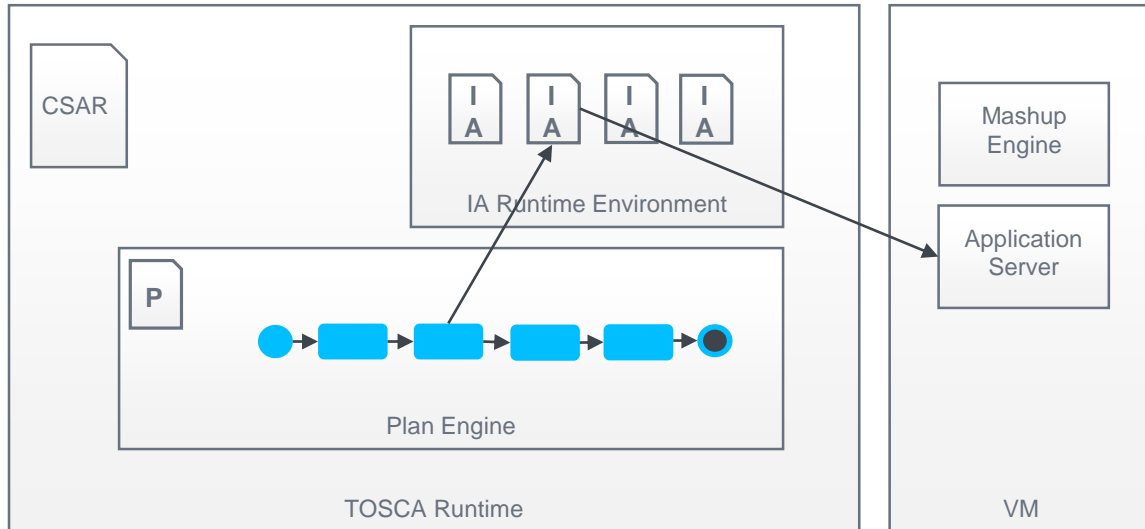
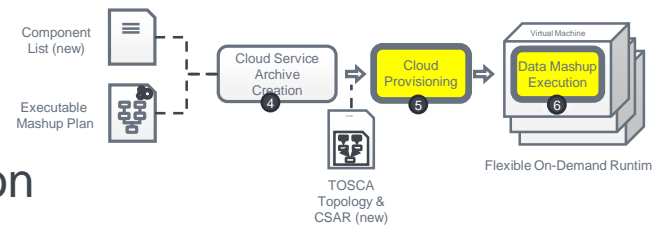
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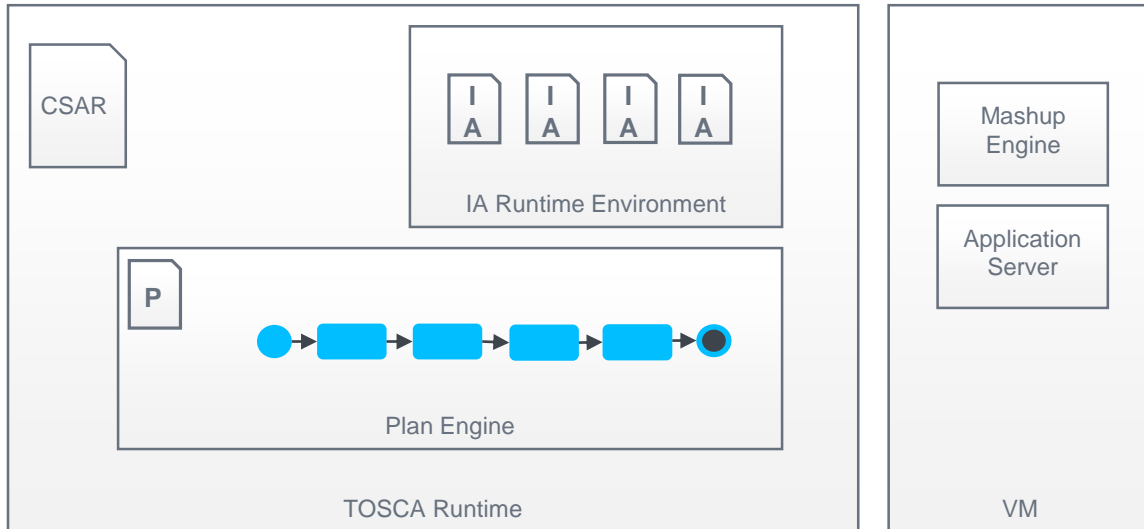
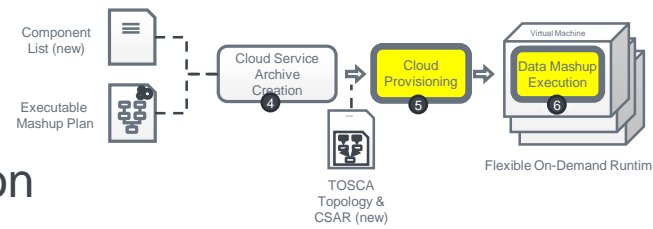
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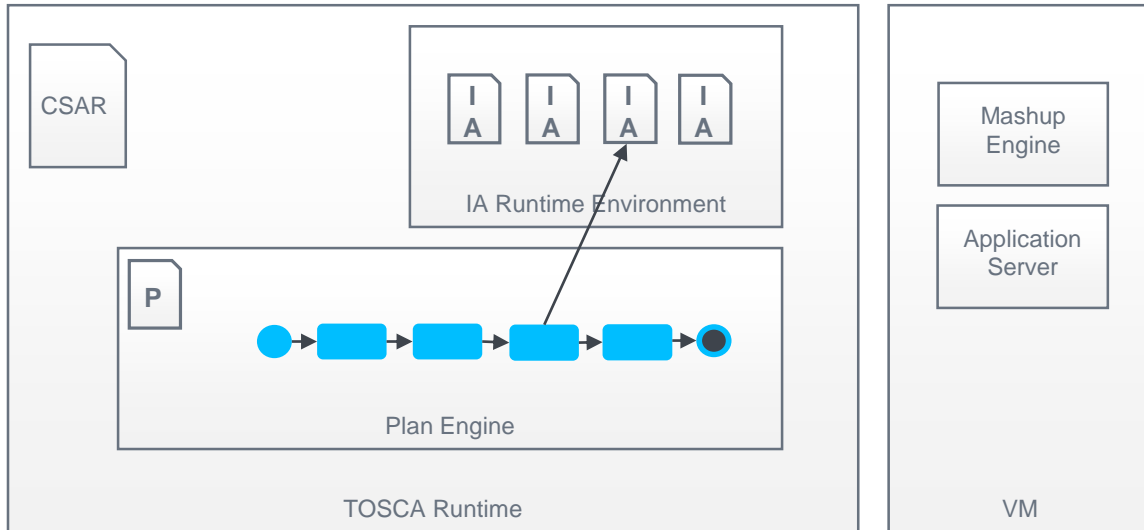
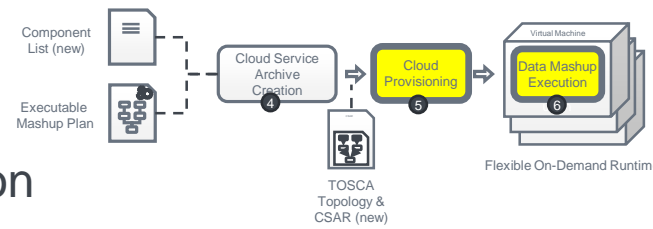
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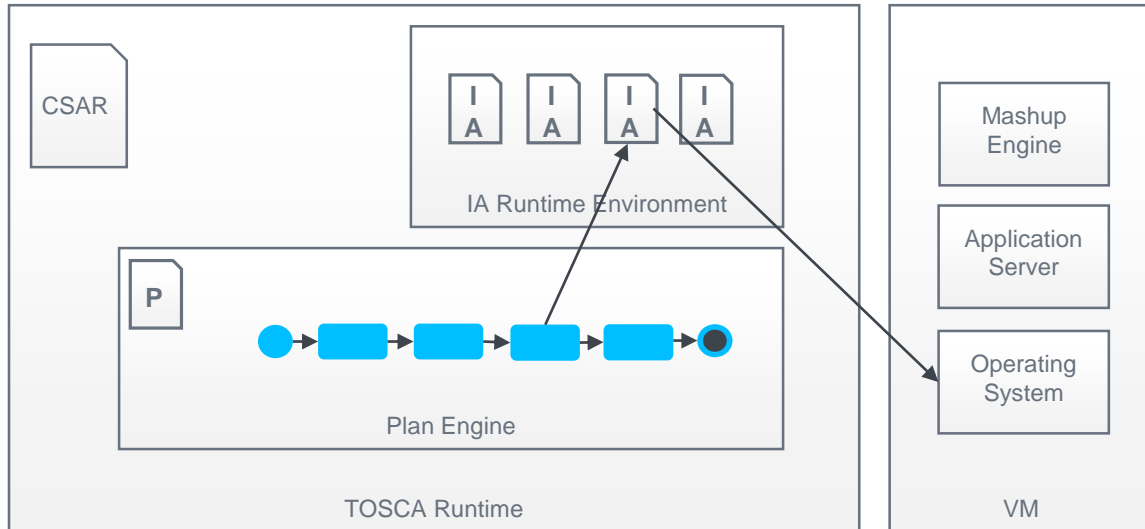
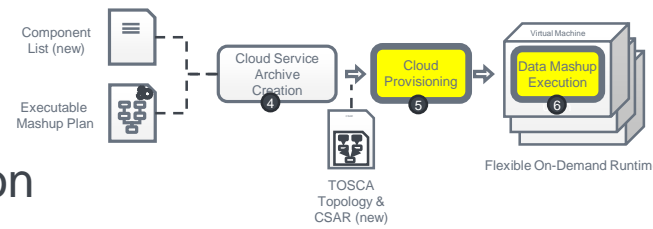
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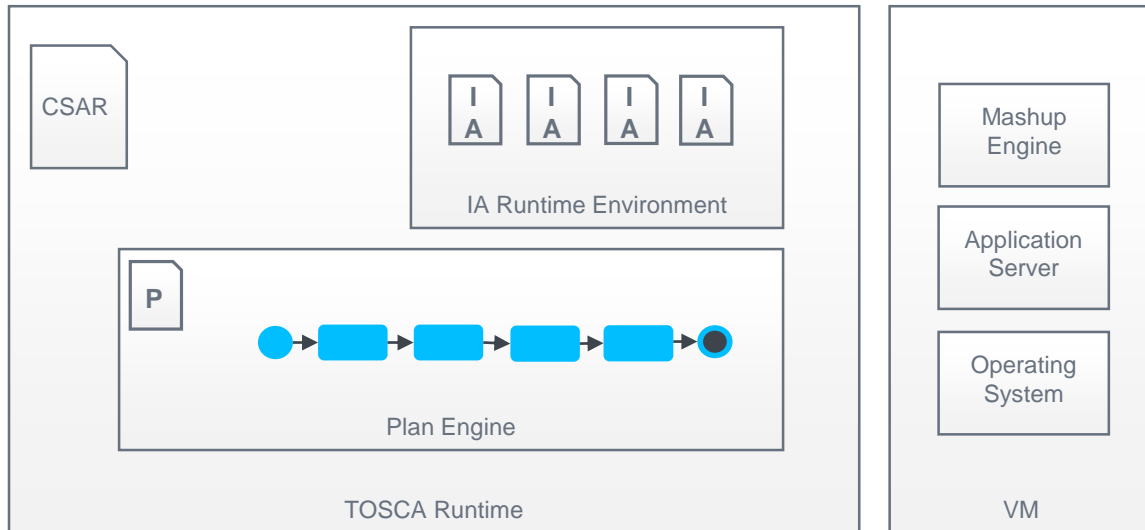
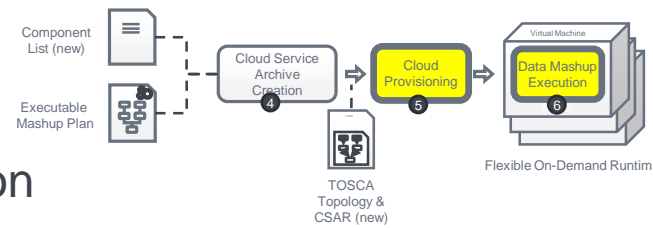
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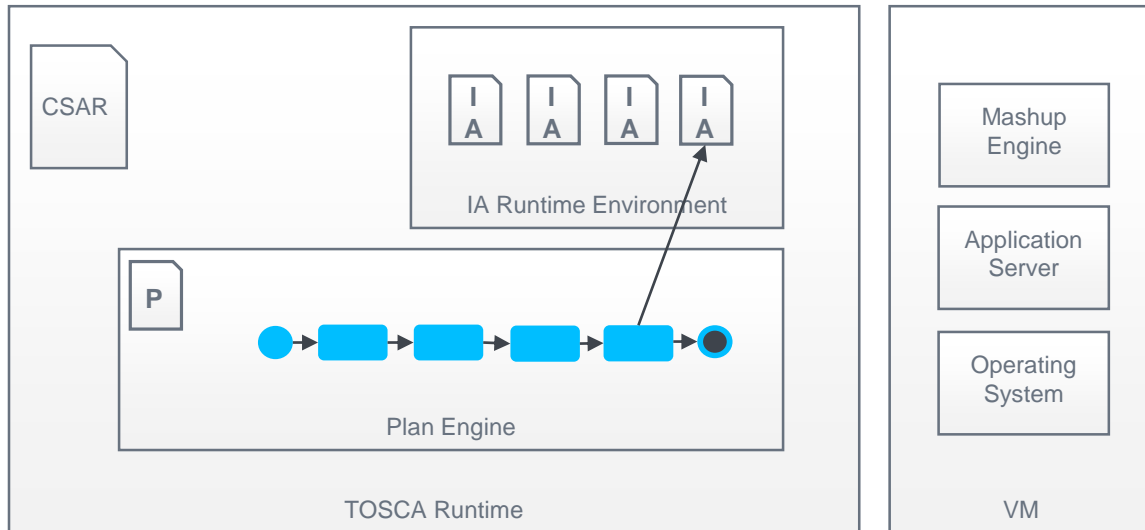
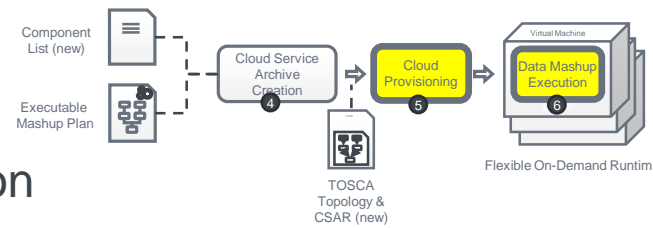
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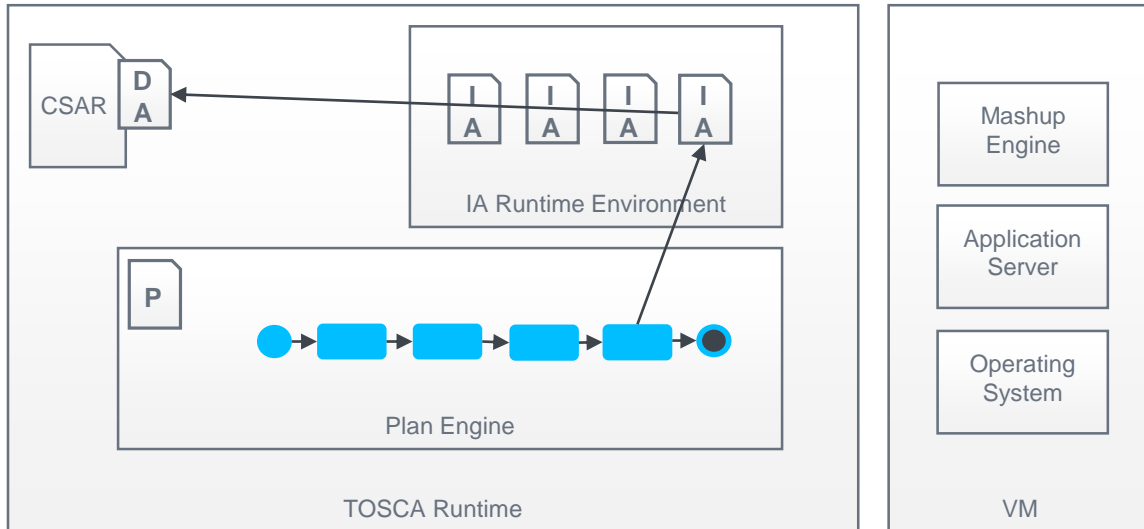
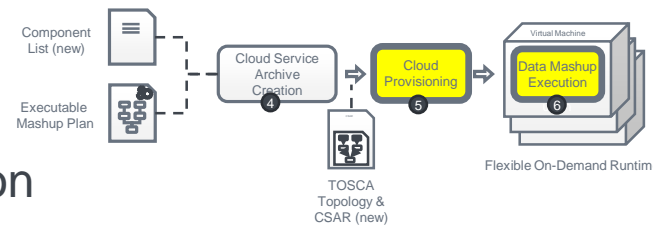
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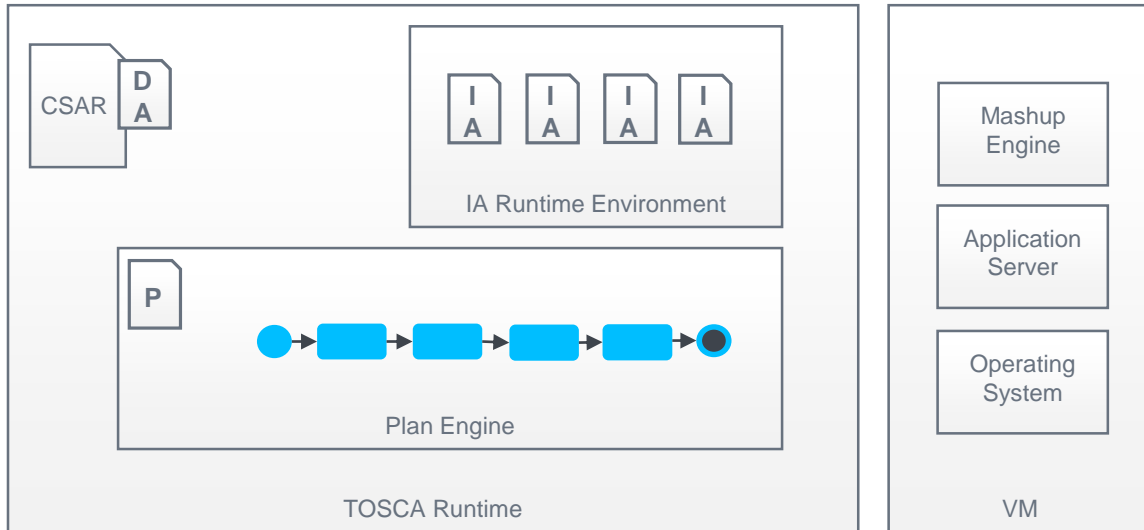
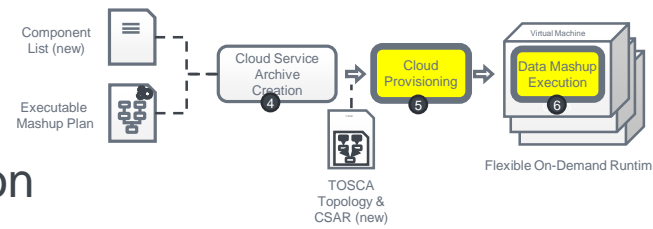
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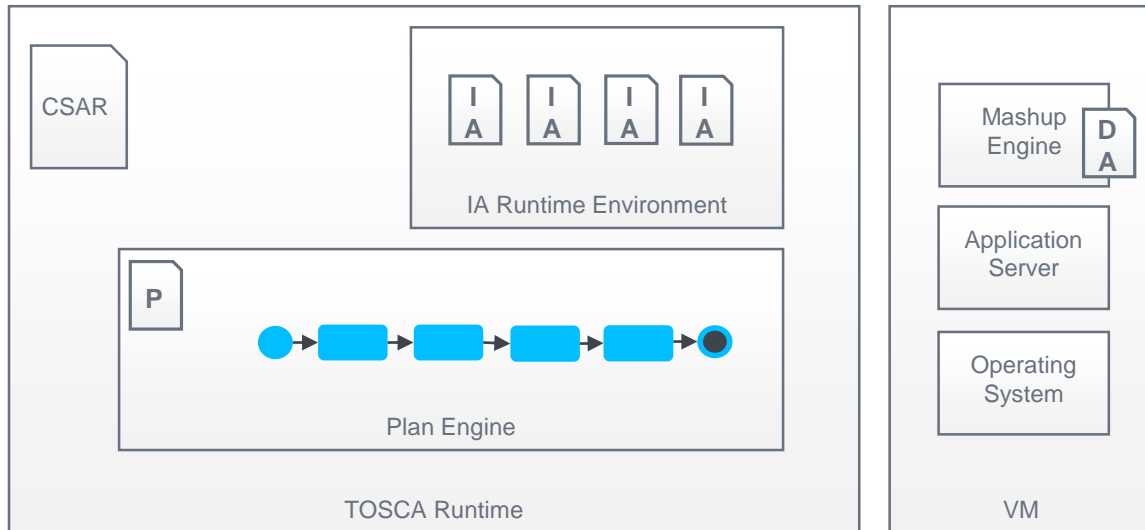
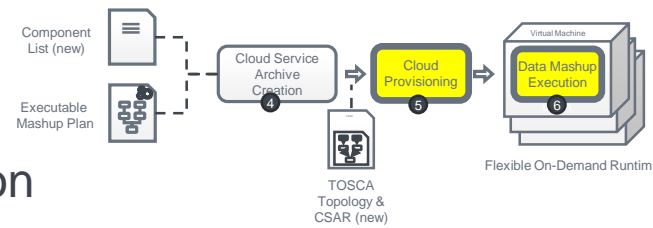
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Implementation

- Prototype implemented based on:
 - OpenTOSCA eco-system
 - TOSCA modeling tool Winery
 - Used as TOSCA type repository
 - Reminder: Modeling is not necessary due to full automation
 - Automated Topology Completion [**Hirmer2014**]
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- Limitations
 - Currently supports specific use case as proof-of-concept
 - Single stacks per software component / no interconnection between stacks

Conclusion and Future Work

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 - Scalable execution
 - Distribution of the execution
- Solves a specific problem but can be **easily adopted** to a wide range of applications
- Future Work:
 - Add new TOSCA Node Types to support more use cases (i.e., more non-functional user requirements)

Thank you!