Validity – Going beyond suspect links

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InterConnect 2015
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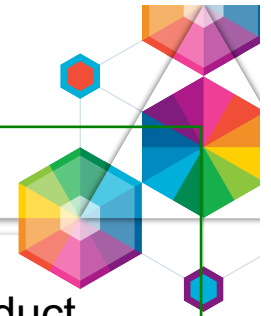**February 22 – 26**
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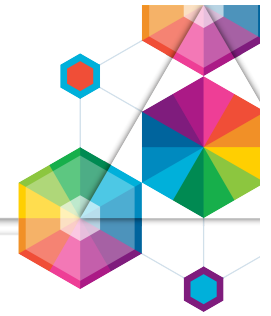
Validity service – Going beyond suspects

- Introduction to the Validity Service
- Rational Team Concert – Validity Editor
- Design topics
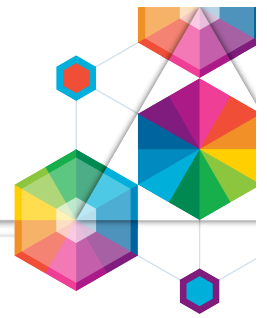
What is Validity?

- Validity is a property of a link, where a link connects two artifacts (the "source" artifact and the "target" artifact).

- A link is valid if the semantics of the link is satisfied by the two artifacts connected by that link.

- A link can have one of the following link validity status values:
  - Valid: the link is known to be valid
  - Invalid: the link is known not to be valid
  - Suspect: the validity status of the link is unknown
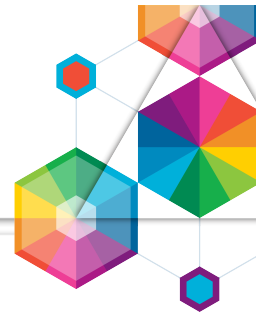
Validity in a Configuration

- A configuration is a set of states ("versions") of versioned artifact and a set of artifact links. A configuration contains at most one version of a given versioned artifact.

- An artifact link is valid in a configuration if the versions selected by the configuration for the source and target artifacts of the link satisfy the semantics of the link.
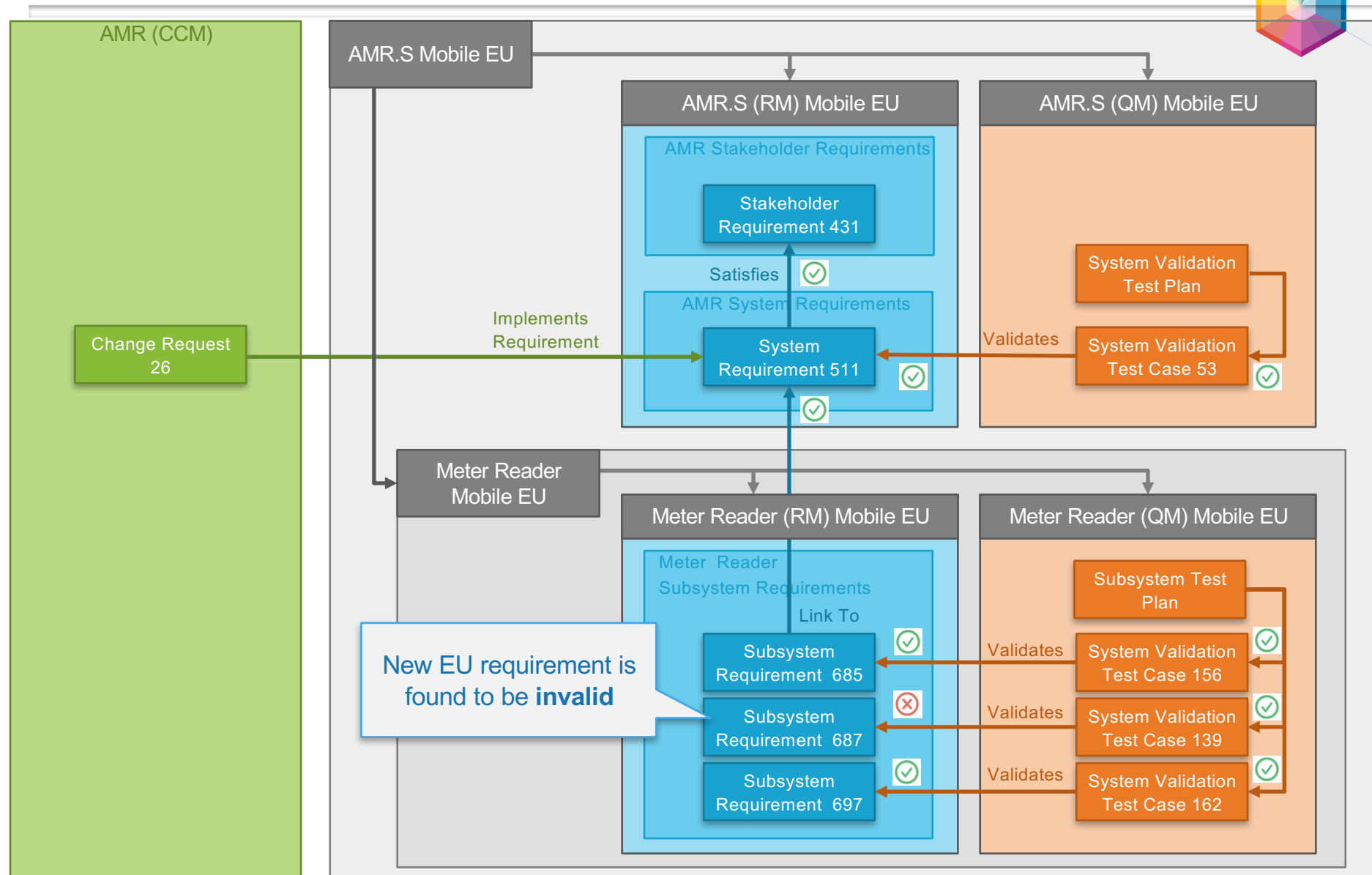
Validity in a Configuration
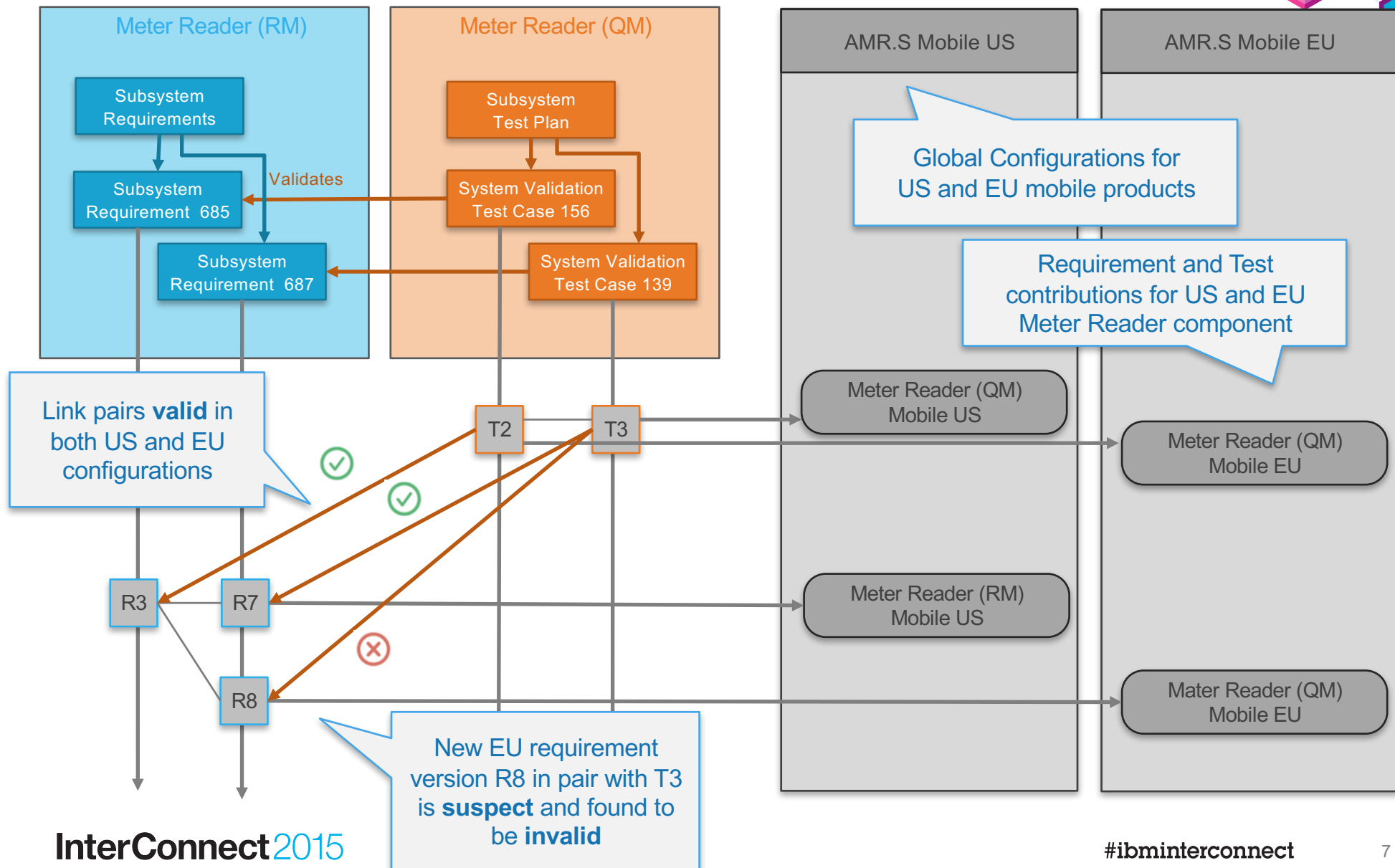
Validity in a Configuration – Artifact Traceability
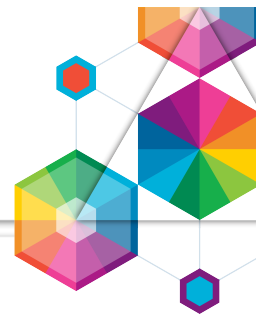
A Validity Service

- A validity service manages tuples with the following required fields:

    - A link type identifier

    - A source artifact identifier

    - A source state identifier

    - A target artifact identifier

    - A target state identifier

    - A Boolean indicating valid or invalid

- Additional optional fields:

    - Tuple creation date

    - Tuple creation user id

    - Tuple deletion date

    - Tuple deletion user id
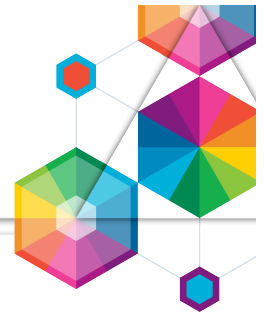
Validity Use Cases

- Assert that a given link in a given configuration is valid

- Assert that a given link in a given configuration is invalid

- Assert that a given link in a given configuration is suspect

- For a given configuration and link, display the validity status of that link

- For a given configuration, link, and source artifact, display all of the valid target artifact versions

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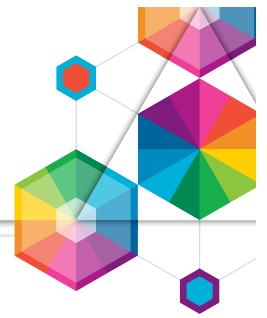
Validity vs. Suspicion

- Suspicion is another way of maintaining Valid/Suspect link status (but usually does not maintain Invalid link status)

- Suspicion is logically based on date stamps: an artifact is relation is valid if the "validity date" of the link is greater than the "modification date" of the source and target artifacts.

- Suspicion does not work well in a versioned environment, because when a set of changes are merged to another configuration, all links that are connected to an artifact updated by the merge become suspect. In contrast, validity information is effectively carried forward with a merge. In addition, when validity is asserted in one configuration, that information is effectively "broadcast" to any other configuration that selects the same artifact versions.
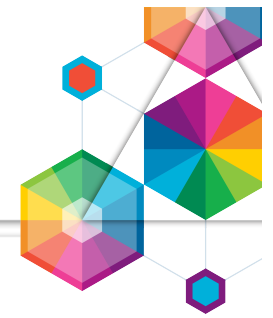
Versioned Link Service

- For a given configuration, a given source artifact with a version selected by the configuration, and a given link, a versioned link service provides the following link status values:

  - Exists: The link is selected by the configuration, and a version of the link target is selected.

  - Potential: The link is not selected by the configuration, but a version of the link target is selected.

  - Dangling: The link is selected by the configuration, but no version of the link target is selected.

  - Potential dangling: The link is not selected by the configuration, and no version of the link target is selected.

- Validity and Versioned Link Service Use Cases

  - For a given configuration, link, and source artifact, display all of the potential and/or dangling valid target artifact versions.

  - For a given configuration, link, and target artifact, display all of the potential and/or dangling valid source artifact versions.
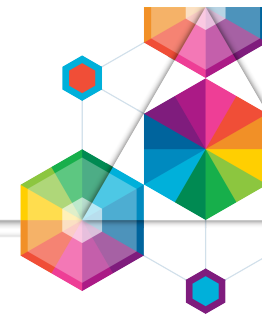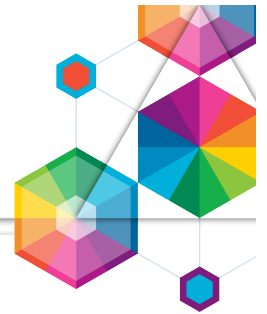
Validity Use-Cases

- **As a system engineer I need to, after replacing a contribution in a global configuration, identify links that are suspect of no longer being valid, or declared as invalid**

- As a system engineer I need to **inspect an artifact and see annotations** on links visualizing the link validity

- As a system engineer I need to **set the validity** on a link in a configuration

- As a system engineer I need to select a link, **browse known validity** on pairs of source and target artifact versions

- As a system engineer I need to **identify a valid link and accept / merge the artifact version** into my configuration

Rational Team Concert – Validity Editor

- Validity implemented in Rational Team Concert for ASPICE extension

- Validity across file versions in SCM configurations

Validity - User Experience Design

- Suspect capabilities adopting Link validity service
- Validity state visible and set on links and traceability views

Suspect column in Module / Validity view

Review and Set validity state by hovering over suspect icon Or browse know valid states

Validity - User Experience Design

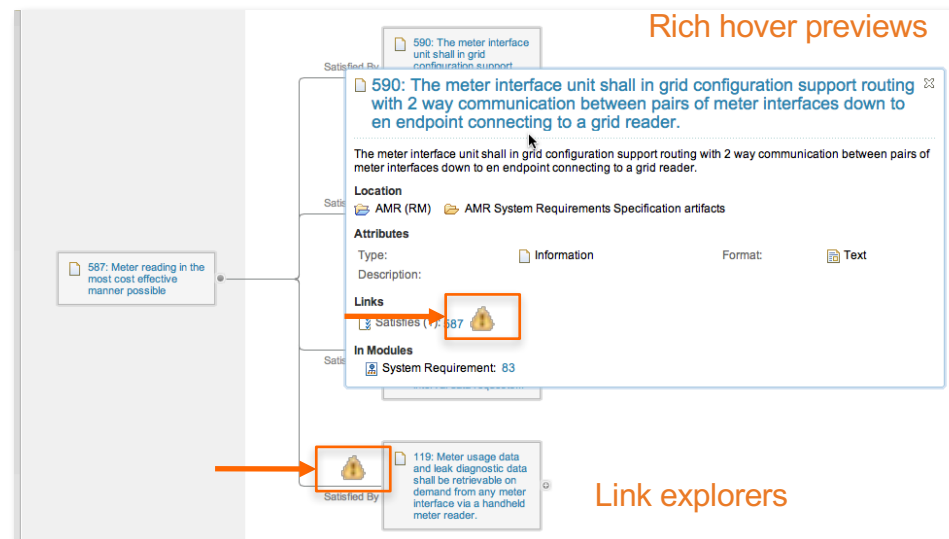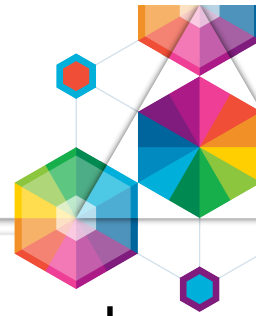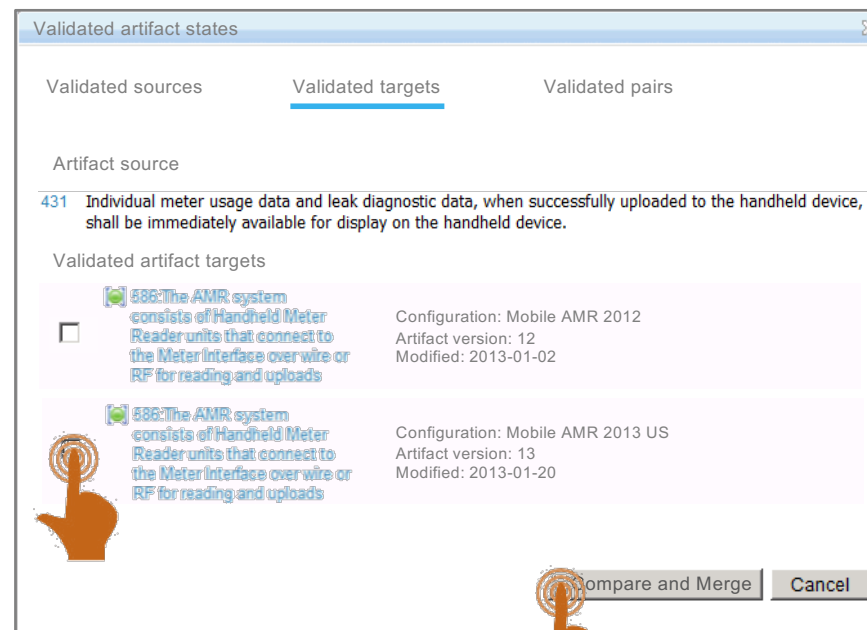- Validity information available on link information (examples)
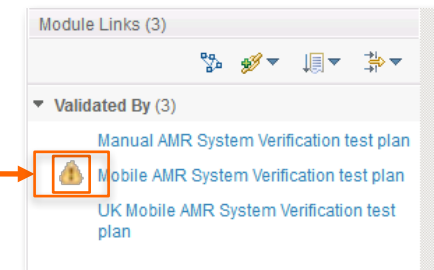
Validity - User Experience Design

- Using the link service, linked pairs with known valid state can be explored: Valid sources / Valid targets / Valid pairs

- A new version(s) of linked artifact(s) can be selected (and merged) into the current configuration context

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