Cloud Application Management for Platforms (CAMP) Test Assertions
Version 1.1

Committee Specification Draft 01 / Public Review Draft 01

12 February 2014

Specification URIs
This version:
http://docs.oasis-open.org/camp/camp-ta/v1.1/csprd01/camp-ta-v1.1-csprd01.pdf (Authoritative)
http://docs.oasis-open.org/camp/camp-ta/v1.1/csprd01/camp-ta-v1.1-csprd01.html
http://docs.oasis-open.org/camp/camp-ta/v1.1/csprd01/camp-ta-v1.1-csprd01.doc

Previous version:
N/A

Latest version:
http://docs.oasis-open.org/camp/camp-ta/v1.1/camp-ta-v1.1.pdf (Authoritative)
http://docs.oasis-open.org/camp/camp-ta/v1.1/camp-ta-v1.1.html
http://docs.oasis-open.org/camp/camp-ta/v1.1/camp-ta-v1.1.doc

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Abstract:
This document defines the Test Assertions for Version 1.1 of the OASIS Cloud Application Management for Platforms (CAMP) specification. Test Assertions are testable or measurable expressions related to normative statements in a specification for evaluating if an implementation (or part of it) conforms to that specification. These Test Assertions are intended to be used for defining precisely the conditions required by a CAMP implementation in order to conform. They support the testing activity by acting as a bridge between the normative statements in the specification and the executable test cases that are parts of a conformance test suite.
Status:

This document was last revised or approved by the OASIS Cloud Application Management for Platforms (CAMP) TC on the above date. The level of approval is also listed above. Check the “Latest version” location noted above for possible later revisions of this document.

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Citation format:

When referencing this specification the following citation format should be used:

[CAMP-Test-Assertions-v1.1]

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1 Introduction

This document defines the Test Assertions for version 1.1 of the OASIS Cloud Application Management for Platforms (CAMP) specification [CAMP]. Test Assertions are testable or measurable expressions related to normative statements in a specification for evaluating if an implementation (or part of it) conforms to this specification. These Test Assertions are intended to be used for defining precisely the conditions required by a CAMP implementation in order to conform. They support the testing activity by acting as a bridge between the normative statements in the specification and the executable test cases that are parts of a conformance test suite. Terminology

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

1.1 Normative References


1.2 Non-Normative References

2 Test Assertions Design and Objectives

2.1 Testing Objectives

A Test Assertions is a testable or measurable expression for evaluating the adherence of an implementation (or part of it) to a normative statement(s) in a specification.

The Test Assertions presented here are intended to help a precise understanding of what is expected from implementations of the CAMP specification.

They are also intended as a starting point for actual test suites. Testing for conformance to the CAMP specification occurs typically in two major contexts:

1. **Product Conformance assessment.** In this set-up the primary goal is to assess if an implementation behaves in conformance to CAMP. A test driver simulates a Consumer, when the implementation being tested is a CAMP Provider. Conversely, a Consumer may also be tested for conformance, in which case there is no test driver but merely some scenarios that the Consumer is expected to execute along with a Provider. The objective of testing is not always to establish conformance or interoperability. Conformance testing may also include an assessment of which options are or are not supported by an end-point, even if all the mandatory requirements are met.

2. **Product Interoperability test rounds.** In this set-up the ability of several implementations to interoperate with each-other is evaluated. A set of implementations is tested pair-wise based on test scenarios between a Consumer and Provider. Even if the exchanges are successful, they must be validated as conforming to CAMP (successful interoperability does not imply successful conformance to CAMP, and vice-versa.)

In both cases, some Consumer-Provider exchanges are executed according to some pre-defined scenarios. In both cases, these exchanges must be verified for conformance to CAMP.

There is also a 3rd context where testing for CAMP conformance is likely to occur: routine regression testing on systems in production. In this context, real business exchanges between a Consumer and a Provider are being monitored and tested for conformance. The rationale is that Cloud end-points may often be upgraded (patches, revisions) or their operational context be modified (configuration change, recovery, etc.), which might cause a deterioration of their conformance to CAMP. Since it is impractical to stop operations and undergo a full round of testing each time some end-point is upgrading, it is often sufficient to detect as early as possible a regression, whenever it occurs.

2.2 Design Principles

CAMP test assertions are intended to be usable by test suites designed for the various testing contexts and objectives described in the previous section. To achieve this versatility, the following design principles are used:

- The test assertions intended to verify conformance of Provider and Consumer are focusing on messages or artifacts exchanged between these roles. They are designed so that they could – ideally – be evaluated with a log of messages as sole input.

- Each test assertion is designed to apply to a particular pattern of messages (except for those directly targeting the PDP or Plan artifacts). The test assertion does not make any assumption about how to produce this pattern of message: it only describes it. A concrete test suite written from such test assertions could enforce (script) the test scenarios that will produce the expected message pattern, or could just discover and analyze such patterns in a message log.

- Each test assertion references the normative statement(s) in the original specification that it is addressing. The test assertion “interprets” the normative requirement in a testable way – i.e. translates the normative requirements in terms of what is a “correct (or incorrect) message exchange pattern” to be observed between a Consumer and a Provider. Clearly an important aspect of designing test assertions is to derive correct and testable interpretations of the original specification requirements.
• A test assertion may address more than one normative statement, as it is often difficult to design test assertions with the level of granularity fine enough to address, or verify, just one normative statement. When such a test assertion “fails” (i.e. related test case(s) fail), it means that at least one of the referred normative statements has been violated.

• Conversely, in order to address the same normative statement in a well-rounded way, several test assertions may be needed that focus on different aspects or sub-cases of the normative statement. In order to have confidence that a normative statement is satisfied by an implementation, all of the test assertions referring to a normative statement should be exercised successfully (i.e. test case(s) pass).

2.3 Anatomy of a Test Assertion
The structure of test assertions follows the recommendation from OASIS TAG [TA-guidelines].

The general structure used for Test Assertions is as follows:

2.3.1 Core Elements
The core elements of a Test Assertion are:

Test Assertion ID (or Identifier, or TA_Id)
The unique identifier of the test assertion. It facilitates the mapping of assertions to specification statements. It is recommended that the identifier be made universally unique.

Normative Source(s)
These refer to the precise specification requirement(s) or normative statement(s) that the test assertion addresses.

Target
The target – or test target - categorizes an implementation or a part of an implementation of the referred specification that is the main object of the test assertion and of its Normative Sources. In CAMP, the target will typically be a message exchanged between Consumer and Provider (e.g. a response to an HTTP GET), or the PDP or Plan artifact.
NOTE: the “test [assertion] target” should not be confused with the “conformance target”. The test target is the artifact or component actually subject to the particular testing described in the test assertion (e.g. a message), while the conformance target is the entity ultimately evaluated for conformance, (e.g. a CAMP Provider implementation). Of course, the test target can be traced to a conformance target.

**Predicate**

It contains the actual conformance logic. It is worded as a fact (not as a rule or requirement – i.e. no MUST/SHOULD). A predicate asserts, in the form of an expression that evaluates to either “true” or “false”, the feature (a behavior or a property) described in the specification statement(s) referred by the Normative Sources, concerning an instance of Target. If the predicate evaluates to “true” over the test assertion Target, this means that the Target exhibits this feature. “False” means the Target does not exhibit this feature.

### 2.3.2 Optional Elements

The following parts of a test assertion are optional:

**Description**

An informal definition of the role of the test assertion, with some optional details on some of its parts. This description must not alter the general meaning of the test assertion and its parts. This description may be used to annotate the test assertion with any information useful to its understanding. It does not need to be an exhaustive description of the test assertion.

**Prescription Level**

A keyword that indicates how imperative it is that the Normative Statement referred to in the Normative Source, be satisfied. Three prescription levels are used:

- **Mandatory**: this value applies to test assertions which address normative statements that include strongly imperative keywords such as “MUST”, “REQUIRED”, and “SHALL”, but also their negative counterparts (“MUST NOT”, “SHALL NOT”, etc.) as the Predicate is where the negative aspect is expressed.
- **Preferred**: applies to test assertions which address normative statements that can be interpreted as recommendations, using such keywords as “SHOULD” and “RECOMMENDED” as well as their negative counterparts.
- **Permitted**: applies to test assertions about normative statements that concern optional features about which the specification remains neutral (no recommendation) using such keywords as “MAY” or “OPTIONAL”. Note that the negative counterparts of these keywords (e.g. “NEED NOT” or “CAN NOT”) often have a **mandatory** character.

**Prerequisite**

A test assertion Prerequisite is a logical expression (similar to a Predicate) which further qualifies the Target for undergoing the core test (expressed by the Predicate) that addresses the Normative Statement. It may include references to the outcome of other test assertions. If the Prerequisite evaluates to “false” then the Target instance is not qualified for evaluation by the Predicate. Prerequisites have also been called “preconditions”.

**Tags**

Test assertions may be assigned ‘tags’ or ‘keywords’, which may in turn be given values. These tags allow for categorizing the test assertions.

The above test assertion model is formally described in the OASIS test assertions standard [TA-model].

### 2.3.3 Example Test Assertion

<table>
<thead>
<tr>
<th><strong>TA_Id</strong>: CAMP11-NNN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NormativeSource</strong>: &lt;a normative TAG, and optionally a section name&gt;</td>
</tr>
<tr>
<td><strong>Target</strong>: A response message to a GET assembly URI message.</td>
</tr>
</tbody>
</table>
**Predicate**: the target message content satisfies the JSON “schema” for assembly resources.

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 2.3.4 CAMP Profile

The above test assertion model is profiled for CAMP in the following way:

1. The “**NormativeSource**” element refers to the section(s) in the specification that contain(s) the normative statements addressed by the test assertion. As CAMP has tagged its normative statements, there will be one or more “normative tags” in this field. (Sometimes it does more than make a reference, i.e. makes some “interpretation” of the original statement(s) that can be narrower, and that reflects more concretely the actual test expression). There may be some additional normative tags in parenthesis: this indicates that such normative statements are assumed to be satisfied before using this test assertion – i.e. some kind of prerequisite, or indicating a precedence order for using test assertions.

2. The “**Target**” may be the PDP or the Plan (for PDP and Plan conformance). For conformance of the Provider or Consumer (indicated by the “conformance” tag), the target will be a particular message pattern (e.g. as expected to be captured in a log) that would “trigger” the verification.

3. The “**Predicate**” -should be evaluated each time a sequence of message appears in the log that satisfies the message pattern described in the Target, and in case the Prerequisite is also satisfied (if any). The Predicate is expressed using any content of the Target message and also contents from the Prerequisite messages if any (see below). Predicate=false means the implementation failed the normative requirement.

4. The “**Prerequisite**” in most cases is a contextual exchange of additional messages between Provider and Consumer that must have occurred along with the target message. These contextual messages must occur often prior to the target message (by default), but sometimes after the target message (this is indicated).

5. Test assertions “**Tags**” (not to be confused with CAMP normative tags in the “normativeSource” field), as accessory information. Only one tag named conformance is used in this document. In the above example, the conformance tag has value “Provider”. This means that the actual entity under evaluation for conformance by this assertion is the Provider (as opposed to the Consumer): the failure of the verification (i.e. predicate value=”false”) means a failure of the Provider to conform. Note that the conformance target is not always same as the test assertion target: in the above example, the conformance target is “Provider” while the test target is a message.

6. When the same test assertion logic applies to several resource types, a variable will be defined to represent any item over the set of resource types. This amounts to parameterizing the test assertions, so that it does not need to be repeated for each resource. This parameterizing may also apply for other elements when under the same logic.

In the example below, a resource variable is defined that can take either one among four resource names (sensor, plan, assembly, or component), thus avoiding to write four different test assertions that would only differ by the name of the resource.

```
Var: (resource) in {
    sensor,
    plan,
    assembly,
    component
}
```

**Target**: A message (m1) of the form PUT resource URI (with no select_attr query parameter)

### 2.4 Categories of Test Assertions

Four general categories of test assertions can be distinguished, depending on their conformance target (value of the conformance tag):

- **Categories**: 
  - **NormativeSource**
  - **Target**
  - **Predicate**
  - **Prerequisite**

In general, these categories include:

- **NormativeSource**
- **Target**
- **Predicate**
- **Prerequisite**

For each category, there may be further subcategories based on the specific requirements of the test assertion.
- **Provider TAs**: addressing normative statements concerning behavior of, and messages generated by the Provider, such as serialization of resources.
- **Consumer TAs**: addressing normative statements concerning behavior of, and messages generated by the Consumer, such as queries, operations on resources.
- **PDP TAs**: addressing normative statements concerning the structure and content of PDP artifacts as well as of their archive format.
- **Plan TAs**: addressing normative statements concerning the structure and content of Plan files.

NOTE: Provider TAs and Consumer TAs may also contain their own tests similar to those found in PDP and Plan TAs. The difference is that these tests will target the messages containing PDPs and Plans (or referring to these) instead of directly the PDP and Plan artifacts. In such cases, the Test Assertions will have an ID that indicates their close relationship. For example:

- **CAMP11-405**, is the ID of a Test Assertions about the Consumer's ability to send a Plan artifact that is correctly formed. Its target is a message referring to such a Plan.
- **CAMP11-405b**, is the ID of a similar Test Assertions about the Plan artifact itself. It describes the same test concerning the Plan as CAMP11-405 (addressing the same normative statement, using the same predicate). Its target is however the Plan itself, instead of a message containing or referring to the Plan.

### 2.5 Notational Conventions

#### 2.5.1 Identification scheme for Test Assertions

Test Assertions are identified according to the scheme:

<specificationID> "-" <number>

Where **specificationID** is here “CAMP11”, and **number** takes the following ranges:

- For **Model Serialization and Integrity** Test Assertions: 100 < number < 200
- For **Protocol** Test Assertions: 200 < number < 300
- For **Resource State Changes and Lifecycle** Test Assertions: 300 < number < 400
- For **PDP** Test Assertions: 400 < number < 500

#### 2.5.2 Identifying a message inside a Test Assertion

When referring to an HTTP message, either request or response, the following notation is used:

“(" messageID ")" 

where **messageID** is a symbolic identifier typically of the form. “m1”, “m2” etc. Such an identifier is only relative to the test assertion; they are used to distinguish messages from each other in the same test assertion (i.e. this identifier does not appear in the message itself).

#### 2.5.3 Identifying an attribute of a resource in a message

When referring to an attribute of a resource serialized in a message, the Courier New font is used to indicate a name proper to the CAMP model. The following notation is used:

“(" messageID ")" <resource_type> "." <attribute_name>

Where:

- **messageID** is a symbolic message identifier.
- **resource_type** is a reminder of the resource type expected to be found for the top-level serialized resource in this message.
- **attribute_name** is the attribute name of interest for the resource (defined for this resource_type and expected to be found on the serialized resource).
For example:

(m2)platform.assemblies_uri

### 2.6 Coverage of the Specification

In this document, only “mandatory” normative statements (SHALL / SHALL NOT) have been addressed.
### 3 Test Assertions

#### 3.1 Provider Test Assertions

These Test Assertions concern the Provider as conformance target.

#### 3.1.1 Basic Schema Compliance for Platform Resources, Provider Side

##### 3.1.1.1 `platform_endpoints` (CAMP11-101)

**Addressing normative statements:**

When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

**TA_Id:** CAMP11-101  
**NormativeSource:** RE-70, RE-06 (section: platform_endpoints)  
**Target:** A successful response message (HTTP code 200) to a GET `platform_endpoints` message.  
**Predicate:** the target (response) message content satisfies the serialization schema (JSON) for `platform_endpoints`, AND has a type attribute of value = "platform_endpoints".  
**PrescriptionLevel:** mandatory  
**Tag:** conformance=Provider

##### 3.1.1.2 `platform_endpoint` serialization (CAMP11-102)

**Addressing normative statements:**

When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

Each `platform_endpoint` resource SHALL refer to exactly one `platform_resource`, and indicate the versions supported by the Platform. [RE-20]

If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

**TA_Id:** CAMP11-102  
**NormativeSource:** RE-70, RE-20, RE-06 (section: platform_endpoint)  
**Target:** A successful response message (HTTP code 200) to a GET `platform_endpoint` message (m1).  
**Prerequisite:** the URI used in message (m1) exists as a link in `platform_endpoints.platform_endpoint_links[]` as result to a previous GET `platform_endpoints` URI.  
**Predicate:** the target (response) message content satisfies the serialization schema (JSON) for `platform_endpoint`, AND has a type attribute of value = "platform_endpoint" AND non-empty `platform_uri`, `implementation_version`, `specification_version` attribute values.  
**PrescriptionLevel:** mandatory  
**Tag:** conformance=Provider
3.1.1.3 platform Serialization (CAMP11-103)

Addressing normative statements:
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]
If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

TA_Id: CAMP11-103
NormativeSource: RE-70, RE-06, (RE-53) (Section: platform Resource definition)
Target: A successful response message (HTTP code 200) to a GET platform message.
Predicate: the target message content satisfies the serialization schema (JSON ) for platform, AND has a type attribute of value = "platform".
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.1.4 service Serialization (CAMP11-104)

Addressing normative statements:
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]
If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

TA_Id: CAMP11-104
NormativeSource: RE-70, (RE-06, RE-53) (Section: service Resource definition)
Target: A successful response message (HTTP code 200) to a GET service message (m1).
Prerequisite: the URI used in message (m1) exists as a link in services.service_links where services is obtained from platform.services_uri as shown in the result to a previous GET platform URI message.
Predicate: the target (response) message content satisfies the serialization schema (JSON ) for service, AND has a type attribute of value = "service".
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.2 Basic Schema Compliance for Application Resources

3.1.2.1 assembly Serializations (CAMP11-111)[CHG]

Addressing normative statements:
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]
If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

TA_Id: CAMP11-111
NormativeSource: RE-70, RE-06, (RE-53) (Section: assembly Resource definition)
Target: A successful response message (HTTP code 200) to a GET assembly message (m1).
Prerequisite: the URI used in the message (m1) exists as a link in assemblies.assembly_links, as shown in the result to a previous GET assemblies message (obtained from platform.assemblies_uri), OR there is a POST to an assemblies that returns this URI.

Predicate: the target message content satisfies the serialization schema (JSON ) for assembly, AND has a type attribute of value = “assembly”.

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.2.2 component Serialization (CAMP11-112)

Addressing normative statements:
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]
If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

TA_Id: CAMP11-112
NormativeSource: RE-70, RE-06, (RE-53,) (Section: component Resource definition)
Target: A successful response message (HTTP code 200) to a GET component message (m1).
Prerequisite: the URI used in the message (m1) exists as a link in assembly.components[] as shown in the result to a previous GET assembly message.
Predicate: the target message content satisfies the serialization schema (JSON ) for component AND has a link assembly to the parent assembly URI, AND has a type attribute of value = “component”.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.2.3 plan Serializations (CAMP11-113)

Addressing normative statements:
The schema of the plan resource returned from a CAMP Provider SHALL conform to the schema for Plans described in Section 4.3, "Plan Schema", with the following additional requirements: [RMR-07]
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]
If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

TA_Id: CAMP11-113
NormativeSource: RMR-07, RE-70, RE-06, (RE-53) (Section: plan Resource definition)
Target: A successful response message (HTTP code 200) to a GET plan message (m1).
Prerequisite: the URI used in the message (m1) exists in a link in plan.plan_links as shown in the result to a previous GET plans message (obtained from platform.plans_uri), OR there is a POST to an plans Resource that returns this URI.
Predicate: the target message content satisfies the serialization schema (JSON ) for plan, AND has a type attribute of value = "plan".
PrescriptionLevel: mandatory
Tag: conformance=Provider
3.1.3 Consistency of Serialization with Metadata

3.1.3.1 Consistent Use of Formats (CAMP11-114)

Addressing normative statements:

When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

Providers SHALL respond in the requested Supported Format [PR-05]

TA_Id: CAMP11-114

NormativeSource: RE-70, PR-05, (section: Media Types / Supported Formats)

Var: (resource) in {
    assembly,
    component,
    platform,
    service
}

Target: A response message (m4) to a GET resource message (m3).

Prerequisite:

- A successful response message (m2) to a previous GET platform.supported_formats_uri message (m1).
- The negotiated format (using the HTTP Accept request header) in the GET resource message (m3), is defined in (m2).

Predicate: in the target message (m4), the resource data in case of a successful response message (HTTP code 200), or the error data in case of an error code (4xx or 5xx), is serialized consistently with the requested format.

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.3.2 Consistent Use of Type_definition names (CAMP11-150)

Addressing normative statement:

The value of the name attribute in a type_definition resource SHALL match the value of the type attribute for the resource type that it describes. [RE-75]

TA_Id: CAMP11-150

NormativeSource: RE-75, (section: type_definition resources)

Var: (resource) in {
    assembly,
    component,
    platform,
    service
}

Target: A response message (m4) to a GET resource message (m3).

Prerequisite:

A successful response message (m2) to a previous GET type_definitions (m1) where type_definitions is obtained from platform.type_definitions_uri.

Predicate: in the target message (m4), the resource data in case of a successful response message (HTTP code 200) shows a type attribute with a value that is same as the name attribute in one of the type_definition items in (m1), AND each attribute of the resource in (m4) is also described by an
attribute_definition resource referred in the
type_definition.attribute_definition_links.

**PrescriptionLevel:** mandatory
**Tag:** conformance=Provider

### 3.1.3.3 Inheritance from camp_resource (CAMP11-151)

**Addressing normative statement:**

All CAMP resources SHALL inherit directly or indirectly from this resource. [MO-05]

<table>
<thead>
<tr>
<th><strong>TA_Id:</strong></th>
<th>CAMP11-151</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NormativeSource:</strong></td>
<td>MO-05, (section: camp_resource resource)</td>
</tr>
<tr>
<td><strong>Target:</strong></td>
<td>A successful response message (m2) to a previous GET type_definitions (m1) where type_definitions is obtained from platform.type_definitions_uri.</td>
</tr>
<tr>
<td><strong>Prerequisite:</strong></td>
<td>A successful response message (m4) to a previous GET type_definition (m3) where the name attribute value shown in (m4) is camp_resource.</td>
</tr>
<tr>
<td><strong>Predicate:</strong></td>
<td>Every link in type_definitions.type_definition_links uses an URI that refers to a type_definition resource that satisfies either condition: (the name attribute has value camp_resource OR the inherits_from attribute has a link showing same URI as the URI used in (m3).</td>
</tr>
</tbody>
</table>

**PrescriptionLevel:** mandatory
**Tag:** conformance=Provider

### 3.1.3.4 Non-Mutability Enforcement (Provider) (CAMP11-115)

**Addressing normative statement:**

This boolean indicates the mutability of the attribute's value(s). “false” indicates that the value of the attribute, once set, SHALL NOT change for the lifetime of the resource. [RE-07]

<table>
<thead>
<tr>
<th><strong>TA_Id:</strong></th>
<th>CAMP11-115</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NormativeSource:</strong></td>
<td>RE-07, (RE-53) (section: Mutable)</td>
</tr>
<tr>
<td><strong>Var:</strong></td>
<td>(resource) in { assembly, component, plan }</td>
</tr>
<tr>
<td><strong>Target:</strong></td>
<td>A response message (m4) to a PUT request (m3) to a resource.</td>
</tr>
<tr>
<td><strong>Prerequisite:</strong></td>
<td>The following message sequence occurred:</td>
</tr>
<tr>
<td></td>
<td>A previous message (m1) of the form GET resource was sent with a successful response message (m2). (and assuming no “delete resource” message after m1).</td>
</tr>
<tr>
<td></td>
<td>The PUT request (m3) is providing different value than shown in (m2) for a consumer-mutable=false attribute.</td>
</tr>
</tbody>
</table>

**Predicate:** the target message (m4) has an 4xx HTTP code.

**PrescriptionLevel:** mandatory
**Tag:** conformance=Provider
3.1.4 Metadata Integrity and Serialization

3.1.4.1 parameters_definitions Serialization and Integrity (CAMP11-117)

Addressing normative statements:

When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

**TA_Id:** CAMP11-117

**NormativeSource:** RE-70, RE-06, (RE-53) (section: parameter_definitions)

**Target:** A successful response message (HTTP code 200) (m4) to a GET parameter_definitions message (m3).

**Prerequisite:** The following message sequence occurred:

- A successful response (HTTP 200) message (m2) to a GET assemblies message (m1)
- The GET parameter_definitions (m3) is on the URI returned as assemblies parameter_definitions_uri.

**Predicate:** the target (response) message content satisfies the serialization schema (JSON ) for parameter_definitions, and has a type attribute of value = "parameter_definitions"

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

3.1.4.2 parameters_definition Serialization and Integrity (CAMP11-118)

Addressing normative statements:

When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

If the Required boolean constraint for an attribute of a resource type has a value of "true", then a resource of this type SHALL have the attribute present. [RE-06]

**TA_Id:** CAMP11-118

**NormativeSource:** RE-70, RE-06, (RE-53,) (section: parameter_definition)

**Target:** A successful response message (HTTP 200) (m6) to a GET parameter_definition message (m5).

**Prerequisite:** The following message sequence occurred:

- A successful response (HTTP 200) message (m2) to a GET assemblies message (m1)
- A successful response (HTTP 200) message (m4) to a GET parameter_definitions (m3) on the URI returned by (m2) as assemblies parameter_definitions_uri.
- The GET parameter_definition (m5) is against on one of the URIs returned in (m4) parameter_definition parameter_definition_links

**Predicate:** the target message (m6) content satisfies the serialization schema (JSON ) for parameter_definition, AND has a type attribute of value = "parameter_definition"

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider
3.1.4.3 formats Serialization (CAMP11-119)

Addressing normative statement:
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

TA_Id: CAMP11-119

NormativeSource: RE-70 (section: formats)
Target: A successful response message (HTTP code 200) to a GET formats message (m1).
Prerequisite: the URI used in the message (m1) exists as value of a platform.supported_formats_uri attribute as result to a previous GET platform message.
Predicate: the target (response) message content satisfies the serialization schema (JSON ) for formats, and has a type attribute of value = “formats”.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.4.4 format Serialization (CAMP11-120)

Addressing normative statement:
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

TA_Id: CAMP11-120

NormativeSource: RE-70 (section: format)
Target: A successful response message (HTTP code 200)(m4) to a GET format message (m3).
Prerequisite: the URI used in the message (m3) exists as an item in formats.format_links as shown in a result to a previous GET formats message (m2), itself obtained from a previous GET platform message (m1) as platform.supported_formats_uri.
Predicate: the target message (m4) content satisfies the serialization schema (JSON ) for format, and has a type attribute of value = “format”.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.4.5 Presence of JSON Format (CAMP11-121)

Addressing normative statement:
The name, mime_type, version, and documentation attribute values for the JSON Format Resource SHALL reflect the above values. [RE-42]

TA_Id: CAMP11-121

NormativeSource: RE-42 (section: Required JSON Format Resource)
Target: A successful response message (HTTP code 200)(m4) to a GET format message (m3) with query for “name”="JSON".
Prerequisite: the URI used in the message (m3) exists as an item in formats.format_links as a result to a previous GET Formats message (m2), itself obtained from a previous GET platform message (m1) as platform.supported_formats_uri.
Predicate: the target message (m4) has: "mime_type","version","documentation" set respectively to the expected values ("application/json", "RFC4627", "http://www.ietf.org/rfc/rfc4627.txt") .
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.4.6 Position of JSON Format  (CAMP11-122)

Addressing normative statement:

The Required JSON Format Resource SHALL be listed first in the format_links array. [RE-41]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-122</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: RE-41 (section: format_links)</td>
</tr>
<tr>
<td>Target: A successful response message (HTTP code 200)(m2) to a GET formats message (m1).</td>
</tr>
<tr>
<td>Prerequisite: the URI used in the message (m1) exists as platform.supported_formats_uri value, as a result to a previous GET platform message.</td>
</tr>
<tr>
<td>Predicate: the target message (m2) has its first link item with “target_name” set to “JSON”.</td>
</tr>
<tr>
<td>PrescriptionLevel: mandatory</td>
</tr>
</tbody>
</table>

Tag: conformance=Provider

3.1.4.7 type_definitions Serialization (CAMP11-123)

Addressing normative statement:

When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-123</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: RE-70, (RE-43) (section: type_definitions Resource)</td>
</tr>
<tr>
<td>Target: A successful response message (HTTP code 200)(m2) to a GET type_definitions message (m1).</td>
</tr>
<tr>
<td>Prerequisite: the URI used in the message (m1) exists as platform.type_definitions_uri in a result to a previous GET platform message.</td>
</tr>
<tr>
<td>Predicate: the target message (m2) content satisfies the serialization schema (JSON ) for type_definitions, AND has a type attribute of value = “type_definitions”.</td>
</tr>
<tr>
<td>PrescriptionLevel: mandatory</td>
</tr>
</tbody>
</table>

Tag: conformance=Provider

3.1.4.8 type_definition Serialization (CAMP11-124)

Addressing normative statement:

When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-124</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: RE-70 (section: Resources)</td>
</tr>
<tr>
<td>Target: A successful response message (HTTP code 200) to a GET type_definition message (m1).</td>
</tr>
<tr>
<td>Prerequisite: the URI used in the message (m1) exists as an item in type_definitions. type_definitions_links as a result to a previous GET type_definitions message, itself obtained from platform.type_definitions_uri in a previous GET Platform message.</td>
</tr>
<tr>
<td>Predicate: the target (response) message content satisfies the serialization schema (JSON ) for type_definition, AND has a type attribute of value = “type_definition”.</td>
</tr>
<tr>
<td>PrescriptionLevel: mandatory</td>
</tr>
</tbody>
</table>
Tag: conformance=Provider

3.1.4.9 attribute_definition Serialization (CAMP11-125)

Addressing normative statement:
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

TA_Id: CAMP11-125
NormativeSource: RE-70 (section: Resources)
Target: A successful response message (HTTP code 200) (m2) to a GET Attribute_definition message (m1).
Prerequisite: the URI used in the message (m1) exists as an item in Type_definition. attribute_definition s_links as a result to a previous GET Type_definition.
Predicate: the target message (m2) content satisfies the serialization schema (JSON ) for Attribute_definition, AND has a type attribute of value = “attribute_definition”.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5 Various Model Referential and Semantic Constraints

3.1.5.1 type_definitions reference in platform Resource (CAMP11-126)

Addressing normative statement:
The platform resource SHALL provide a Link to the type_definitions resource in the required attribute named type_definitions_uri.[RE-43]

TA_Id: CAMP11-126
NormativeSource: RE-43, (section: type_definitions Resource)
Target: A successful response message (HTTP code 200) (m2) to a GET platform message (m1).
Predicate: the target message (m2) content has:
- an attribute platform.type_definitions_uri, that contains a valid URI referring to a type_definitions Resource.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.2 platform_endpoint specification_version (CAMP11-127)

Addressing normative statements:
For Platforms that implement this version of the CAMP specification, the value of this attribute SHALL be “CAMP 1.1” as defined in Section 1.8, “Specification Version”. [RE-22]
platform_endpoint resources that reference Specification Version “CAMP 1.1” Platform Resources SHALL NOT include this attribute because no previous versions are compatible. [RE-24]

TA_Id: CAMP11-127
Target: A successful response message (HTTP code 200) (m2) to a GET platform_endpoint message (m1).
Prerequisite: the URI used in the message (m1) exists as a link in platform_endpoints.platform_endpoint_links[] as shown in the result to a previous GET platform_endpoints URI.

Predicate: the target message (m2) content has a specification_version attribute = “CAMP 1.1” AND does not contain an backward_compatible_specification_versions attribute.

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.3 Platform specification_version (CAMP11-128)

Addressing normative statement:
For Platforms that implement this version of the CAMP specification, the value of this attribute SHALL be as defined in Section 1.8, “Specification Version”. [RE-26]

TA_Id: CAMP11-128
NormativeSource: RE-26 (section: Platform/specification_version)
Target: A successful response message (HTTP code 200) (m2) to a GET platform message (m1).
Predicate: the target message (m2) content has a specification_version attribute = “CAMP 1.1”.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.4 platform_endpoint and platform matching specification_version (CAMP11-129)

Addressing normative statement:
The value of this attribute SHALL exactly match the value of the specification_version attribute of any platform_endpoint resource that references this platform resource. [RE-27]

TA_Id: CAMP11-129
NormativeSource: RE-27 (section: Platform/specification_version),
Target: A successful response message (HTTP code 200) (m4) to a GET platform message (m3).
Prerequisite: The sequence of messages occurred:
- A successful response message (HTTP code 200) (m2) to a GET platform_endpoint message.
- The URI in GET platform message (m3), is same as the platform_endpoint.platform_uri value in (m2)
Predicate: the target (response) message (m4) content has a platform.specification_version .attribute = (m2)platform_endpoint.specification_version.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.5 platform_endpoint and platform matching implementation_version (CAMP11-130)

Addressing normative statement:
The value of this attribute SHALL exactly match the value of the implementation_version attribute of any platform_endpoint resource that references this platform resource. [RE-29]

**TA_Id:** CAMP11-130

**NormativeSource:** RE-29 (section: Platform / implementation_version ),

**Target:** A successful response message (HTTP code 200) (m4) to a GET platform message (m3).

**Prerequisite:** The sequence of messages occurred:
- A successful response message (HTTP code 200) (m2) to a GET platform_endpoint message,
- The URI in GET platform message (m3), is same as the platform_endpoint.platform_uri value in (m2)

**Predicate:** the target message (m4) content has a platform.implementation_version attribute = (m2)platform_endpoint.implementation_version.

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

### 3.1.5.6 Cross-references platform_endpoints and platform (CAMP11-131)[REN]

**Addressing normative statements:**

This attribute is an array of Links to platform_endpoint resources. This array SHALL contain at least one Link. [RE-18]

References between the resources (platform_endpoints, platform_endpoint, and platform) SHALL be self-consistent. [RE-19]

**TA_Id:** CAMP11-131

**NormativeSource:** RE-19, RE-18 (section: platform_endpoint_links),

**Target:** A successful response (HTTP 200) message (m2) to a GET platform message (m1)

**Prerequisite:** The following message sequence occurred:
- A successful response message (HTTP code 200) (m4) to a GET platform_endpoints message (m3).

**Predicate:** there is at least one link in platform_endpoints.platform_endpoint_links that refers to a platform_endpoint resource with platform_endpoint.platform_uri attribute value same as the URI used in (m1). AND the (m2) platform.platform_endpoints_uri value is same URI as the URI used in (m3).

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

### 3.1.5.7 Parameter Definition for pdp_uri or plan_uri in assemblies (CAMP11-132)

**Addressing normative statement:**

The assemblies resource SHALL indirectly reference parameter_definition resources that describes the pdp_uri, plan_uri, pdp_file, and plan_file parameters. [RMR-03]

**TA_Id:** CAMP11-132

**NormativeSource:** RMR-03 (section: Assemblies / parameter_definitions_uri),
Target: A successful response message (HTTP code 200) (m2) to a GET assemblies message (m1), with a representation_skew=NONE.

Prerequisite: The following message sequence occurred after (m2):
- A successful response (HTTP 200) message (m4) to a GET parameter_definitions message (m3) using the (m2) assemblies.parameter_definitions_uri URI.

Predicate: There exists at least four link items in (m4)parameter_definitions.parameter_definitions_links, that describe the "pdp_uri", "plan_uri", "pdp_file" and "plan_file" parameters, i.e. for which respectively a GET parameter_definition message (m5) returns a successful response (m6) with parameter_definition.name = "pdp_uri", "plan_uri", "pdp_file" and "plan_file".

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.8 Parameter Definition for pdp_uri or plan_uri in plans (CAMP11-152)

Addressing normative statement:
The plans resource SHALL indirectly reference parameter_definition resources that describe the pdp_uri, plan_uri, pdp_file, and plan_file parameters. [RMR-06]

TA_Id: CAMP11-152

NormativeSource: RMR-06 (section: plans Resource),

Target: A successful response message (HTTP code 200) (m2) to a GET plans message (m1), with a representation_skew=NONE.

Prerequisite: The following message sequence occurred after (m2):
- A successful response (HTTP 200) message (m4) to a GET parameter_definitions message (m3) using the (m2) plans.parameter_definitions_uri URI.

Predicate: There exists at least four link items in (m4)parameter_definitions.parameter_definitions_links, that describe the "pdp_uri", "plan_uri", "pdp_file" and "plan_file" parameters, i.e. for which respectively a GET parameter_definition message (m5) returns a successful response (m6) with parameter_definition.name = "pdp_uri", "plan_uri", "pdp_file" and "plan_file".

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.9 Required Parameter Definitions in service (CAMP11-134)

Addressing normative statement:
The parameter_definitions resource referenced by this attribute SHALL define parameters to allow setting the ‘name’, ‘description’, and ‘tags’ attributes of any new resource created in the course of interacting with this resource. [RE-37]

TA_Id: CAMP11-134

NormativeSource: RE-37 (section: Service / parameter_definitions_uri),

Target: A successful response message (HTTP code 200) (m2) to a GET service message (m1), with a representation_skew=NONE.

Prerequisite: The following message sequence occurred after (m2):
A successful response (HTTP 200) message (m4) to a GET parameter_definitions message (m3) using the (m2) service.parameter_definitions_uri URI.

**Predicate:** There exists link items in (m4)parameter_definitions.parameter_definitions_links, for which a GET parameter_definition message (m5) returns a successful response (m6) with parameter_definition.name = “name”, AND another (m5’) returns parameter_definition.name = “description”, AND another (m5’’) returns parameter_definition.name = “tags”.

**PrescriptionLevel:** mandatory
**Tag:** conformance=Provider

### 3.1.5.10 UTC Timestamps, Provider side (CAMP11-136)

**Addressing normative statement:**
Consumers and Providers SHALL express Timestamps in UTC (Coordinated Universal Time), with the special UTC designator (“Z”). [RE-65]

**TA_Id:** CAMP11-136

**NormativeSource:** RE-65 (section: Timestamp)

**Target:** A successful response message (HTTP code 200)(m2) that has a resource serialization showing the “timestamp” attribute, in response to a GET message (m1).

**Predicate:** the Timestamp value conforms to the UTC (Universal Time Coordinated) with a “zero” timezone offset, i.e. with format terminated with the designator “Z”, of the form: yyyy '-' mm '-' dd 'T' hh ':' mm ':' ss 'Z' (Example: 1994-11-05T13:15:30Z)

**PrescriptionLevel:** mandatory
**Tag:** conformance=Provider

### 3.1.5.11 representation_skew Content (CAMP11-137)

**Addressing normative statement:**
If present, representation_skew SHALL have one of the following values: [RE-11]

**TA_Id:** CAMP11-137

**NormativeSource:** RE-11, (section: representation_skew)

**Target:** A successful response message (HTTP code 200) message to a GET resource message.

**Prerequisite:** The representation_skew attribute is present.

**Predicate:** the value of representation_skew is among { CREATING, NONE, UNKNOWN, DESTROYING }

**PrescriptionLevel:** mandatory
**Tag:** conformance=Provider

### 3.1.5.12 References to format Resources associated with a platform (CAMP11-140)

**Addressing normative statement:**
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

**TA_Id:** CAMP11-140

**NormativeSource:** RE-70
Target: A successful response message (HTTP code 200) (m4) to a GET formats message (m3) with URI same as in (m2) platform.supported_formats_uri

Prerequisite: A successful result (m2) to a previous GET platform message (m1)

Predicate: For each link in (m4) formats.format_links, a GET format on the URI referenced in the link, returns an HTTP code 2xx AND a type attribute = "format".

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.13 Presence of format Resources for every supported format (CAMP11-149)

Addressing normative statement:
For every format that the Platform supports, there SHALL be a Format resource Link that represents such a format. [RE-40]

TA_Id: CAMP11-149
NormativeSource: RE-40 (section: Formats Resource / format_links)

Target: A successful response message (HTTP code 200) (m4) to a GET message (m3) with HTTP Content-type in (m4) other than “application/json”

Prerequisite: A successful result (m2) to a previous GET platform message (m1) where this resource (m4) is defined.

Predicate: There exists a link in (m4) formats.format_links, where formats is referred to by (m2) platform.supported_formats_uri, that refers to a format resource with mime_type attribute value same as Content-type in (m4).

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.14 Presence of type_definition Resources associated with a platform (CAMP11-141)

Addressing normative statement:
If the array is non-empty, for every resource type that the Platform supports, there SHALL be a type_definition resource Link that represents such a resource type. [RE-44]

TA_Id: CAMP11-141
NormativeSource: RE-44 (section: type_definitions Resource / type_definitions_links)

Target: A successful response message (HTTP code 200) (m4) to a GET resource message (m3) of any kind.

Prerequisite:
A successful response message (HTTP code 200) (m4) to a GET type_definitions message (m1) with URI same as in platform.type_definitions_uri, showing a type_definition_links array with at least one link.

Predicate: There exists a link in (m2) type_definitions.type_definition_links, that references a type_definition resource with a name attribute value same as the type value in the resource returned in (m4).

PrescriptionLevel: mandatory
Tag: conformance=Provider
3.1.5.15 Inheritance of type_definition Resources (CAMP11-148)

Addressing normative statement:
Links in this array SHALL NOT either directly or transitively point to the described resource. [MO-06]

TA_Id: CAMP11-148

NormativeSource: MO-06 (section: type_definition Resource/inherits_from)

Target: A successful response message (HTTP code 200) (m4) to a GET type_definition message (m3).

Prerequisite: The type_definition URI belongs to

Target: A successful response message (HTTP code 200) (m4) to a GET type_definition message (m3).

Prerequisite: A sequence of messages:

Predicate: If the inherits_from link is set in (m4) then every link present in it satisfies: (the link refers to a Resource of type type_definition that has an attribute "type" of value "typeDefinition" AND an attribute "name" value different from the "name" value in (m4) AND an attribute "uri" value different from the URI used in (m3).

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.16 Presence of Attribute_definition Resources associated with a Platform (CAMP11-142)

Addressing normative statement:

Target: A successful response message (HTTP code 200) (m6) to a GET type_definition message (m5), on a URI present in (m4) type_definitions.type_definitions_links

Prerequisite: A sequence of messages:

Predicate: For each attribute of the type_definition in (m6), there exists a link in type_definition.attribute_definitions_links, for which a GET attribute_definition on the URI referenced in the link, returns an HTTP code 2xx AND a type attribute = "attribute_definition" AND a name attribute = the attribute name

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.5.17 Presence of Extension Resources associated with a platform (1) (CAMP11-143)

Addressing normative statement:
For every extension available, there SHALL be an extension resource Link that represents the extension. [EX-08]

**TA_Id:** CAMP11-143  
**NormativeSource:** EX-08 (section: formats Resource/format_links)  
**Target:** A successful response message (HTTP code 200) (m6) to a GET extension message (m5) i.e. where (m6) shows an type attribute of value “extension”.  
**Prerequisite:** A previous sequence of messages such as:  
- A successful response (m2) to a previous GET platform message (m1)  
- A successful response (m4) to a previous GET extensions message (m3) where the URI is same as (m2)platform.extensions_uri.  
**Predicate:** There exists a link in (m4) Extensions.extension_links, with a reference URI same as the URI used in (m5).  
**PrescriptionLevel:** mandatory  
**Tag:** conformance=Provider

### 3.1.5.18 Presence of extension Resources associated with a platform (2) (CAMP11-144)

Addressing normative statements:  
For every extension available, there SHALL be an extension resource Link that represents the extension. [EX-08]  
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

**TA_Id:** CAMP11-144  
**NormativeSource:** EX-08, RE-70 (section: Formats Resource/format_links)  
**Target:** A successful response message (HTTP code 200) (m4) to a GET extensions message (m3) with URI same as in (m2)platform.extensions_uri  
**Prerequisite:** A successful result (m2) to a previous GET platform message (m1)  
**Predicate:** For each link in (m4) extensions.extension_links, a GET extension message on the URI referenced in the link returns an HTTP code 2xx AND shows an type attribute of value “extension”.  
**PrescriptionLevel:** mandatory  
**Tag:** conformance=Provider

### 3.1.5.19 Presence of extensions Resource associated with a platform (CAMP11-145)

Addressing normative statement:  
The platform resource SHALL provide a Link to the extensions resource in the required attribute named extensions_uri [EX-09]  
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]

**TA_Id:** CAMP11-145  
**NormativeSource:** EX-09, RE-70 (section: Formats Resource/format_links)
Target: A successful response message (HTTP code 200) \((m4)\) to a GET extensions message \((m3)\) with URI same as in \((m2)\) platform.extensions_uri.

Prerequisite: A successful result \((m2)\) to a previous GET platform message \((m1)\)

Predicate: The message \((m4)\) has HTTP code 2xx, AND the returned serialization shows a type attribute of value “extensions” AND the serialization is conforming to the extensions schema.

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.5.20 Unique Name of extension Resources associated with a platform (CAMP11-146)

Addressing normative statement:

Entities added by an extension SHALL NOT interfere with names of existing entities, including any added by another extension. [EX-06]

TA_Id: CAMP11-146

NormativeSource: EX-06, (EX-08) (section: Unique Name Requirement)

Target: A successful response message \((m4)\) to a GET extensions message \((m3)\) with URI same as in \((m2)\) platform.extensions_uri

Prerequisite: A successful result \((m2)\) to a previous GET platform message \((m1)\)

Predicate: For any pair of links in \((m4)\) extensions.extension_links, the target_name values in these links are different AND different from any predefined resource or attribute name in the CAMP specification.

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.5.21 Presence of an extension Resource advertising support for plans (CAMP11-147)

Addressing normative statement:

Providers that support the plans and plan resources SHALL advertise such support using the following extension resource: [RMR-12]

TA_Id: CAMP11-147

NormativeSource: RMR-12 (section: Advertising Support for the Plan Resource)

Target: A successful response message (HTTP code 200) \((m4)\) to a GET extensions message \((m3)\) with URI same as in \((m2)\) platform.extensions_uri

Prerequisite: A successful result \((m2)\) to a previous GET platform message \((m1)\), shows an plans_uri attribute set to a valid URI.

Predicate: There exists a link in \((m4)\) extensions.extension_links, for which a GET extension message on the URI referenced in the link returns an extension that shows a name attribute of value “CAMP Plans Extension”.

PrescriptionLevel: mandatory

Tag: conformance=Provider
3.1.6 Support for HTTP Methods

3.1.6.1 GET method (CAMP11-201)

Addressing normative statements:
When supporting such a Resource, a Provider SHALL implement it and serialize it as described in the corresponding sub-section. [RE-70]
Providers SHALL support the HTTP GET, PUT, and PATCH methods on all of the resources defined in this section. [RE-53]

TA_Id: CAMP11-201
NormativeSource: RE-70, RE-53, (section: platform_endpoints resource)
Target: A response message to a GET platform_endpoints message.
Predicate: the target message has HTTP code 200 AND its content is valid for platform_endpoints serialization schema (JSON).
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.6.2 PDP Registration by reference, Provider side (CAMP11-410)

Addressing normative statement:
Providers SHALL support the deployment of applications via HTTP POST requests on the assemblies resource as described in this section. [PR-49]

TA_Id: CAMP11-410
NormativeSource: PR-49 (section: Registering an Application by Reference)
Target: A response (m2) to a POST message (m1) to an assemblies URL, with a "pdp_uri" or a "plan_uri" attribute.
Predicate: the HTTP code in target (m2) is 201 “Created” AND the target message contains a location header with the URI for the new assembly resource, OR ( code = 202 “accepted” AND a subsequent GET on the returned Location header URI shows either representation_skew=CREATING or HTTP code 200 “OK”)
Predicate: the HTTP code in target (m2) is NOT 405 “Method Not Allowed”
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.6.3 Supported HTTP Post for PDP or Plan Registration by Reference: Provider side (CAMP11-435)

Addressing normative statements:
Providers that support the plans resource and plan resources SHALL support the registration of Plans via an HTTP POST request on the plans resource as described in this section. [PR-56]

In addition to the methods defined in Section 5.5, “HTTP Method Support”, Providers SHALL support the HTTP POST method on the plans resource as described in Section 6.12, “Registering a Plan”. [RMR-05]

TA_Id: CAMP11-435
NormativeSource: PR-56, RMR-05
Target: A response message (m2) to a POST plans message (m1) where (m1) contains a “pdp_uri” or a “plan_uri” attribute.
Predicate: the HTTP code in target (m2) is NOT 405 “Method Not Allowed”
Prescription Level: mandatory
Tag: conformance=Provider

3.1.6.4 Supported HTTP Post for PDP or Plan Registration by value: Provider side (CAMP11-436)

Addressing normative statement:
In addition to the methods defined in Section 5.5, “HTTP Method Support”, Providers SHALL support the HTTP POST method on the plans resource as described in Section 6.12, “Registering a Plan”. [RMR-05]

Providers that support the plans resource and plan resources SHALL support the registration of Plans via HTTP POST requests on the plans resource in which the entity body of the request contains the PDP or the Plan file that is being registered. [PR-61]

TA_Id: CAMP11-436
Var: archtype in { application/x-zip, application/x-tar, application/x-tgz, application/x-yaml }
Normative Source: PR-61, RMR-02
Target: A response message (m2) to a POST plans message (m1) where (m1) does not contain a “pdp_uri” nor a “plan_uri” attribute, and contains a Content-Type = archtype.
Predicate: the HTTP code in target (m2) is NOT 405 “Method Not Allowed”
Prescription Level: mandatory
Tag: conformance=Provider

3.1.6.5 Supported HTTP Post for Application Deployment by value: Provider side (CAMP11-434)

Addressing normative statement:
Providers SHALL support the deployment of applications via HTTP POST requests on the assemblies resource in which the entity body of the request contains the PDP or the Plan file that is being deployed. [PR-60]

In addition to the methods defined in Section 5.5, “HTTP Method Support”, Providers SHALL support the HTTP POST method on the assemblies resource as described in Section 6.11, “Deploying an Application”. [RMR-02]

TA_Id: CAMP11-434
Var: archtype in { application/x-zip, application/x-tar, application/x-tgz, application/x-yaml }
Normative Source: PR-60, RMR-02
Target: A response message (m2) to a POST assemblies message (m1) where (m1) does not contain a “pdp_uri” nor a “plan_uri” attribute, and contains a Content-Type = archtype.
Prerequisite: enough time elapsed to allow for the creation to complete.
Predicate: the HTTP code in target (m2) is NOT 405 “Method Not Allowed”
Prescription Level: mandatory
Tag: conformance=Provider

3.1.6.6 HTTP POST support for operation Resource (1) (CAMP11-311)

Addressing normative statement:
The Provider SHALL update the plan_links attribute of the plans resource to include a reference to the newly created plan resource. [PR-64]

TA_Id: CAMP11-311
NormativeSource: RE-64 (section: operation Resource)

Target: A response message to a POST operation message.

Prerequisite: the Operation URI exists as an item in operations.operation_links[] as shown in the result to a previous GET operations URI, itself obtained from a GET assembly.operations_uri.

Predicate: the HTTP code in target (m2) is NOT 405 "Method Not Allowed"

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.7 Support for JSON

3.1.7.1 JSON media-type for Resources (1) (CAMP11-202)

Addressing normative statement:
Providers SHALL provide representations of all available resources in JSON. [PR-01]

TA_Id: CAMP11-202

NormativeSource: PR-01 (section: Required Formats)

Target: A successful response message (HTTP code 200)(m2) to a GET resource message (m1) that has no HTTP “Accept” header or has one set to “application/json”.

Predicate: In the target (m2) the HTTP Content-Type value is “application/json”, AND the content if any is valid JSON.

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.7.2 JSON media-type for Deployments of Applications (1) (CAMP11-220)

Addressing normative statement:
To support the deployment of applications via a reference to either a PDP, Plan file, or plan resource, Providers SHALL accept the "application/json" media type. [PR-68]

TA_Id: CAMP11-220

NormativeSource: PR-68 (section: Deploying an Application by Reference)

Target: A response message (m2) to a POST assemblies message (m1) that has no HTTP “Accept” header or has one set to “application/json” and contains a “pdp_uri” or a “plan_uri” attribute.

Predicate: The HTTP code of (m2) is NOT code 415, “Unsupported Media Type”.

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.7.3 JSON media-type for Plan Registration (1) (CAMP11-221)

Addressing normative statement:
To support the registration of Plans via a reference to either a PDP or a Plan file, Providers SHALL accept the "application/json" media type. [PR-69]

TA_Id: CAMP11-221

NormativeSource: PR-69 (section: Registering a Plan by Reference)

Target: A response message (m2) to a POST plans message (m1) where (m1) has no HTTP “Accept” header or has one set to “application/json” and contains a “pdp_uri” or a “plan_uri” attribute.
Predicate: The HTTP code of (m2) is NOT code 415, "Unsupported Media Type".

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.7.4 Duplicate Keys in JSON, Provider side (CAMP11-204)

Addressing normative statement:
Consumers and Providers SHALL NOT transmit JSON objects that contain duplicate keys. [PR-02]

TA_Id: CAMP11-204
NormativeSource: PR-02 (section: Required Formats / Duplicate Keys in JSON Objects)
Target: A successful response message (m2) with JSON content (Content-Type = "application/json") to a GET resource request (m1).
Predicate: there is no duplicate JSON keys at same level in the JSON content of the target message (m2).
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.7.5 Duplicate Keys in JSON, Provider side, Error generation (CAMP11-205)

Addressing normative statement:

If a Consumer sends a Provider a request containing duplicate keys in a JSON object, the Provider SHOULd reject the request by sending back a '400 Bad Request' status code. [PR-03]

TA_Id: CAMP11-205
NormativeSource: PR-03 (section: Required Formats / Duplicate Keys in JSON Objects)
Target: A response message (m2) to a request message (m1) with JSON content that has duplicate keys at same level.
Predicate: The HTTP code in the target (m2) is '400 Bad Request'.
PrescriptionLevel: preferred
Tag: conformance=Provider

3.1.8 Resource Queries and HTTP

3.1.8.1 select_attr Positive Case Provider side (CAMP11-206)

Addressing normative statement:
A Provider SHALL return only the attributes of the queried resource that match the attribute names passed as arguments of 'select_attr'. [PR-47]

TA_Id: CAMP11-206
NormativeSource: PR-47 ("If a GET message is sent with a select_attr request parameter in the URI, then only the attributes of the queried resource that match these parameters must be returned.") (derived from Section: Request parameters)
Target: A successful response message (HTTP code 200) (m4) to a GET resource query message (m3) that uses "select_attr" query parameter.
Prerequisite: A previous message (m1) of the form GET resource URI (with no select_attr query parameter) was sent with a successful response message (m2). (and assuming no "delete resource" message after m1).
Predicate: the body of the target message (m4) contains only the attributes of the resource within those returned in (m2), that match those attributes in the "select_attr" query parameter.

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.8.2 select_attr Negative Case, GET (CAMP11-208)

Addressing normative statement:

If an attribute is not part of the resource, an HTTP 4XX status code SHALL be returned. [PR-09]

TA_Id: CAMP11-208
NormativeSource: PR-09 (section: Request Parameters)
Target: A response message (m4) to a GET resource query message (m3) that uses “select_attr ” query parameter.

Prerequisite:

- A previous message (m1) of the form GET resource URI (with no select_attr query parameter) was sent with a successful response message (m2). (and assuming no “delete resource” message after m1).
- In the request message (m3), there are attribute names (in select_attr query parameter) that do not appear in the response (m2).

Predicate: the HTTP code in the target message (m4) is of the form 4XX.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.8.3 select_attr Negative Case, PUT (CAMP11-209)

Addressing normative statement:

Upon receiving such a request the Provider SHALL respond with a 400 status code. [PR-13]

TA_Id: CAMP11-209
NormativeSource: PR-13 (section: Request Parameters )
Target: A response message (m4) to a PUT resource query message (m3) that uses "select_attr " query parameter.

Prerequisite:

- A previous message (m1) of the form GET resource URI (with no select_attr query parameter) was sent with a successful response message (m2). (and assuming no “delete resource” message after m1).
- In the PUT resource query message (m3), there are attribute names (in “select_attr ” query parameter) that do not appear in the response (m2).

Predicate: the HTTP code in the target message (m4) is 400.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.9 Resource Updates

3.1.9.1 ETag HTTP Header in Responses (CAMP11-211)

Addressing normative statement:
All HTTP responses that return representation of a resource SHOULD use strong Etag response header field indicating the current value of the entity tag for the resource. [PR-20]

**TA_Id**: CAMP11-211
**NormativeSource**: PR-20 (section: Response Headers)
**Target**: A successful response message (HTTP code 200) (m2) to a GET resource message (m1).
**Predicate**: the target (m2) has an ETag HTTP header, with a valid entity tag value.
**PrescriptionLevel**: preferred
**Tag**: conformance=Provider

### 3.1.9.2 If-Match semantics (CAMP11-212)

Addressing normative statement:

If the If-Match header field value in the request does not match the one on the server-side, the Provider SHALL send back a '412 Precondition Failed' status code. [PR-07]

**TA_Id**: CAMP11-212
**NormativeSource**: PR-07 (section: Request Headers)
**Target**: A response message (m2) to a PUT request message (m1) that has an empty If-Match HTTP header value.
**Prerequisite**: Some previous responses to GET resource messages show the use of ETag by the provider.
**Predicate**: the target message (m2) has HTTP code '412 Precondition Failed'.
**PrescriptionLevel**: mandatory
**Tag**: conformance=Provider

### 3.1.9.3 PUT semantics, regular, Provider (1) (CAMP11-213)

Addressing normative statement:

On successfully processing an HTTP PUT request a Provider SHALL update all the Consumer-mutable attributes of the target resource, and only these, with the values of the matching attributes in the request. [PR-48]

On successfully processing the request the Provider SHALL create an assembly resource and return a 201 Created status code in the HTTP response. [PR-53]

**TA_Id**: CAMP11-213
**NormativeSource**: PR-48, RE-53 (section: Updating Resources)
**Var**: (resource) in {sensor, plan, assembly, component}
**Target**: A successful response message (HTTP code 200)(m4) to a GET resource message (m3).
**Prerequisite**:
- A previous message (m1) of the form PUT resource URI (with no select_attr query parameter) was sent with a successful response message (m2). (and assuming no “delete resource” message after m1).

**Predicate**: the target message (m4) shows for consumer-mutable attributes (e.g. name. description) the same attribute values as their counterpart in the message (m1).
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.9.4 PUT semantics, regular, Provider (2) (CAMP11-214)

Addressing normative statement:
If a resource attribute is present on a resource and if an HTTP PUT request omits that attribute, it SHOULD be treated by the Provider as a request to delete the attribute. [PR-25]

TA_Id: CAMP11-214
NormativeSource: PR-25, (section: Updating Resources)
Var: (resource) in {
    sensor,
    plan,
    assembly,
    component
}
Target: A successful response message (HTTP code 200)(m4) to a GET resource message (m3).
Prerequisite:
A previous message (m1) of the form PUT resource URI (with no select_attribute parameter) and with some consumer-mutable attribute missing (e.g. description) was sent with a successful response message (m2). (and assuming no “delete resource” message after m1).
Predicate: the target message (m4) does not show any (consumer-mutable) attribute name or value, for attribute names that were missing in (m1).

PrescriptionLevel: preferred
Tag: conformance=Provider

3.1.9.5 PUT semantics, immutable attributes, Provider (CAMP11-216)

Addressing normative statement:
On receiving such a request the Provider SHALL generate an HTTP response with 403 HTTP status code. [PR-22]

TA_Id: CAMP11-216
NormativeSource: PR-22 (section: Mutability of Resources Attributes)
Var: (resource) in {
    assembly,
    component,
    plan
}
Target: A response message (m4) to a PUT resource request (m3).
Prerequisite:
- A successful previous response message (m2) to a GET resource message (m1) (same resource URI as target) (and assuming no “delete resource” message after m1).
- The message (m3) is either missing some consumer-immutable attributes for this resource type (compared with those present in the message m2), or is providing some values different from those in (m2).
Predicate: The response (m4) has HTTP code 203
PrescriptionLevel: mandatory
Tag: conformance=Provider
3.1.9.6 PATCH support, Provider (CAMP11-218)

Addressing normative statement:

Providers SHALL support the ‘add’, ‘remove’, and ‘replace’ operations. [PR-27]

Providers SHALL support the HTTP GET, PUT, and PATCH methods on all of the resources defined in this section. [RE-53]

**TA_Id:** CAMP11-218

**NormativeSource:** PR-27, RE-53 (section: Updating with JSON Patch)

**Var:** (resource) in {
  assembly,
  component,
  plan
}

**Target:** A response message (m4) to a PATCH resource request (m3) that contains no other operations than ‘add’, ‘remove’, and ‘replace’.

**Prerequisite:**

- A previous GET resource message (m1) was sent on same resource URI as (m3) with a successful response message (m2). (and assuming no “delete resource” message after m1).
- The PATCH message (m3) only attempts to update consumer-mutable attributes.

**Predicate:** Target message (m4) has HTTP code 200.

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

3.1.9.7 PATCH semantics, Provider (CAMP11-219)

Addressing normative statement:

Providers SHALL support the ‘add’, ‘remove’, and ‘replace’ operations. [PR-27]

**TA_Id:** CAMP11-219

**NormativeSource:** PR-27, (RE-53) (section: Updating with JSON Patch)

**Var:** (resource) in {
  assembly,
  component,
  plan,
  service
}

**Target:** A successful response message (HTTP code 200)(m4) to a GET resource request message (m3).

**Prerequisite:**

A previous message (m1) of the form PATCH resource on same URI as (m3) was sent with a successful response message (m2). (and assuming no “delete resource” message after m1).

**Predicate:** the target message (m4) shows for consumer-mutable attributes the same attribute values as the message (m1) for “replace” and “add” ops, and it does not show any (consumer-mutable) attribute that was in an “remove” op in (m1).

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider
3.1.10 Resource Creation and Consistency of Representations

3.1.10.1 Creation of a plan by Reference (1) (CAMP11-301)

Addressing normative statements:

On successfully processing the request the Provider SHALL create a plan resource and return a 201 Created status code in the HTTP response. [PR-57]

TA_Id: CAMP11-301

NormativeSource: PR-57 (section: Registering a Plan by Reference)

Target: A response message (m2) to a POST plans message (m1).

Prerequisite: the target message (m2) has not an HTTP code 202 "accepted"

Predicate: the target message (m2) has HTTP code 201 "created"

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.10.2 Creation of a plan by Reference (2) (CAMP11-321)

Addressing normative statements:

On successfully processing the request the Provider SHALL create a plan resource and return a 201 Created status code in the HTTP response. [PR-57]

TA_Id: CAMP11-321

NormativeSource: PR-57 (section: Registering a Plan by Reference)

Target: A response message (m4) to a GET plan message (m3), with a representation_skew=NONE.

Prerequisite: A sequence of messages occurred as follows:

- A POST plans message (m1) with a pdp_uri has been sent, and a response message (m2) received with HTTP code 201 “Created” and with a location header with a URI.
- The GET message (m3) is sent to the location URI returned by (m2)

Predicate: the target message (m4) has HTTP code 200 AND its content satisfies the serialization schema (JSON) for Plan, AND has a type attribute of value = "plan".

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.10.3 Consistency of assemblies Links after Deployment of a PDP by Reference (CAMP11-302)

Addressing normative statement:

The Provider SHALL update the assembly_links attribute of the assemblies resource to include a reference to the newly created assembly resource. [PR-52]

TA_Id: CAMP11-302

NormativeSource: PR-52 (section: Deploying an Application by Reference)

Target: A response message (m4) to a GET assemblies message (m3), with a representation_skew=NONE.

Prerequisite: A sequence of messages previously occurred as follows:

- A POST assemblies message (m1) with either a pdp_uri or a plan_uri has been sent,
• A successful (HTTP code 201 “Created”) response message (m2) received with a location header with a URI.
• The GET assemblies message (m3) is sent on same platform as (m1).

**Predicate:** the target message (m4) has HTTP code 200 AND its assemblies.assembly_links resource contains the location URI returned by (m2).

**PrescriptionLevel:** mandatory
**Tag:** conformance=Provider

### 3.1.10.4 Consistency of assemblies Links after Deployment of a PDP or Plan by Value (CAMP11-303)

**Addressing normative statement:**
The Provider SHALL update the assembly_links attribute of the assemblies resource to include a reference to the newly created assembly resource. [PR-55]

**TA_Id:** CAMP11-303
**NormativeSource:** PR-55 (PR-53, PR-54), (section: Deploying an Application by Value)
**Target:** A response message (m4) to a GET assemblies message (m3), with a representation_skew=NONE.

**Prerequisite:** A sequence of messages occurred as follows:
• A POST assemblies message (m1) with either an embedded PDP or a Plan has been sent,
• A successful (HTTP code 201 “Created”) response message (m2) received with a location header with a URI.
• The GET assemblies message (m3) is on same platform URI as (m1).

**Predicate:** the target message (m4) has HTTP code 200 AND its assemblies.assembly_links resource contains the location URI returned by (m2).

**PrescriptionLevel:** mandatory
**Tag:** conformance=Provider

### 3.1.10.5 Effective Creation of an assembly (2), setting Links (CAMP11-306)

**Addressing normative statement:**
An assembly resource SHALL have at least one reference to a component resource. [RE-39]
Providers that support Plans SHALL include this attribute (plan_uri) in all assembly resources. [RMR-04]

**TA_Id:** CAMP11-306
**NormativeSource:** RE-39, RMR-04
**Target:** A response message (m4) to a GET assembly message (m3), with a representation_skew=NONE.

**Prerequisite:** A sequence of messages occurred as follows:
• A POST plan message (m1) has been sent (the plan URI exists in the plans.plan_links obtained from platform.plan_uris), with a successful (HTTP code 201 “Created”) response message (m2) received with a location header with a URI.
• The GET assembly message (m3) is sent on the URI returned by (m2).

**Predicate:** the target message (m4) has HTTP code 200 AND its assembly.components[] has at least one link to a Component resource, AND its assembly.plan_uri link is set to the URI used in (m1).
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.10.6 Direct Creation of a component (1) (CAMP11-310)

Addressing normative statement:
If this attribute is present in the resource, Providers SHALL support the POST method on that resource in addition to the methods defined in Section 5.5, "HTTP Method Support". [RE-38]

TA_Id: CAMP11-310
NormativeSource: RE-38 (section: Service Resource / parameter_definitions_uri)
Target: A response message (m2) to a POST service message (m1) that has the parameter_definitions_uri defined.
Predicate: the target message has HTTP code 201 “Created” and a location header with a URI.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.11 Use of Parameters

3.1.11.1 Consistent Use of Parameters in POST (CAMP11-312)

Addressing normative statement:
If a POST request body does not contain a value for a required parameter, a "400 Bad Request" response SHALL be returned. [PR-18]

TA_Id: CAMP11-312
NormativeSource: PR-18, (section: POST Body Parameters / Parameter Handling)
Var: (resource) in {
    assembly,
    plan,
    service
}
Target: A response message (m6) to a POST resource message (m5), where (m5) is not setting a required parameter as defined in (m4).
Prerequisite:
- A successful response message (m2) to a previous GET resource message (m1).
- A successful response message (m4) to a GET resource.parameter_definitions_uri message (m3). In the array (m4)parameter_definitions.parameter_definitions_links some link(s) refer to a parameter_definition resource with a required attribute set to “true”.
Predicate: the target message (m6) has an HTTP error code 400 “Bad request”.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.11.2 Acceptable Value of Parameters in POST (CAMP11-313)

Addressing normative statement:
If a POST request body does not contain an acceptable value for a parameter, a "400 Bad Request" response SHALL be returned. [PR-19]
TA_Id: CAMP11-313
NormativeSource: PR-19, (section: POST Body Parameters / Parameter Handling)

Var: (resource) in {
   assemblies,
   plans,
   service
}

Target: A response message (m6) to a POST resource message (m5), where (m5) is setting a parameter with a value incompatible with its parameter_type as defined in (m4).

Prerequisite:
- A successful response message (m2) to a previous GET resource message (m1).
- A successful response message (m4) to a GET resource.parameter_definitions_uri message (m3).
- Successful response messages to access enough parameter_definition resources referred In the links (m4)parameter_definitions.parameter_definitions_links, in order to show incompatibility of a parameter value used in (m5)

Predicate: the target message (m6) has an HTTP error code 400 “Bad request”.

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.12 Resource Deletion

3.1.12.1 HTTP-level Deletion of an assembly resource (CAMP11-317)

Addressing normative statement:
In addition to the methods defined in Section 5.5, “HTTP Method Support”, Providers SHALL support the HTTP DELETE method on the assembly resource. [RE-61]

TA_Id: CAMP11-317
NormativeSource: RE-61 (section: Deleting an Application Instance and a Deployed Application)
Target: A response message to a DELETE assembly message.

Prerequisite: The assembly URI exists as a link in assemblies.assembly_links obtained from platform.assemblies_uri from prior successful (HTTP code 200 “OK”) response message to a GET platform message.

Predicate: the target message has NOT an HTTP code 405 “Method Not Allowed”

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.12.2 Effective Deletion of an assembly resource (CAMP11-318)

Addressing normative statement:
On reception of a DELETE request a Provider SHALL remove the reference to the assembly resource from the assemblies resource’s assembly_links array. [RE-74]
**Target:** A response message (m4) to a GET assembly URI message (m3).

**Prerequisite:** The following sequence of messages occurred:

- Prior to the target message:
- Prior to the target message: A successful (HTTP code 2xx) response (m2) to a DELETE assembly message (m1). The assembly URI is same as in (m3) and exists in a link in assemblies.assembly_links obtained from platform.assemblies_uri as shown in a previous GET platform message.
- After the target message: A successful (HTTP code 2xx) response (m6) to a GET assemblies message (m5).

**Predicate:** the target message (m4) has HTTP code 5xx, AND the URI does not exist anymore in a link in (m6) assemblies.assembly_links.

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

### 3.1.12.3 Effective Deletion of component resources of an assembly resource (CAMP11-340)

**Addressing normative statement:**

On reception of a DELETE request a Provider SHALL remove the assembly resource from the system along with any component resources referenced by that assembly resource. (i.e. the tree of resources that was created when the application was instantiated). [RE-73]

**TA_Id:** CAMP11-340

**NormativeSource:** RE-73, (RE-61)(section: assembly Resource)

**Target:** A response message (m6) to a GET component URI message (m5), where the component URI belongs to m2.assembly.components[] (see prerequisite).

**Prerequisite:** The following sequence of messages occurred prior to the target message:

- A successful (HTTP code 2xx) response (m2) to a GET assembly message (m1).
- A successful (HTTP code 2xx) response (m4) to a DELETE assembly message (m3).

**Predicate:** the target message (m6) has HTTP code 5xx.

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

### 3.1.12.4 Effective Deletion of a component resource (CAMP11-320)

**Addressing normative statement:**

In addition to the methods defined in Section 5.5, “HTTP Method Support”, Providers SHALL support the HTTP DELETE method on the component resource. [RE-62]

**TA_Id:** CAMP11-320

**NormativeSource:** RE-62 (section: Component Resource)

**Target:** A response message (m4) to a GET component URI message (m3).

**Prerequisite:** The following sequence of messages occurred:

- Prior to the target message: A successful (HTTP code 2xx) response (m2) message to a DELETE component message (m1). The URI is same as in (m3), and exists in a link in an assembly.components[] as shown in a previous GET assembly message (m0).
• After the target message occurred: a successful (HTTP code 200 “OK”) response message (m6) to a GET assembly message (m5) on same URI as in (m0).

**Predicate**: the target message (m4) has HTTP code 5xx, AND the URI does not exist anymore as a link in (m6)assembly.components[].

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 3.1.12.5 HTTP Deletion of a component resource (CAMP11-323)

Addressing normative statement:

In addition to the methods defined in Section 5.5, “HTTP Method Support”, Providers SHALL support the HTTP DELETE method on the component resource. [RE-62]

**TA_Id**: CAMP11-323

**NormativeSource**: RE-62 (section: Component Resource)

**Target**: A response message to a DELETE component message.

**Prerequisite**: The component URI exists as a link in an assembly.components[] as shown in a previous GET assembly message.

**Predicate**: the target message has NOT an HTTP code 405 “Method Not Allowed”

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 3.1.13 Representation Skew Semantics

#### 3.1.13.1 representation_skew Semantics (1) (CAMP11-329)

Addressing normative statement:

The following table lists the methods that SHALL be supported for each representation_skew value. [RE-12]

<table>
<thead>
<tr>
<th>representation_skew value</th>
<th>Methods Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATING</td>
<td>GET, DELETE</td>
</tr>
<tr>
<td>NONE</td>
<td>All supported methods for that resource.</td>
</tr>
<tr>
<td>UNKNOWN</td>
<td>All supported methods for that resource.</td>
</tr>
<tr>
<td>DESTROYING</td>
<td>GET</td>
</tr>
</tbody>
</table>

**TA_Id**: CAMP11-329

**NormativeSource**: RE-12, (RE-53) (section: representation_skew)

**Var**: (resource) in {
  plan,
  component,
  assembly
}

**Target**: A response message (m4) to a PUT request (m3) to a resource.

**Prerequisite**: The following message sequence occurred:

- Prior to the target: A message (m1) of the form GET resource URI was sent with a successful response message (m2), showing representation_skew=CREATING.
After the target: An message (m5) similar to (m1) with a successful response message (m6), still showing representation_skew=CREATING.

**Predicate**: the target message has an 4xx HTTP code.

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 3.1.13.2 representation_skew Semantics (2) (CAMP11-330)

**Addressing normative statement**: (see CAMP11-329)

The following table lists the methods that SHALL be supported for each representation_skew value. [RE-12]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-330</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: RE-12, (RE-53) (section: representation_skew)</td>
</tr>
<tr>
<td>Var: (resource) in {plan, component, assembly}</td>
</tr>
<tr>
<td>Target: A response message (m4) to a PATCH resource message (m3).</td>
</tr>
<tr>
<td>Prerequisite: The following message sequence occurred:</td>
</tr>
<tr>
<td>• Prior to the target: A message (m1) of the form GET resource URI was sent with a successful response message (m2), showing representation_skew=CREATING.</td>
</tr>
<tr>
<td>• After the target: An message (m5) similar to (m1) with a successful response message (m6), still showing representation_skew=CREATING.</td>
</tr>
</tbody>
</table>

**Predicate**: the target message has an 4xx HTTP code.

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 3.1.13.3 representation_skew Semantics (3) (CAMP11-331)

**Addressing normative statement**: (see CAMP11-329)

The following table lists the methods that SHALL be supported for each representation_skew value. [RE-12]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-331</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: RE-12, (RE-53) (section: representation_skew)</td>
</tr>
<tr>
<td>Var: (resource) in {plan, assembly}</td>
</tr>
<tr>
<td>Target: A response message (m4) to a PUT resource message (m3).</td>
</tr>
<tr>
<td>Prerequisite: The following message sequence occurred:</td>
</tr>
<tr>
<td>• Prior to the target: A message (m1) of the form GET resource URI was sent with a successful response message (m2), showing representation_skew=DESTROYING.</td>
</tr>
<tr>
<td>• After the target: An message (m5) similar to (m1) with a successful response message (m6), still showing representation_skew=DESTROYING.</td>
</tr>
</tbody>
</table>
**Predicate**: the target message has an 4xx HTTP code.

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 3.1.13.4 representation_skew Semantics (4) (CAMP11-332)

Addressing normative statement:

(see CAMP11-329)

The following table lists the methods that SHALL be supported for each representation_skew value. [RE-12]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>NormativeSource</th>
<th>Var</th>
<th>Target</th>
<th>Prerequisite:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMP11-332</td>
<td>RE-12, (RE-53) (section: representation_skew)</td>
<td>(resource) in {</td>
<td>A response message (m4) to a PATCH resource message (m3).</td>
<td>The following message sequence occurred:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>plan, assembly</td>
<td></td>
<td>• Prior to the target: A message (m1) of the form GET resource URI was sent with a successful response message (m2), showing representation_skew=DESTROYING.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• After the target: An message (m5) similar to (m1) with a successful response message (m6), still showing representation_skew=DESTROYING.</td>
</tr>
</tbody>
</table>

**Predicate**: the target message has an 4xx HTTP code.

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 3.1.13.5 representation_skew Semantics (5) (CAMP11-333)

Addressing normative statement:

(see CAMP11-329)

The following table lists the methods that SHALL be supported for each representation_skew value. [RE-12]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>NormativeSource</th>
<th>Var</th>
<th>Target</th>
<th>Prerequisite:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMP11-333</td>
<td>RE-12, (RE-53) (section: representation_skew)</td>
<td>(resource) in {</td>
<td>A response message (m4) to a DELETE resource message (m3).</td>
<td>The following message sequence occurred:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>plan, assembly</td>
<td></td>
<td>• Prior to the target: A previous message (m1) of the form GET resource URI was sent with a successful response message (m2), showing representation_skew=DESTROYING.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• After the target: An message (m5) similar to (m1) with a successful response message (m6), still showing representation_skew=DESTROYING.</td>
</tr>
</tbody>
</table>

**Predicate**: the target message has an 4xx HTTP code.

**PrescriptionLevel**: mandatory
Tag: conformance=Provider

3.1.14 PDP and Plan Registration

3.1.14.1 PDP Registration by reference: Provider side (1) (CAMP11-412)

Addressing normative statement:
On successfully processing the request the Provider SHALL create a plan resource and return a 201 Created status code in the HTTP response. [PR-57]

TA_Id: CAMP11-412
NormativeSource: PR-57 (RMR-05)
Target: A response message (m2) to a POST plans message (m1) where (m1) has a “pdp_uri” attribute.
Prerequisite: the HTTP code in target (m2) is NOT 202 “accepted”.
Predicate: the HTTP code in target (m2) is 201 “Created”.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.14.2 PDP Registration by reference: Provider side (2) (CAMP11-414)

Addressing normative statement:
On successfully processing the request the Provider SHALL create a plan resource and return a 201 Created status code in the HTTP response. [PR-57]
The Provider SHALL include the Location header in the HTTP response and the value of this header SHALL reference the newly created plan resource. [PR-58]

TA_Id: CAMP11-414
NormativeSource: PR-57, PR-58 (RMR-05)
Target: A response message (m2) to a POST plans message (m1) where (m1) has a “pdp_uri” attribute.
Prerequisite: the HTTP code in target (m2) is 201 “Created”.
Predicate: the target message contains a location header with the URI for the new plan resource AND this URI resolves (GET plan) to a plan resource with type attribute = “plan”
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.14.3 PDP Registration by reference: Provider side (CAMP11-425)

Addressing normative statement:
The Provider SHALL update the plan_links attribute of the plans resource to include a reference to the newly created plan resource. [PR-59]

TA_Id: CAMP11-425
NormativeSource: PR-59
Target: A response message (m4) to a GET plans message (m3), with a representation_skew=NONE.
Prerequisite: A sequence of messages previously occurred as follows:
  - A POST plans message (m1) with either a pdp_uri or a plan_uri has been sent,
A successful (HTTP code 201 “Created”) response message (m2) received with a location header with a URI.

The GET plans message (m3) is sent on same platform as (m1).

**Predicate**: the target message (m4) has HTTP code 200 AND its plans.plan_links attribute contains the location URI of the new plan resource returned by (m2).

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 3.1.14.4 PDP Registration by value: Provider side (1) (CAMP11-418)

**Addressing normative statement:**

On successfully processing the request the Provider SHALL create a plan resource and return a 201 Created status code in the HTTP response. [PR-62]

The Provider SHALL include the Location header in the HTTP response and the value of this header SHALL reference the newly created plan resource. [PR-63]

**TA_Id**: CAMP11-418

**NormativeSource**: PR-62, PR-63 (RMR-05)

**Target**: A response message (m2) to a POST plans message (m1) where (m1) does not contain a "pdp_uri" nor a "plan_uri" attribute, and contains a Content-Type: application/x-zip or application/x-tar or application/x-tgz, or application/x-yaml.

**Prerequisite**: the HTTP code in target (m2) is 201 “Created”.

**Predicate**: the target message contains a location header with the URI for the new plan resource AND this URI resolves (GET plan) to a plan resource with type attribute = “plan”.

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider

### 3.1.14.5 PDP Registration by value: Provider side (2) (CAMP11-413)

**Addressing normative statement:**

To support the registration of Plans using a PDP, Providers SHALL accept the media types associated with the various formats as follows:

- ZIP: "application/x-zip" [PR-70]
- TAR: "application/x-tar" [PR-71]
- GZIP compressed TAR: "application/x-tgz" [PR-72]

**TA_Id**: CAMP11-413

**NormativeSource**: PR-70, PR-71, PR-72, (RMR-05)

**Target**: A response message (m2) to a POST plans message (m1) where (m1) does not contain a "pdp_uri" nor a "plan_uri" attribute, and contains a Content-Type: application/x-zip or application/x-tar or application/x-tgz.

**Predicate**: the HTTP code in target (m2) is 201 “Created” AND the target message contains a location header with the URI for the new plan resource, OR ( code = 202 “accepted” AND a subsequent GET on the returned Location header URI shows either representation_skew=CREATING or HTTP code 200 "OK").

**PrescriptionLevel**: mandatory

**Tag**: conformance=Provider
3.1.14.6 PDP Registration by value: Provider side (2) (CAMP11-419)

Addressing normative statement:

To support the registration of Plans using a Plan file, Providers SHALL accept the use of the "application/x-yaml" media type. [PR-73]

**TA_Id:** CAMP11-419  
**NormativeSource:** PR-73 (RMR-05)  
**Target:** A response message (m2) to a POST plans message (m1) where (m1) does not contain a "pdp_uri" nor a "plan_uri" attribute, and contains a Content-Type: application/x-yaml.  
**Predicate:** the HTTP code in target (m2) is 201 “Created” AND the target message contains a location header with the URI for the new plan resource, OR ( code = 202 "accepted" AND a subsequent GET on the returned Location header URI shows either representation_skew=CREATING or HTTP code 200 “OK”).

**PrescriptionLevel:** mandatory  
**Tag:** conformance=Provider

3.1.14.7 Plan Registration by value using MIME Provider side (CAMP11-433)

Addressing normative statement:

Providers that support the plans resource and plan resources SHALL support the registration of Plans via HTTP POST requests on the plans resource as described in this section. [PR-75]

**TA_Id:** CAMP11-433  
**NormativeSource:** PR-75, (RMR-05)  
**Target:** A response message (m2) to a POST plans message (m1) where (m1) does not contain a "pdp_uri" nor a "plan_uri" attribute, and contains a Content-Type = multipart/form-data, and the Content-Disposition header has name set to “plan_file”  
**Predicate:** (the HTTP code in target (m2) is 201 “Created” AND the target message m2 contains a location header with the URI for the new plan resource), OR ( code = 202 “accepted” AND a subsequent GET on the returned Location header URI shows either representation_skew=CREATING or HTTP code 200 “OK”).

**PrescriptionLevel:** mandatory  
**Tag:** conformance=Provider

3.1.14.8 PDP Registration by value using MIME Provider side (CAMP11-437)

Addressing normative statement:

Providers that support the plans resource and plan resources SHALL support the registration of Plans via HTTP POST requests on the plans resource as described in this section. [PR-75]

**TA_Id:** CAMP11-437  
**NormativeSource:** PR-75, (RMR-05)  
**Target:** A response message (m2) to a POST plans message (m1) where (m1) does not contain a "pdp_uri" nor a "plan_uri" attribute, and contains a Content-Type = multipart/form-data, and the Content-Disposition header has name set to “pdp_file”  
**Predicate:** (the HTTP code in target (m2) is 201 “Created” AND the target message m2 contains a location header with the URI for the new plan resource), OR ( code = 202 “accepted” AND a subsequent GET on the returned Location header URI shows either representation_skew=CREATING or HTTP code 200 “OK”).
**PrescriptionLevel**: mandatory
**Tag**: conformance=Provider

### 3.1.14.9 PDP Registration: URI scheme for Artifact Content reference (1) (CAMP11-415)

Addressing normative statement:

Providers SHALL support the "https" URI scheme as defined in RFC 2818 [RFC2818]. [PDP-27]

**NOTE**: partial test.

**TA_Id**: CAMP11-415

**NormativeSource**: PDP-27 (section: ContentSpecification)

**Target**: A response message (m2) to a POST platform message (m1) that uses "https" scheme, and refers to a PDP or passes a PDP or a Plan by value, where some ArtifactSpecification element has a content element with an "href" attribute.

**Prerequisite**: the PDP and contained Plan are well-formed.

**Predicate**: the HTTP code in target message is 2xx.

**PrescriptionLevel**: mandatory
**Tag**: conformance=Provider

### 3.1.14.10 PDP Registration: pdp scheme for Artifact Content reference (Provider) (CAMP11-417)

Addressing normative statement:

Providers SHALL understand this delimiter and SHALL NOT resolve any content if the archive format is unsupported. [PDP-29]

**TA_Id**: CAMP11-417

**NormativeSource**: PDP-29 (section: ContentSpecification)

**Target**: A response to a POST platform message that refers to a PDP or passes a PDP or a Plan by value, where some ArtifactSpecification element has a content element with an "href" attribute, that uses the URI scheme "pdp".

**Prerequisite**: the PDP and contained Plan are well-formed AND the archive format used in the first part of the URI path (before "!") is known to be supported.

**Predicate**: the HTTP code in target is 2xx.

**PrescriptionLevel**: mandatory
**Tag**: conformance=Provider

### 3.1.14.11 Registering PDP by Value with .zip format (CAMP11-422)

Addressing normative statement:

A Provider SHALL support the following archive formats for a PDP:

- A PDP as a ZIP archive [ZIP] [PDP-02]

To support the registration of Plans using a PDP, Providers SHALL accept the media types associated with the various formats as follows:

- ZIP: "application/x-zip" [PR-70]

**TA_Id**: CAMP11-422

**NormativeSource**: PDP-02, PR-70, (RMR-02, PR-63) (section: Supported Archive Formats)
Target: A response message (m2) to a A POST platform message (m1) with no “pdp_uri” nor a “plan_uri” attribute, and with an embedded PDP of type .zip (Content-Type: application/x-zip).

Predicate: the HTTP code in target (m2) is 201 “Created” AND the target message contains a location header with the URI for the deployed plan.

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.14.12 Registering a PDP by Value with .tar format (CAMP11-423)

Addressing normative statement:
A Provider SHALL support the following archive formats for a PDP:
- A PDP as a TAR archive [TAR] [PDP-03]

To support the registration of Plans using a PDP, Providers SHALL accept the media types associated with the various formats as follows:
- TAR: "application/x-tar" [PR-71]

TA_Id: CAMP11-423
NormativeSource: PDP-03, PR-71 (PR-63) (section: Supported Archive Formats)
Target: A response message (m2) to a A POST platform message (m1) with no “pdp_uri” nor a “plan_uri” attribute, and with an embedded PDP of type .tar (Content-Type: application/x-tar).

Predicate: the HTTP code in target (m2) is 201 “Created” AND the target message contains a location header with the URI for the deployed plan.

PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.14.13 Registering a PDP by Value with .tar.gz format (CAMP11-424)

Addressing normative statement:
A Provider SHALL support the following archive formats for a PDP:
- A PDP as a GZIP [RFC1952] compressed TAR archive [PDP-04]

To support the registration of Plans using a PDP, Providers SHALL accept the media types associated with the various formats as follows:
- GZIP compressed TAR: "application/x-tgz" [PR-72]

TA_Id: CAMP11-424
NormativeSource: PDP-04, PR-72 (PR-63) (section: Supported Archive Formats)
Target: A response message (m2) to a A POST platform message (m1) with no “pdp_uri” nor a “plan_uri” attribute, and with an embedded PDP of type .tar.gz (Content-Type: application/x-tgz).

Predicate: the HTTP code in target (m2) is 201 “Created” AND the target message contains a location header with the URI for the deployed plan.

PrescriptionLevel: mandatory
Tag: conformance=Provider
3.1.15 Application Deployment

3.1.15.1 Application Deployment by reference: Provider side (1) (CAMP11-439)

Addressing normative statement:

On successfully processing the request the Provider SHALL create an assembly resource and return a 201 Created status code in the HTTP response. [PR-50]

<table>
<thead>
<tr>
<th>TA_Id:</th>
<th>CAMP11-439</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource:</td>
<td>PR-50 (section: Deploying an Application by Reference)</td>
</tr>
<tr>
<td>Target:</td>
<td>A response message (m2) to a POST assemblies message (m1) where (m1) has a either a “pdp_uri” or a “plan_uri” attribute.</td>
</tr>
<tr>
<td>Prerequisite:</td>
<td>the target message (m2) has not an HTTP code 202 “accepted”</td>
</tr>
<tr>
<td>Predicate:</td>
<td>the target message (m2) has HTTP code 201 “created”</td>
</tr>
<tr>
<td>PrescriptionLevel:</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag:</td>
<td>conformance=Provider</td>
</tr>
</tbody>
</table>

3.1.15.2 Application Deployment by reference: Provider side (2) (CAMP11-440)

Addressing normative statement:

On successfully processing the request the Provider SHALL create an assembly resource and return a 201 Created status code in the HTTP response. [PR-50]

The Provider SHALL include the Location header in the HTTP response and the value of this header SHALL reference the newly created assembly resource. [PR-51]

<table>
<thead>
<tr>
<th>TA_Id:</th>
<th>CAMP11-440</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource:</td>
<td>PR-50, PR-51</td>
</tr>
<tr>
<td>Target:</td>
<td>A response message (m2) to a POST assemblies message (m1) where (m1) has a either a “pdp_uri” or a “plan_uri” attribute.</td>
</tr>
<tr>
<td>Prerequisite:</td>
<td>the target message contains a location header with the URI for the new assembly resource, OR ( code = 202 “accepted” AND a subsequent GET on the returned Location header URI shows either representation skew=CREATING or HTTP code 200 “OK”. )</td>
</tr>
<tr>
<td>Predicate:</td>
<td>HTTP code in (m2) is NOT 202 “accepted” i.e. enough time elapsed to allow for the creation to complete.</td>
</tr>
<tr>
<td>PrescriptionLevel:</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag:</td>
<td>conformance=Provider</td>
</tr>
</tbody>
</table>

3.1.15.3 Application Deployment by value: Provider side (1) (CAMP11-441)

Addressing normative statement:

On successfully processing the request the Provider SHALL create an assembly resource and return a 201 Created status code in the HTTP response. [PR-53]

<table>
<thead>
<tr>
<th>TA_Id:</th>
<th>CAMP11-441</th>
</tr>
</thead>
<tbody>
<tr>
<td>Var: archtype in {application/x-zip, application/x-tar, application/x-tgz, application/x-yaml}</td>
<td></td>
</tr>
<tr>
<td>NormativeSource:</td>
<td>PR-53, (PR-60), {PR-29, PR-30, PR-31, PR-32}</td>
</tr>
<tr>
<td>Target:</td>
<td>A response message (m2) to a POST assemblies message (m1) where (m1) does not contain a “pdp_uri” nor a “plan_uri” attribute, and contains a Content-Type = archtype.</td>
</tr>
<tr>
<td>Prerequisite:</td>
<td>HTTP code in (m2) is NOT 202 “accepted” i.e. enough time elapsed to allow for the creation to complete.</td>
</tr>
</tbody>
</table>
**Predicate:** the HTTP code in target (m2) is 201 "Created"

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

### 3.1.15.4 Application Deployment by value: Provider side (2) (CAMP11-442)

**Addressing normative statement:**

On successfully processing the request the Provider SHALL create an *assembly resource* and return a 201 *Created* status code in the HTTP response. [PR-53]

The Provider SHALL include the *Location* header in the HTTP response and the value of this header SHALL reference the newly created *assembly resource*. [PR-54]

**TA_Id:** CAMP11-442

**Var:** archtype in {application/x-zip, application/x-tar, application/x-tgz, application/x-yaml}

**NormativeSource:** PR-53, PR-54, (PR-60), {PR-29, PR-30, PR-31, PR-32}

**Target:** A response message (m2) to a POST assemblies message (m1) where (m1) does not contain a “pdp_uri” nor a “plan_uri” attribute, and contains a *Content-Type = archtype*.

**Predicate:** (the HTTP code in target (m2) is 201 “Created” AND the target message contains a location header with the URI for the new *assembly resource*), OR (code = 202 “accepted” AND a subsequent GET on the returned Location header URI shows either representation_skew=CREATING or HTTP code 200 “OK”)

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

### 3.1.15.5 Application Deployment by value using MIME: Provider side (CAMP11-443)

**Addressing normative statement:**

Providers SHALL support the deployment of applications via HTTP POST requests on the *assemblies resource* as described in this section. [PR-74]

**TA_Id:** CAMP11-443

**NormativeSource:** PR-74, {PR-29, PR-30, PR-31, PR-32}

**Target:** A response message (m2) to a POST assemblies message (m1) where (m1) does not contain a “pdp_uri” nor a “plan_uri” attribute, and contains a *Content-Type = multipart/form-data*.

**Prerequisite:** The name parameter of (m1) *Content-Disposition* header is set to “pdp_file”.

**Predicate:** (the HTTP code in target (m2) is 201 “Created” AND the target message m2 contains a location header with the URI for the new *assembly resource*), OR (code = 202 “accepted” AND a subsequent GET on the returned Location header URI shows either representation_skew=CREATING or HTTP code 200 “OK”)

**PrescriptionLevel:** mandatory

**Tag:** conformance=Provider

### 3.1.15.6 Creation of plan when Deploying an Application (1) (CAMP11-444)

**Addressing normative statement:**

Regardless of whether a Consumer attempts to create an *assembly resource* by POSTing to the *assemblies resource* or creates a *plan resource* by POSTing to the *plans resource*, a Provider that supports *plans* and *plan resources* SHALL create a *plan resource* for every deployed application. [RMR-11]
Providers that support Plans SHALL include this attribute (plan_uri) in all assembly resources. [RMR-04]

**TA_Id:** CAMP11-444  
**NormativeSource:** RMR-11  
**Target:** A response message (m4) to a GET assembly message (m3), with HTTP code 200 and with a representation_skew=NONE.

**Prerequisite:** A set of messages previously occurred as follows:
- A successful POST assemblies message (m1) has been sent (response HTTP code 201 “Created”), that returns a Location header URI (m2) used in (m3) (GET assembly)
- A successful response message (m2) received from a GET platform message (m1) shows a plan_uris attribute set to a valid plans Resource.

**Predicate:** the target message (m4) has its assembly.plan_uri link set to a plan Resource (a GET on that URI returns HTTP code 200 “OK”) AND the plan URI also exists in the plans.plan_links obtained from platform.plan_uris,(m2).

**PrescriptionLevel:** mandatory  
**Tag:** conformance=Provider

### 3.2 Consumer Test Assertions

These Test Assertions concern the Consumer as conformance target.

#### 3.2.1 Basic Schema Compliance for Platform Resources, Consumer Side

##### 3.2.1.1 Resource serialization with PUT (CAMP11-105)

A Consumer SHALL serialize Resource data in its requests based on the definition of this Resource as described in the corresponding sub-section. [RE-71]

**TA_Id:** CAMP11-105  
**NormativeSource:** RE-71 (section: Resources)  
**Var:** (resource) in {sensor, plan, assembly, component}

**Target:** A message (m1) of the form PUT resource URI (with no select_attr query parameter)  
**Predicate:** the target message (m1) content satisfies the serialization schema (JSON ) for resource, AND has a type attribute of value = <resource name>.

**PrescriptionLevel:** mandatory  
**Tag:** conformance=Consumer

### 3.2.2 Consistency of Serialization with Metadata

#### 3.2.2.1 Non-Mutability Enforcement (Consumer) (CAMP11-116)

Addressing normative statement:  
“false” indicates that the value(s) of the attribute SHALL NOT be changed by Consumers. [RE-09]

**TA_Id:** CAMP11-116
**NormativeSource:** RE-09, (RE-53) (section: Consumer-mutable)

**Var:** (resource) in {
  assembly,
  component,
  platform
}

**Target:** A PUT request (m3) to a resource.

**Prerequisite:** The following message sequence occurred:
A previous message (m1) of the form GET resource URI was sent with a successful response message (m2). (and assuming no “delete resource” message after m1).

**Predicate:** The PUT request (m3) is providing same values as shown in (m2) for consumer-mutable=false attributes.

**PrescriptionLevel:** mandatory

**Tag:** conformance=Consumer

### 3.2.3 Various Model Referential and Semantic Constraints

#### 3.2.3.1 UTC Timestamps, Consumer side (CAMP11-135)

Addressing normative statement:
Consumers and Providers SHALL express Timestamps in UTC (Coordinated Universal Time), with the special UTC designator (“Z”). [RE-65]

**TA_Id:** CAMP11-135

**NormativeSource:** RE-65 (section: Timestamp)

**Target:** A POST or PUT message that has a resource serialization showing the “timestamp” attribute.

**Predicate:** the Timestamp value conforms to the UTC (Universal Time Coordinated) with a “zero” timezone offset, i.e. with format terminated with the designator “Z”, of the form: yyyy ‘-’ mm ‘-’ dd ‘T’ hh ':' mm ':' ss ‘Z’ (Example: 1994-11-05T13:15:30Z)

**PrescriptionLevel:** mandatory

**Tag:** conformance=Consumer

#### 3.2.4 Support for JSON

#### 3.2.4.1 Duplicate Keys in JSON, Consumer side (CAMP11-203)

Addressing normative statement:
Consumers and Providers SHALL NOT transmit JSON objects that contain duplicate keys. [PR-02]

**TA_Id:** CAMP11-203

**NormativeSource:** PR-02 (sections: Required Formats / Duplicate Keys in JSON Objects)

**Target:** A POST or a PUT request with JSON content to any platform resource.

**Predicate:** there is no duplicate JSON keys at same level in the JSON content of the target message.

**PrescriptionLevel:** mandatory

**Tag:** conformance=Consumer

NOTE: the corresponding error handling TA (Provider side) is addressing PR-03.
3.2.5 Resource Queries and HTTP

3.2.5.1 select_attr Positive Case Consumer side (CAMP11-207)

Addressing normative statement:

When one or more request parameters are specified for a PUT request, a Consumer SHALL NOT include attributes in the request entity body that are not specified in the request parameter. [PR-12]

Note: Requirement about request parameters (6.5): "In order to address a subset of attributes in a resource, the client can use request parameters in PUT ... When one or more request parameters are specified for a PUT request, a client shall not include attributes in the request entity body that are not specified in the request parameter."

TA_Id: CAMP11-207

NormativeSource: PR-12 ("If a PUT message is sent with a select_attr request parameter in the URI, then only the attributes that appear in the select_attr request parameter must be used in the body of the update message.") (derived from section: Request parameters)

Target: A PUT request message to a resource, that uses "select_attr" query parameter.

Predicate: every attribute present in the body of the target message also appears in the "select_attr" query parameter.

PrescriptionLevel: mandatory

Tag: conformance=Consumer

3.2.6 Resource Updates

3.2.6.1 If-Match HTTP Header in PUT Requests (CAMP11-210)

Addressing normative statement:

All PUT requests that update a resource SHOULD contain the If-Match header field with a single entity tag value. [PR-06]

TA_Id: CAMP11-210

NormativeSource: PR-06 (section: Request Headers)

Target: A PUT request message to any resource existing in the platform.

Predicate: the target has an If-Match HTTP header.

PrescriptionLevel: preferred

Tag: conformance=Consumer

3.2.6.2 PUT semantics, immutable attributes, Consumer (CAMP11-215)

Addressing normative statement:

Consumers SHALL NOT send a request that changes the value of a resource attribute that is declared with a constraint of 'Mutable=false' or 'Consumer-mutable=false'. [PR-21]

TA_Id: CAMP11-215

NormativeSource: PR-21 (section: Mutability of Resources Attributes)

Var: (resource) in { plan, assembly,
component
}

**Target:** A PUT *resource* request message.

**Prerequisite:**
A successful previous response message (m2) to a GET *resource* message (m1) (same resource URI as target) (and assuming no “delete *resource*” message after m1).

**Predicate:** the target message has all the consumer-immutable attributes for this resource type, as already present in the message (m2), and with same values as in (m2).

**PrescriptionLevel:** mandatory

**Tag:** conformance=Consumer

### 3.2.6.3 PATCH syntax, Consumer (CAMP11-217)

Addressing normative statement:

Providers SHALL support the HTTP PATCH method in conjunction with the “application/json-patch+json” media type with the following, additional provisions with respect to the operations defined in Section 4 of the JSON Patch specification: [PR-26]

**TA_Id:** CAMP11-217

**NormativeSource:** PR-26 (section: Updating with JSON Patch)

**Var:** (resource) in {
  assembly,
  component,
  plan,
  service
}

**Target:** A PATCH *resource* request.

**Predicate:** the media-type (Content-Type header) application/json-patch
is used in HTTP headers, AND the JSON content complies with JSON patch syntax (at least: an array of triples with keys “op”, “path” and “value”).

**PrescriptionLevel:** mandatory

**Tag:** conformance=Consumer

### 3.2.7 PDP and Plan Contents

#### 3.2.7.1 PDP Content by reference, Consumer side (1) (CAMP11-401)

Addressing normative statements:

The Plan file SHALL be located at the root of the PDP archive. [PLAN-01]  
The Plan file SHALL be named “camp.yaml”. [PLAN-02]

**TA_Id:** CAMP11-401

**NormativeSource:** PLAN-01, PLAN-02 (section: Plan Schema)

**Target:** A POST message with a “pdp_uri” attribute to a plans resource (obtained from platform.plan_uris), or an assemblies resource (obtained from platform.assemblies_uri).

**Predicate:** the PDP identified by pdp_uri is an archive that contains at its root a file named “camp.yaml”, with a YAML structure recognizable as a Plan (same top-level attributes, and “tags”).

**PrescriptionLevel:** mandatory
Tag: conformance=Consumer

3.2.7.2 PDP Content, by reference, Consumer side (2) (CAMP11-402)

Addressing normative statement:
A Platform Deployment Package (PDP) SHALL contain a single Plan file. [PDP-11]

TA_Id: CAMP11-402

NormativeSource: PDP-11 (section: Plan Schema)

Target: A POST message with a “pdp_uri” attribute to a plans resource (obtained from platform.plan_uris, or to an assemblies resource (obtained from platform.assemblies_uri).

Predicate: the PDP identified by pdp_uri is an archive that contains at its root a file named "camp.yaml", and does not contain any other yaml file of this name or of a structure recognizable as a plan (same top-level attributes, and "tags").

PrescriptionLevel: mandatory

Tag: conformance=Consumer

3.2.7.3 PDP Content, by value, Consumer side (1) (CAMP11-403)

Addressing normative statements:
The Plan file SHALL be located at the root of the PDP archive. [PLAN-01]
The Plan file SHALL be named “camp.yaml”. [PLAN-02]

TA_Id: CAMP11-403

NormativeSource: PLAN-01, PLAN-02, (section: Plan Schema)

Target: A POST message without a “pdp_uri” or “plan_uri” attribute, to a plans resource (obtained from platform.plan_uris, or to an assemblies resource (obtained from platform.assemblies_uri).

Predicate: the PDP in the embedded archive contains at its root a file named “camp.yaml”, with a structure recognizable as a plan (same top-level attributes, and "tags").

PrescriptionLevel: mandatory

Tag: conformance=Consumer

3.2.7.4 PDP Content, by value, Consumer side (2) (CAMP11-404)

Addressing normative statement:
A Platform Deployment Package (PDP) SHALL contain a single Plan file. [PDP-11]

TA_Id: CAMP11-404

NormativeSource: PDP-11 (section: Plan Schema)

Target: A POST message without a “pdp_uri” or “plan_uri” attribute, to a plans resource (obtained from platform.plan_uris, or to an assemblies resource (obtained from platform.assemblies_uri).

Predicate: the PDP in the embedded archive contains at its root a file named “camp.yaml”, and does not contain any other yaml file of this name or of a structure recognizable as a plan (same top-level attributes, and "tags").

PrescriptionLevel: mandatory

Tag: conformance=Consumer
3.2.7.5 Plan Content, Consumer side (1) (CAMP11-405)
Addressing normative statement:
A Plan file SHALL contain a single instance of a Plan. [PLAN-03]

TA_Id: CAMP11-405
NormativeSource: PLAN-03 (PDP-11) (section: Plan)
Target: A POST message to a plans URL, containing or referring to a Plan file.
Predicate: the Plan file identified in this POST contains a single yaml plan node (satisfies the yaml schema for this node).
PrescriptionLevel: mandatory
Tag: conformance=Consumer

3.2.7.6 Plan Content, Consumer side (2) (CAMP11-406)
Addressing normative statement:
For Plans that conform to this document, the value of this node (camp_version) SHALL be as defined in Section 1.8 "Specification Version". [PLAN-05]

TA_Id: CAMP11-406
NormativeSource: PLAN-05 (PLAN-03) (section: campVersion)
Target: A POST message to a plans URL, containing or referring to a Plan file.
Predicate: the Plan file identified in this POST has a yaml node that has a camp_version tag with value “CAMP 1.1”.
PrescriptionLevel: mandatory
Tag: conformance=Consumer

3.2.7.7 Plan Content, Consumer side (3) (CAMP11-430)
Addressing normative statement:
Plans SHALL use id values that are unique within the scope of the Plan. [PLAN-06]

TA_Id: CAMP11-430
NormativeSource: PLAN-06 (section: serviceSpecification)
Target: A POST message to a plans URL, containing or referring to a Plan file.
Predicate: the services array (ServiceSpecification[]) contained in the Plan file identified in this POST does NOT have two ServiceSpecification items with same id node value.
PrescriptionLevel: mandatory
Tag: conformance=Consumer

3.2.7.8 Plan Content, Consumer side (4) (CAMP11-431)
Addressing normative statement:
If a Consumer includes this node in a Plan, the value of this node SHALL reference a Consumer-visible resource within the target Platform. [RMR-01]

TA_Id: CAMP11-431
NormativeSource: RMR-01 (section: ServiceSpecification)
Target: A POST message to a plans URL, containing or referring to a Plan file.
Predicate: Any ServiceSpecification items that has an href node in the services array (ServiceSpecification[]) contained in the Plan file identified in this POST, has the href value resolve to an existing resource on the target platform.

PrescriptionLevel: mandatory
Tag: conformance=Consumer

3.2.7.9 Plan Artifact Type Content Specification, Consumer side (CAMP11-407)

Addressing normative statement:
The Plan file SHALL conform to the description provided in this section. [PLAN-09]

TA_Id: CAMP11-407
NormativeSource: PLAN-09 (section: ContentSpecification)
Target: A POST message to a plans URL, containing or referring to a Plan file.

Predicate: in the Plan file identified in this POST, every ArtifactSpecification item (artifacts array) has a content node that has either an href node, or a data node but not both.

PrescriptionLevel: mandatory
Tag: conformance=Consumer

3.2.7.10 PDP Manifest, Consumer side (CAMP11-408)

Addressing normative statement:
The format of the manifest file and the certificate file SHALL be as defined by the OVF specification [OVF]. [PDP-10]

TA_Id: CAMP11-408
NormativeSource: PDP-10 (PDP-06) (section: Validating Integrity)
Target: A POST message to a plans URL, with either (a) a “pdp_uri”, or (b) a Content-Type: application/x-zip or application/x-tar or application/x-tgz.

Prerequisite: the PDP referenced in the target message contains a manifest (“camp.mf”) at its root.

Predicate: the manifest (“camp.mf”) at the root of the PDP conforms to the structure defined in OVF [DSP0243] for OVF manifest files.

PrescriptionLevel: mandatory
Tag: conformance=Consumer

3.2.7.11 PDP Certificate, Consumer side (CAMP11-409)

Addressing normative statement:
The format of the manifest file and the certificate file SHALL be as defined by the OVF specification [OVF]. [PDP-10]

TA_Id: CAMP11-409
NormativeSource: PDP-10 (section: Validating Integrity)
Target: A POST message to a plans URL, with either (a) a “pdp_uri”, or (b) a Content-Type: application/x-zip or application/x-tar or application/x-tgz.

Prerequisite: the PDP referenced in the target message contains a certificate (named “camp.cert”) at its root.

Predicate: the certificate (named “camp.cert”) at the root of the PDP conforms to the structure defined in OVF [DSP0243] for OVF certificate files.
PrescriptionLevel: mandatory
Tag: conformance=Consumer

3.2.8 PDP and Plan Registration

3.2.8.1 PDP Registration: pdp scheme for Artifact Content reference (Consumer) (CAMP11-416)

Addressing normative statement:
Consumers SHALL follow the syntax and semantics described here when using URIs with a “pdp” scheme. [PLAN-07]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-416</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PLAN-07 (section: ContentSpecification)</td>
</tr>
<tr>
<td>Target</td>
<td>A POST platform message that refers to a PDP or passes a PDP or a Plan by value, where some ArtifactSpecification element has a content element with an “href” attribute, that uses the URI scheme “pdp” and contains the “!” character.</td>
</tr>
<tr>
<td>Predicate</td>
<td>the URI either shows “!” just after the scheme, or just after an archive name AND the right part after “!” is a path for a file that is resolvable from the root of the archive.</td>
</tr>
<tr>
<td>PrescriptionLevel</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag</td>
<td>conformance=Consumer</td>
</tr>
</tbody>
</table>

3.3 PDP and Plan Test Assertions

3.3.1 PDP Test Assertions

3.3.1.1 PDP and YAML Plan (CAMP11-401b)

Addressing normative statements:
The Plan file SHALL be located at the root of the PDP archive. [PLAN-01]
The Plan file SHALL be named “camp.yaml”. [PLAN-02]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-401b</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PLAN-01, PLAN-02 (section: Plan Schema)</td>
</tr>
<tr>
<td>Target</td>
<td>A PDP artifact.</td>
</tr>
<tr>
<td>Prerequisite</td>
<td>the PDP is in archive format (ZIP, TAR or GZIP).</td>
</tr>
<tr>
<td>Predicate</td>
<td>the PDP archive contains at its root a file named “camp.yaml”, with the YAML structure of a Plan.</td>
</tr>
<tr>
<td>PrescriptionLevel</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag</td>
<td>conformance=PDP</td>
</tr>
</tbody>
</table>

3.3.1.2 PDP and Plan file (CAMP11-402b)

Addressing normative statement:
A Platform Deployment Package (PDP) SHALL contain a single Plan file. [PDP-11]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-402b</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PDP-11 (section: Plan Schema)</td>
</tr>
<tr>
<td>Target</td>
<td>PDP-11 (section: Plan Schema)</td>
</tr>
<tr>
<td>Target</td>
<td>A PDP artifact.</td>
</tr>
</tbody>
</table>
Predicate: the PDP contains (at its root if an archive) a file named "camp.yaml", and does not contain any other yaml file of this name or of a structure recognizable as a plan.

PrescriptionLevel: mandatory
Tag: conformance=PDP

3.3.1.3 PDP Manifest (CAMP11-408b)
Addressing normative statement:
The format of the manifest file and the certificate file SHALL be as defined by the OVF specification [OVF]. [PDP-10]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-408b</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PDP-10 (PDP-06) (section: Validating Integrity)</td>
</tr>
<tr>
<td>Target</td>
<td>A PDP artifact.</td>
</tr>
<tr>
<td>Prerequisite</td>
<td>the PDP contains a manifest (&quot;camp.mf&quot;) at its root.</td>
</tr>
<tr>
<td>Predicate</td>
<td>the manifest (&quot;camp.mf&quot;) at the root of the PDP conforms to the structure defined in OVF [DSP0243] for OVF manifest files.</td>
</tr>
<tr>
<td>PrescriptionLevel</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag</td>
<td>conformance=PDP</td>
</tr>
</tbody>
</table>

3.3.1.4 PDP Certificate (CAMP11-409b)
Addressing normative statement:
The format of the manifest file and the certificate file SHALL be as defined by the OVF specification [OVF]. [PDP-10]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-409b</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PDP-10 (PDP-06) (section: Validating Integrity)</td>
</tr>
<tr>
<td>Target</td>
<td>A PDP artifact.</td>
</tr>
<tr>
<td>Prerequisite</td>
<td>the PDP contains a certificate (named &quot;camp.cert&quot;) at its root.</td>
</tr>
<tr>
<td>Predicate</td>
<td>the certificate (named &quot;camp.cert&quot;) at the root of the PDP conforms to the structure defined in OVF [DSP0243] for OVF certificate files.</td>
</tr>
<tr>
<td>PrescriptionLevel</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag</td>
<td>conformance=PDP</td>
</tr>
</tbody>
</table>

3.3.2 Plan Test Assertions

3.3.2.1 Plan File Content (1) (CAMP11-405b)
Addressing normative statement:
A Plan file SHALL contain a single instance of a Plan. [PLAN-03]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-405b</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PLAN-03 (PDP-11) (section: Plan)</td>
</tr>
<tr>
<td>Target</td>
<td>A Plan file.</td>
</tr>
<tr>
<td>Predicate</td>
<td>the Plan file contains a single yaml plan node and satisfies the yaml schema for this node.</td>
</tr>
<tr>
<td>PrescriptionLevel</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag</td>
<td>conformance=Plan</td>
</tr>
</tbody>
</table>
3.3.2.2 Plan CAMP version (CAMP11-406b)

Addressing normative statement:
For Plans that conform to this document, the value of this node (camp_version) SHALL be as defined in Section 1.8 “Specification Version”. [PLAN-05]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-406b</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: PLAN-05 (PLAN-03) (section: campVersion)</td>
</tr>
<tr>
<td>Target: A Plan file.</td>
</tr>
<tr>
<td>Predicate: the Plan file has a yaml node that has a camp_version tag with value “CAMP 1.1”.</td>
</tr>
<tr>
<td>PrescriptionLevel: mandatory</td>
</tr>
<tr>
<td>Tag: conformance=Plan</td>
</tr>
</tbody>
</table>

3.3.2.3 Plan and Unique Service IDs (CAMP11-430b)

Addressing normative statement:
Plans SHALL use id values that are unique within the scope of the Plan. [PLAN-06]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-430b</th>
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</thead>
<tbody>
<tr>
<td>NormativeSource: PLAN-06 (section: ServiceSpecification)</td>
</tr>
<tr>
<td>Target: A Plan file.</td>
</tr>
<tr>
<td>Predicate: the services array (ServiceSpecification[]) contained in the Plan file does NOT have two ServiceSpecification items with same id node value.</td>
</tr>
<tr>
<td>PrescriptionLevel: mandatory</td>
</tr>
<tr>
<td>Tag: conformance=Plan</td>
</tr>
</tbody>
</table>

3.3.2.4 Plan References (CAMP11-431b)

Addressing normative statement:
If a Consumer includes this node in a Plan, the value of this node SHALL reference a Consumer-visible resource within the target Platform. [RMR-01]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-431b</th>
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<tbody>
<tr>
<td>NormativeSource: RMR-01 (section: ServiceSpecification)</td>
</tr>
<tr>
<td>Target: A Plan file.</td>
</tr>
<tr>
<td>Prerequisite: the Plan is originating on Consumer side.</td>
</tr>
<tr>
<td>Predicate: Any ServiceSpecification items that has an href node in the services array (ServiceSpecification[]) contained in the Plan file identified in this POST, has the href value resolve to an existing resource on the target platform.</td>
</tr>
<tr>
<td>PrescriptionLevel: mandatory</td>
</tr>
<tr>
<td>Tag: conformance=Plan</td>
</tr>
</tbody>
</table>

3.3.2.5 Plan Artifact integrity (CAMP11-407b)

Addressing normative statement:
The Plan file SHALL conform to the description provided in this section. [PLAN-09]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-407b</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: PLAN-09 (section: ContentSpecification)</td>
</tr>
<tr>
<td>Target: A Plan file.</td>
</tr>
</tbody>
</table>
**Predicate:** in the Plan file, every `ArtifactSpecification` item (artifacts array) has a content node that has either an `href` node, or a `data` node but not both.

**PrescriptionLevel:** mandatory

**Tag:** conformance= Plan
4 Conformance

4.1 Implementations

Implementations of this specification are test suites that are derived from (or exercise) all or parts of the test assertions defined in this document. Such Implementations are called here CAMP test suites.

Note: Implementations of this CAMP Test Assertions specification are NOT to be confused with implementations of the CAMP specification, which are programs or parts of a system implementing the CAMP Provider functions, or the CAMP Consumer functions, or yet data artifacts such as a CAMP PDP or a CAMP Plan. However, these four types of CAMP implementations (CAMP Provider, CAMP Consumer, PDP, Plan) are useful to partition the related Test assertions, and to define related conformance profiles for test suites.

A test suite is typically composed of test cases. According to the definition in [TAG] adopted here, a test case is:

“A set of a test tools, software or files (data, programs, scripts, or instructions for manual operations) that verifies the adherence of a test assertion target to one or more normative statements in the specification.”

A test suite is said to implement a test assertion if it contains one or more test cases that exercise this test assertion, with the ability to assess whether an actual test target (i.e. an instance of the “target” of the test assertion) fulfills the associated normative CAMP requirement (as identified by the “normativeSource” of the test assertion). This means that the test case(s) related to a test assertion, must be able to either “pass” or “fail” most test targets, under expected usage conditions.

Identification of test restrictions:

- A conforming CAMP test suite that is unable to assess a subset of test targets for a particular test assertion, MUST clearly identify or characterize this subset, regardless whether this limitation is intentional or not.
- A conforming CAMP test suite that is unable to assess test targets under specific conditions or within a specific context for a particular test assertion, MUST clearly identify these conditions and/or context, regardless whether this limitation is intentional or not.

Four conformance profiles are defined for CAMP test suites:

1. CAMP test suite for CAMP Provider (or “CAMP Provider test suite”)
2. CAMP test suite for CAMP Consumer (or “CAMP Consumer test suite”)
3. CAMP test suite for PDP (or “CAMP PDP test suite”)
4. CAMP test suite for Plan (or “CAMP Plan test suite”)

A CAMP test suite may claim conformance to more than one of the above conformance profiles.

4.2 CAMP Provider Test Suite Conformance Profile

In order to claim conformance to the CAMP Provider test suite conformance profile, a CAMP test suite MUST do both of the following:

- Satisfy the above “Identification of test restrictions” requirements,
- Implement all test assertions (in the sense defined in Section 2) that are tagged with a “conformance” tag of value “Provider”.

Such a test suite is qualified for verifying conformance of a CAMP implementation to the CAMP Provider profile.
4.3 CAMP Consumer Test Suite Conformance Profile
In order to claim conformance to the CAMP Consumer test suite conformance profile, a CAMP test suite MUST do both of the following:

- Satisfy the above “Identification of test restrictions” requirements,
- Implement all test assertions (in the sense defined in Section 2) that are tagged with a “conformance” tag of value “Consumer”.

Such a test suite is qualified for verifying conformance of a CAMP implementation to the CAMP Consumer profile.

4.4 CAMP PDP Test Suite Conformance Profile
In order to claim conformance to the CAMP PDP test suite conformance profile, a CAMP test suite MUST do both of the following:

- Satisfy the above “Identification of test restrictions” requirements,
- Implement all test assertions (in the sense defined in Section 2) that are tagged with a “conformance” tag of value “PDP”.

Such a test suite is qualified for verifying conformance of a CAMP implementation to the CAMP PDP profile.

4.5 CAMP Plan Test Suite Conformance Profile
In order to claim conformance to the CAMP Plan test suite conformance profile, a CAMP test suite MUST do both of the following:

- Satisfy the above “Identification of test restrictions” requirements,
- Implement all test assertions (in the sense defined in Section 2) that are tagged with a “conformance” tag of value “Plan”.

Such a test suite is qualified for verifying conformance of a CAMP implementation to the CAMP Plan profile.
Appendix A. Acknowledgments

This section is informative. The following individuals have participated in the creation of this specification and are gratefully acknowledged:

Participants:

- Roshan Agrawal, Rackspace Hosting, Inc.
- Michael Behrens, US Department of Defense (DoD)
- Bhaskar Reddy Byreddy, Software AG, Inc.
- Mark Carlson, Oracle
- Martin Chapman, Oracle
- Francesco D'Andria, Cloud4SOA
- Jacques Durand, Fujitsu Limited
- Panagiotis Gouvas, Cloud4SOA
- Keith Grange, JumpSoft
- Alex Heneveld, Cloudsoft Corporation Limited
- Gershon Janssen, Individual Member
- David Jilk, Standing Cloud, Inc.
- Duncan Johnston-Watt, Cloudsoft Corporation Limited
- Anish Karmarkar, Oracle
- Tobias Kunze, Red Hat
- Eugene Luster, US Department of Defense (DoD)
- Ashok Malhotra, Oracle
- Alex McDonald, NetApp
- Rich Miller, Cloudsoft Corporation Limited
- Jeff Mischkinsky, Oracle
- Adrian Otto, Rackspace Hosting, Inc.
- Derek Palma, Vnomic
- Gilbert Pilz, Oracle
- Krishna Raman, Red Hat
- Tom Rutt, Fujitsu Limited
- Zhexuan Song, Huawei Technologies Co., Ltd.
- Charles Tupitza, JumpSoft
- Jeffrey West, Oracle
- Prasad Yendluri, Software AG, Inc.
# Appendix B. Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Editor</th>
<th>Changes Made</th>
</tr>
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<tbody>
<tr>
<td>Wd18</td>
<td>Feb 4, 2014</td>
<td>Jacques Durand</td>
<td>First complete set of test assertions matching CAMP WD37</td>
</tr>
<tr>
<td>Wd19</td>
<td>Feb 7, 2014</td>
<td>Jacques Durand</td>
<td>Several edits from Wd18 (see diffs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- OASIS references set to the right citation format for OASIS refs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Missing hyperlinks for cross-references (bookmarks)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Various minor edits in Section 2.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Improved section 2.3 (avoid redundancies, add more complete explanations.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Improved on several PUT test assertions (more appropriate set of resources, for their variables)</td>
</tr>
<tr>
<td></td>
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<td>- Various minor edits and typos in TAs fixed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Added missing TA (CAMP11-105)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Improved on the Conformance clause.</td>
</tr>
<tr>
<td>WD20</td>
<td>Feb 10, 2014</td>
<td>Gilbert Pilz</td>
<td>Editorial cleanups and formatting.</td>
</tr>
</tbody>
</table>