Cloud Application Management for Platforms (CAMP) Test Assertions
Version 1.1
Committee Specification 01
09 November 2014

Specification URIs
This version:
http://docs.oasis-open.org/camp/camp-ta/v1.1/cs01/camp-ta-v1.1-cs01.pdf (Authoritative)
http://docs.oasis-open.org/camp/camp-ta/v1.1/cs01/camp-ta-v1.1-cs01.html
http://docs.oasis-open.org/camp/camp-ta/v1.1/cs01/camp-ta-v1.1-cs01.doc

Previous version:
http://docs.oasis-open.org/camp/camp-ta/v1.1/csprd02/camp-ta-v1.1-csprd02.pdf (Authoritative)
http://docs.oasis-open.org/camp/camp-ta/v1.1/csprd02/camp-ta-v1.1-csprd02.html
http://docs.oasis-open.org/camp/camp-ta/v1.1/csprd02/camp-ta-v1.1-csprd02.doc

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

Technical Committee:
OASIS Cloud Application Management for Platforms (CAMP) TC

Chair:
Martin Chapman (martin.chapman@oracle.com), Oracle

Editors:
Jacques Durand (jdurand@us.fujitsu.com), Fujitsu Limited
Gilbert Pilz (gilbert.pilz@oracle.com), Oracle
Adrian Otto (adrian.otto@rackspace.com), Rackspace Hosting, Inc.
Tom Rutt (trutt@us.fujitsu.com), Fujitsu Limited

Related work:
This specification is related to:

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 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.
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. Any other numbered Versions and other technical work produced by the Technical Committee (TC) are listed at https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=camp#technical.

TC members should send comments on this specification to the TC’s email list. Others should send comments to the TC’s public comment list, after subscribing to it by following the instructions at the “Send A Comment” button on the TC’s web page at https://www.oasis-open.org/committees/camp/.

For information on whether any patents have been disclosed that may be essential to implementing this specification, and any offers of patent licensing terms, please refer to the Intellectual Property Rights section of the Technical Committee web page (https://www.oasis-open.org/committees/camp/ipr.php).

Citation format:

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

[CAMP-Test-Assertions-v1.1]

Notices

Copyright © OASIS Open 2014. All Rights Reserved.

All capitalized terms in the following text have the meanings assigned to them in the OASIS Intellectual Property Rights Policy (the “OASIS IPR Policy”). The full Policy may be found at the OASIS website.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published, and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this section are included on all such copies and derivative works. However, this document itself may not be modified in any way, including by removing the copyright notice or references to OASIS, except as needed for the purpose of developing any document or deliverable produced by an OASIS Technical Committee (in which case the rules applicable to copyrights, as set forth in the OASIS IPR Policy, must be followed) or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by OASIS or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and OASIS DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY OWNERSHIP RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

OASIS requests that any OASIS Party or any other party that believes it has patent claims that would necessarily be infringed by implementations of this OASIS Committee Specification or OASIS Standard, to notify OASIS TC Administrator and provide an indication of its willingness to grant patent licenses to such patent claims in a manner consistent with the IPR Mode of the OASIS Technical Committee that produced this specification.

OASIS invites any party to contact the OASIS TC Administrator if it is aware of a claim of ownership of any patent claims that would necessarily be infringed by implementations of this specification by a patent holder that is not willing to provide a license to such patent claims in a manner consistent with the IPR Mode of the OASIS Technical Committee that produced this specification. OASIS may include such claims on its website, but disclaims any obligation to do so.

OASIS takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on OASIS’ procedures with respect to rights in any document or deliverable produced by an OASIS Technical Committee can be found on the OASIS website. Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this OASIS Committee Specification or OASIS Standard, can be obtained from the OASIS TC Administrator. OASIS makes no representation that any information or list of intellectual property rights will at any time be complete, or that any claims in such list are, in fact, Essential Claims.

The name “OASIS” is a trademark of OASIS, the owner and developer of this specification, and should be used only to refer to the organization and its official outputs. OASIS welcomes reference to, and implementation and use of, specifications, while reserving the right to enforce its marks against misleading uses. Please see https://www.oasis-open.org/policies-guidelines/trademark for above guidance.
Table of Contents

1 Introduction .............................................................................................................................................. 6
  1.1 Terminology ......................................................................................................................................... 6
  1.2 Normative References ........................................................................................................................... 6
  1.3 Non-Normative References .................................................................................................................. 6
2 Test Assertions Design and Objectives ...................................................................................................... 7
  2.1 Testing Objectives ............................................................................................................................... 7
  2.2 Design Principles ............................................................................................................................... 7
  2.3 Anatomy of a Test Assertion ............................................................................................................... 8
    2.3.1 Core Elements ............................................................................................................................... 8
    2.3.2 Optional Elements ........................................................................................................................ 9
    2.3.3 Example Test Assertion ............................................................................................................... 9
    2.3.4 CAMP Profile ............................................................................................................................. 10
  2.4 Categories of Test Assertions ............................................................................................................. 10
  2.5 Notational Conventions ..................................................................................................................... 11
    2.5.1 Identification scheme for Test Assertions .................................................................................... 11
    2.5.2 Identifying a message inside a Test Assertion .............................................................................. 11
    2.5.3 Identifying an attribute of a resource in a message ...................................................................... 11
  2.6 Coverage of the Specification ............................................................................................................ 12
3 Test Assertions ...................................................................................................................................... 13
  3.1 Provider Test Assertions ..................................................................................................................... 13
    3.1.1 Basic Schema Compliance for Platform Resources, Provider Side ............................................. 13
    3.1.2 Basic Schema Compliance for Application Resources ............................................................... 14
    3.1.3 Consistency of Serialization with Metadata .................................................................................. 16
    3.1.4 Metadata Integrity and Serialization ............................................................................................. 18
    3.1.5 Various Model Referential and Semantic Constraints ................................................................ 21
    3.1.6 Support for HTTP Methods ......................................................................................................... 29
    3.1.7 Support for JSON ......................................................................................................................... 32
    3.1.8 Resource Queries and HTTP ....................................................................................................... 33
    3.1.9 Resource Updates ......................................................................................................................... 35
    3.1.10 Resource Creation and Consistency of Representations ............................................................ 39
    3.1.11 Use of Parameters ....................................................................................................................... 41
    3.1.12 Resource Deletion ....................................................................................................................... 42
    3.1.13 Representation Skew Semantics .................................................................................................. 44
    3.1.14 PDP and Plan Registration ........................................................................................................ 47
    3.1.15 Application Deployment ............................................................................................................ 52
  3.2 Consumer Test Assertions ................................................................................................................. 54
    3.2.1 Basic Schema Compliance for Platform Resources, Consumer Side ...................................... 54
    3.2.2 Consistency of Serialization with Metadata ................................................................................ 54
    3.2.3 Various Model Referential and Semantic Constraints ............................................................... 55
    3.2.4 Support for JSON ....................................................................................................................... 55
    3.2.5 Resource Queries and HTTP ....................................................................................................... 56
    3.2.6 Resource Updates ....................................................................................................................... 56
    3.2.7 PDP and Plan Contents .............................................................................................................. 57
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.

1.1 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].

1.2 Normative References


1.3 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>TA_Id:</th>
<th>CAMP11-NNN</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource:</td>
<td>&lt;a normative TAG, and optionally a section name&gt;</td>
</tr>
<tr>
<td>Target:</td>
<td>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 the 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):
• **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 Serialization (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 Serialization (CAMP11-111)

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 Serialization (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 plans.plan_links as shown in the result to a previous GET plans message (obtained from platform.plans_uri), OR there is a POST to a 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]

**TA_Id:** CAMP11-151
**NormativeSource:** MO-05, (section: camp_resource resource)
**Target:** A successful response message (m2) to a previous GET type_definitions (m1) where type_definitions is obtained from platform.type_definitions_uri.

**Prerequisite:**
- A successful response message (m4) to a previous GET type_definition (m3) where the name attribute value shown in (m4) is camp_resource.

**Predicate:** 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).

**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]

**TA_Id:** CAMP11-115
**NormativeSource:** RE-07, (RE-53) (section: Mutable)
**Var:** (resource) in {assembly, component, plan}

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

**Prerequisite:** The following message sequence occurred:
- 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).
- The PUT request (m3) is providing different value than shown in (m2) for a consumer-mutable=false attribute.

**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 one of the URIs returned in (m4) parameter_definitions.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) 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) 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]

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

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

TA_Id: CAMP11-124
NormativeSource: RE-70 (section: Resources)
Target: A successful response message (HTTP code 200) to a GET type_definition message (m1).
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.
Predicate: the target (response) message content satisfies the serialization schema (JSON ) for type_definition, AND has a type attribute of value = "type_definition".
PrescriptionLevel: mandatory
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 and specification_version (CAMP11-127)

Addressing normative statement:
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)

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 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 type_definitions.type_definition_links as obtained from platform.type_definitions_uri in previous message exchanges.
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:
For every attribute of the type not inherited from its super-types, there SHALL be an AttributeLink that references the attribute_definition resource that defines that attribute. [RE-45]

TA_Id: CAMP11-142
NormativeSource: RE-45 (section: type_definition Resource/attribute_definition_s_links)
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:
- A successful response (m2) to a previous GET platform message (m1)
- A successful response (m4) to a previous GET type_definitions message (m3) on the URI platform.type_definitions_uri.
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 a 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]
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"

PrescriptionLevel: 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 }

**NormativeSource:** PR-61, 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 = archtype.

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

**PrescriptionLevel:** 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 }

**NormativeSource:** 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”

**PrescriptionLevel:** 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]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-202</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PR-01 (section: Required Formats)</td>
</tr>
<tr>
<td>Target</td>
<td>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”.</td>
</tr>
<tr>
<td>Predicate</td>
<td>In the target (m2) the HTTP Content-Type value is “application/json”, AND the content if any is valid JSON.</td>
</tr>
<tr>
<td>PrescriptionLevel</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag</td>
<td>conformance=Provider</td>
</tr>
</tbody>
</table>

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]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-220</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PR-68 (section: Deploying an Application by Reference)</td>
</tr>
<tr>
<td>Target</td>
<td>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.</td>
</tr>
<tr>
<td>Predicate</td>
<td>The HTTP code of (m2) is NOT code 415, ”Unsupported Media Type”.</td>
</tr>
<tr>
<td>PrescriptionLevel</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag</td>
<td>conformance=Provider</td>
</tr>
</tbody>
</table>

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]

<table>
<thead>
<tr>
<th>TA_Id</th>
<th>CAMP11-221</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource</td>
<td>PR-69 (section: Registering a Plan by Reference)</td>
</tr>
<tr>
<td>Target</td>
<td>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.</td>
</tr>
<tr>
<td>Predicate</td>
<td>The HTTP code of (m2) is NOT code 415, ”Unsupported Media Type”.</td>
</tr>
<tr>
<td>PrescriptionLevel</td>
<td>mandatory</td>
</tr>
<tr>
<td>Tag</td>
<td>conformance=Provider</td>
</tr>
</tbody>
</table>

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 those attributes of the queried resource whose name occurs in the list specified by the value 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 400 Bad Request 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 400.
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.8.3 select_attr Positive Case, PUT (CAMP11-222a)

Addressing normative statement: (regular case with explicit value update)
To allow an update of a subset of a resource's attributes, Providers SHALL support the use of the 'select_attr' query parameter in conjunction with the HTTP PUT method. [PR-76]

TA_Id: CAMP11-222a
NormativeSource: PR-76 (section: Partial Updates with PUT)
Target: A response message (m4) to a GET resource URI query message (m3).
Prerequisite:
- A previous message (m1) of the form PUT resource URI with select_attr query parameter showing attribute names that also appear in (m1) body with actual values was sent, with a successful response message (m2). (and assuming no "delete resource" message after m1).
Predicate: The target message (m4) is a successful response and the attributes in (m4) that also appear in the select_attr query parameter of (m1) as well as in (m1) body, show the same values as in the body of (m1).
PrescriptionLevel: mandatory
Tag: conformance=Provider

3.1.8.4 select_attr Positive Case, PUT (CAMP11-222b)

Addressing normative statement: (case with implicit value deletion)
To allow an update of a subset of a resource's attributes, Providers SHALL support the use of the 'select_attr' query parameter in conjunction with the HTTP PUT method. [PR-76]

TA_Id: CAMP11-222b
NormativeSource: PR-76 (section: Partial Updates with PUT)
Target: A response message (m4) to a GET resource URI query message (m3).
Prerequisite:
- A previous message (m1) of the form PUT resource URI with select_attr query parameter showing attribute names that do not appear in (m1) body was sent, with a successful response message (m2). (and assuming no "delete resource" message after m1).
Predicate: The target message (m4) is a successful response and the attributes that appear in the `select_attr` query parameter of (m1) but not in (m1) body, are absent (i.e. empty-valued) from (m4).

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.8.5 `select_attr` Positive Case, PUT (CAMP11-222c)

Addressing normative statement: (case showing that attributes NOT present in `select_attr` are not affected)

To allow an update of a subset of a resource’s attributes, Providers SHALL support the use of the ‘`select_attr`’ query parameter in conjunction with the HTTP PUT method. [PR-76]

Target: A response message (m6) to a GET `resource URI` query message (m5).

Prerequisite:

- A previous message (m1) of the form GET `resource URI` has a successful response message (m2) showing some attribute values.
- A previous message (m3) of the form PUT `resource URI` with `select_attr` query parameter showing attribute names that are a subset of those in (m2) was sent, with a successful response message (m4).

Predicate: The target message (m6) is a successful response and shows same attribute values as in (m2) for those attributes that do not appear in the `select_attr` query parameter of (m3).

PrescriptionLevel: mandatory

Tag: conformance=Provider

3.1.8.6 `select_attr` Negative Case, PUT (CAMP11-209)

Addressing normative statement:

Upon receiving such a malformed request (see PR-12 case) the Provider SHALL respond with a 400 status code. [PR-13]

Target: A response message (m4) to a PUT `resource URI` query message (m3) that uses “`select_attr`” query parameter, where (m3) includes attributes in its request body that are not listed in `select_attr` values.

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_attr query 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 2xx.

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 parameterDefinitionsUri 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.parameterDefinitionsUri message (m3). In the array parameterDefinitions.parameterDefinitionsLinks some link(s) refer to a parameterDefinition 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]

TA_Id: CAMP11-318
NormativeSource: RE-74 (RE-61)(section: Deleting an Application Instance and a Deployed Application)
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 DELETE 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><strong>TA_Id</strong></th>
<th>CAMP11-330</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NormativeSource</strong></td>
<td>RE-12, (RE-53) (section: representation_skew)</td>
</tr>
<tr>
<td><strong>Var</strong></td>
<td>(resource) in { plan, component, assembly }</td>
</tr>
<tr>
<td><strong>Target</strong></td>
<td>A response message (m4) to a PATCH resource message (m3).</td>
</tr>
<tr>
<td><strong>Prerequisite</strong>: The following message sequence occurred:</td>
<td></td>
</tr>
<tr>
<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 $representation_skew=CREATING$.</td>
</tr>
<tr>
<td></td>
<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><strong>TA_Id</strong></th>
<th>CAMP11-331</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NormativeSource</strong></td>
<td>RE-12, (RE-53) (section: representation_skew)</td>
</tr>
<tr>
<td><strong>Var</strong></td>
<td>(resource) in { plan, assembly }</td>
</tr>
<tr>
<td><strong>Target</strong></td>
<td>A response message (m4) to a PUT resource message (m3).</td>
</tr>
<tr>
<td><strong>Prerequisite</strong>: The following message sequence occurred:</td>
<td></td>
</tr>
<tr>
<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>
</tbody>
</table>
• After the target: An message (m5) similar to (m1) with a successful response message (m6), still showing representation_skew=DESTROYING.

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

**Prescription Level**: 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>CAMP11-332</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normative Source</strong>:</td>
<td>RE-12, (RE-53) (section: representation_skew)</td>
</tr>
<tr>
<td><strong>Var</strong>: (resource) in {</td>
<td>plan, assembly</td>
</tr>
<tr>
<td><strong>Target</strong>: A response message (m4) to a PATCH resource message (m3).</td>
<td></td>
</tr>
<tr>
<td><strong>Prerequisite</strong>: The following message sequence occurred:</td>
<td></td>
</tr>
</tbody>
</table>
  • 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.
  • After the target: An message (m5) similar to (m1) with a successful response message (m6), still showing representation_skew=DESTROYING.
| **Predicate**: the target message has an 4xx HTTP code. |
| **Prescription Level**: 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>CAMP11-333</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normative Source</strong>:</td>
<td>RE-12, (RE-53) (section: representation_skew)</td>
</tr>
<tr>
<td><strong>Var</strong>: (resource) in {</td>
<td>plan, assembly</td>
</tr>
<tr>
<td><strong>Target</strong>: A response message (m4) to a DELETE resource message (m3).</td>
<td></td>
</tr>
<tr>
<td><strong>Prerequisite</strong>: The following message sequence occurred:</td>
<td></td>
</tr>
</tbody>
</table>
  • 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.
  • After the target: An message (m5) similar to (m1) with a successful response message (m6), still showing representation_skew=DESTROYING.
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]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-419</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: PR-73 (RMR-05)</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>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”).</td>
</tr>
<tr>
<td>PrescriptionLevel: mandatory</td>
</tr>
<tr>
<td>Tag: conformance=Provider</td>
</tr>
</tbody>
</table>

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]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-433</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: PR-75, (RMR-05)</td>
</tr>
<tr>
<td>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”</td>
</tr>
<tr>
<td>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”).</td>
</tr>
<tr>
<td>PrescriptionLevel: mandatory</td>
</tr>
<tr>
<td>Tag: conformance=Provider</td>
</tr>
</tbody>
</table>

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]

<table>
<thead>
<tr>
<th>TA_Id: CAMP11-437</th>
</tr>
</thead>
<tbody>
<tr>
<td>NormativeSource: PR-75, (RMR-05)</td>
</tr>
<tr>
<td>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”</td>
</tr>
</tbody>
</table>
| 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]

TA_Id: CAMP11-439
NormativeSource: PR-50 (section: Deploying an Application by Reference)
Target: A response message (m2) to a POST assemblies message (m1) where (m1) has a either a “pdp_uri” or a “plan_uri” attribute.
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

3.1.15.2 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]

TA_Id: CAMP11-440
NormativeSource: PR-50, PR-51
Target: A response message (m2) to a POST assemblies message (m1) where (m1) has a either a “pdp_uri” or a “plan_uri” attribute.
Predicate: 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

3.1.15.3 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]

TA_Id: CAMP11-441
Var: archtype in {application/x-zip, application/x-tar, application/x-tgz, application/x-yaml}
NormativeSource: PR-53, (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.
Prerequisite: HTTP code in (m2) is NOT 202 “accepted” i.e. enough time elapsed to allow for the creation to complete.
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 Resource 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_uri** 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_uri,(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:

A Consumer SHALL NOT include attributes, whose name does not occur in the list specified by the value of the 'select_attr' query parameter, in the entity body of a PUT request. [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,
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>
</table>

NormativeSource: PLAN-07 (section: ContentSpecification)
Target: 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.
Predicate: 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.

PrescriptionLevel: mandatory
Tag: conformance=Consumer

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>
</table>

NormativeSource: PLAN-01, PLAN-02 (section: Plan Schema)
Target: A PDP artifact.
Prerequisite: the PDP is in archive format (ZIP, TAR or GZIP).
Predicate: the PDP archive contains at its root a file named “camp.yaml”, with the YAML structure of a Plan.

PrescriptionLevel: mandatory
Tag: conformance=PDP

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>
</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]

TA_Id: CAMP11-408b
NormativeSource: PDP-10 (PDP-06) (section: Validating Integrity)
Target: A PDP artifact.
Prerequisite: the PDP 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=PDP

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]

TA_Id: CAMP11-409b
NormativeSource: PDP-10 (section: Validating Integrity)
Target: A PDP artifact.
Prerequisite: the PDP 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=PDP

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]

TA_Id: CAMP11-405b
NormativeSource: PLAN-03 (PDP-11) (section: Plan)
Target: A Plan file.
Predicate: the Plan file contains a single yaml plan node and satisfies the yaml schema for this node.
PrescriptionLevel: mandatory
Tag: conformance=Plan
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]

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

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]

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

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]

TA_Id: CAMP11-431b
NormativeSource: RMR-01 (section: ServiceSpecification)
Target: A Plan file.
Prerequisite: the Plan is originating on Consumer side.
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=Plan

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]

TA_Id: CAMP11-407b
NormativeSource: PLAN-09 (section: ContentSpecification)
Target: A Plan file.
**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.