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MEF Specification

MEF 55.0.x

Amendment to MEF 55 - TOSCA Service Templates

Approved Draft 1 July 13 2017

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67 1 List of Contributing Members

68 The following members of the MEF participated in the development of this document and have
69 requested to be included in this list.

70 *Editor Note 1: Table below to be populated after Letter Ballot with companies voting in CfCB*
71 *and opt-in.*

72

XYZ	abc

73 2 Abstract

74 This document is an amendment to Lifecycle Service Orchestration (LSO) Reference Architec-
75 ture (RA), MEF 55 [A5-5]. The changes to MEF 55 are:

- 76 - Changes to Section 3 (Terminology), Section 7.2 (Information Model), 7.3 (Business
77 Process Flows) and Section 12 (References)
- 78 - New Appendix describing TOSCA Service Templates for deployment of MEF Services
79 and the relevant MEF LSO entities that could use such templates. Additionally, example
80 TOSCA Node Types and TOSCA Topology are provided for illustration purposes.

81 3 Changes to Section 3 of MEF 55 – Terminology and Acronyms

82 The following entries are added to the terminology table of MEF 55.

83

Term	Definition	Source
Topology and Orchestration Specification for Cloud Applications (TOSCA)	A specification defining the structure, properties and behavior expressed by TOSCA Service Templates	TOSCA [A5-1]
TOSCA Service Template	The combination of a TOSCA Topology Template and TOSCA Plans (or Orchestration processes). In this document, a TOSCA Service Template can be used for Products or Services or Resources in MEF LSO	TOSCA [A5-1]

Term	Definition	Source
TOSCA Topology Template	A TOSCA Topology Template (also referred to as the topology model of a service) defines the structure of a service. It consists of a set of TOSCA Node Templates and TOSCA Relationship Templates that together define the topology model of a service as a (not necessarily connected) directed graph.	TOSCA [A5-1]
TOSCA Node Type	A TOSCA Node Type defines the properties and the operations available to manipulate a component of a service.	TOSCA [A5-1]
TOSCA Node Template	A node in a topology graph is represented by a TOSCA Node Template. A TOSCA Node Template specifies the occurrence of a TOSCA Node Type as a component of a service.	TOSCA [A5-1], [A5-3]
TOSCA Relationship Type	A TOSCA Relationship Type defines the semantics and any properties of the relationship between TOSCA Nodes.	TOSCA [A5-1]
TOSCA Relationship Template	A TOSCA Relationship Template specifies the occurrence of a relationship between nodes in a TOSCA Topology Template.	TOSCA [A5-1]
TOSCA Plans	TOSCA Plans define the (Orchestration) process models that are used to create and terminate a service as well as to manage a service during its whole lifetime. In this document, TOSCA Plans are similar to the term Business Process Flows in some entities, e.g., SOF or ICM, of LSO RA.	TOSCA [A5-1]

84

Table A5-1: Terminology and Acronyms

85

4 Changes to Section 7.2 of MEF 55 – Information Models

86

Modify one sentence as shown below - Changes are shown as highlighted text:

87

The MEF Forum defines management information models supporting LSO, that describe the information associated with the generalized management interactions using protocol neutral Unified Modeling Language (UML) **and TOSCA Service Templates**.

88

89

90

5 Changes to Section 7.3 of MEF 55 – Business Process Flows

91

Modify one sentence as shown below - Changes are shown as highlighted text:

92 The details of the high level Operational Threads outlined in the LSO Reference Architecture
93 and Framework are further expanded into more detailed Business Process Flows **or TOSCA**
94 **Plans**.

95 **6 Changes to Section 12 of MEF 55 – References**

96 Add the following references in Section 12 of MEF 55:

97 [A5-1] OASIS TOSCA 1.0, <http://docs.oasis-open.org/tosca/TOSCA/v1.0/os/TOSCA-v1.0->
98 [os.pdf](http://docs.oasis-open.org/tosca/TOSCA/v1.0/os/TOSCA-v1.0-os.pdf), November 2013.

99 [A5-2] OASIS BPEL, *Web Services Business Process Execution Language Version 2.0*. OA-
100 SIS Standard. 11 April 2007. <http://docs.oasis-open.org/wsbpel/2.0/wsbpel-v2.0.html>.

101 [A5-3] OASIS TOSCA *Simple Profile for Network Functions Virtualization (NFV) Version*
102 *1.0*, 17 March 2016. <http://docs.oasis-open.org/tosca/tosca-nfv/v1.0/tosca-nfv->
103 [v1.0.pdf](http://docs.oasis-open.org/tosca/tosca-nfv/v1.0/tosca-nfv-v1.0.pdf).

104 [A5-4] MEF Forum 7.3, *Carrier Ethernet Service Information Model*, February 2017.

105 **7 Additional References (This document only)**

106
107 [A5-5] MEF Forum 55, *Lifecycle Service Orchestration Reference Architecture and Frame-*
108 *work*, March 2016.

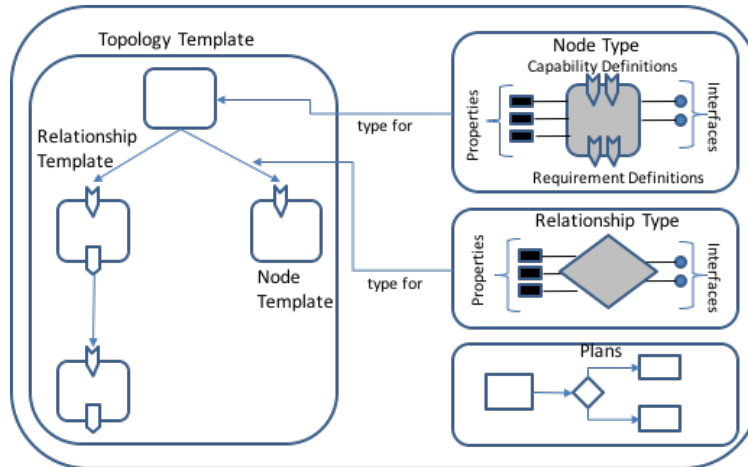
109 **8 New Appendix in MEF 55**

110 The following section is added as a new Appendix A5-III in MEF 55

111 **Appendix A5-III TOSCA Service Templates**

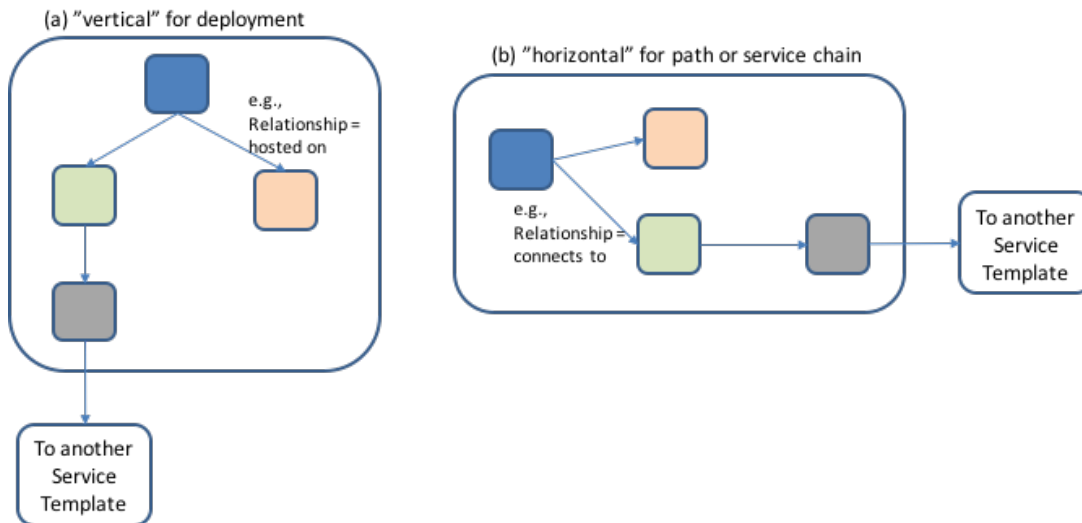
112 The TOSCA specification [A5-1] provides an approach for defining the relationships between
113 Customers, Service Providers and developers of IT services, and can be applied to many service
114 types, including connectivity services. A Service Provider can use a TOSCA Service Template to
115 offer and orchestrate the deployment of services for Customers. The use of a standardized inter-
116 face with automation tools enables easier interaction between Customers and Service Provid-
117 ers/Partners.

118 A TOSCA Service Template is a combination of a TOSCA Topology Template and one or more
119 TOSCA Orchestration Plans as shown in Figure A5-1 below. The topology includes the TOSCA
120 Components (i.e., TOSCA Node Templates) and relationships between them as described in
121 TOSCA Relationship Templates.



122
123 **Figure A5-1: TOSCA Service Template (from [A5-1])**

124 The Relationship between TOSCA Nodes, as a graph, can describe the associations between a
125 given Service instance and one or more Service Components, or, between a given Service Com-
126 ponent and one or more Resources. For example, Service Components can be Classes of objects
127 and when instantiated in to Service instances, the TOSCA Topology Template can be used to
128 show either a vertical relationship between Service and Resource layers or horizontal relation-
129 ship within a given layer as shown in Figure A5-2.



130
Figure A5-2: Use of TOSCA Topology Template

131 One example of a TOSCA Topology is in [A5-3]. The TOSCA Topology graph can also be used
132 in a Topology API Service to client systems for sharing details such as graph of Service Com-
133 ponents only or include more details such as graph of Resources for a given Service instance.
134 TOSCA Service Templates could be nested, i.e., a TOSCA Node within a TOSCA Service Tem-
135 plate can be another TOSCA Service Template.

136 TOSCA Plans explicitly define which Nodes will be deployed and how they will be connected.
137 TOSCA Plans are typically expressed as Business Process Execution Language (BPEL, [A5-2])
138 or shell scripts.

139 **A5-III.1 TOSCA Service Templates in MEF LSO RA**

140 One possible use of TOSCA Service Templates is in the Service Orchestration Function (SOF)
141 entity of MEF LSO Reference Architecture (Figure 2) for the orchestration of Service Compon-
142 nents across one or more domains. The templates can also be used in an Infrastructure Control
143 and Management (ICM) entity for the orchestration of Resources within a domain, in support of
144 one or more Service Components. Additionally, as discussed in Section 11.1, a Product Offering
145 in a Product catalog would represent what is externally presented to the market with appropriate
146 mapping to one or more Services. Thus, a Product can be represented as a TOSCA Node Type
147 and/or TOSCA Service Template for marketable entities.

148 TOSCA Service Templates are defined more broadly than MEF Services and can be used to de-
149 scribe more than just MEF Service Components or Forwarding Domains. They includes metada-
150 ta to orchestrate the service lifecycle via the TOSCA Plans, i.e., ‘how’ to deploy a service, where-
151 as, a MEF Service describes the behavior as seen by an external observer, i.e., the ‘what’. In oth-
152 er words, a MEF Service can be shown as a TOSCA Node Type in a TOSCA Topology view and
153 used, as example for a Virtual Link, in the TOSCA Simple Profile for NFV [A5-3]. Additionally,
154 a MEF Service can be made up of a hierarchy of TOSCA Nodes and TOSCA Relationships as
155 shown in Figure A5-2. However, while TOSCA Plans provide for orchestration of the service
156 lifecycle, Operational Threads and Policy based Management are also required to address behav-
157 iors for the entire lifecycle of the Service.

158 One key value of using TOSCA Service Templates is interoperability with structure of the Ser-
159 vice, i.e., Service composition/definition, and deployment lifecycle. TOSCA Service Templates
160 could be part of the Service Catalog in a SOF or Resource Catalog in an ICM. Some TOSCA
161 Service Templates in a Service Catalog can be exchanged with other Operators across Sonata
162 (via Business Applications entity) or Interlude reference points to request a specific deployment
163 configuration. Standardized TOSCA Service Templates as part of a Service Catalog, for exam-
164 ple, can enable interoperable definitions as well as implementations. Standard TOSCA Service
165 Templates can also allow for Service composition when components are deployed in different
166 domains within a Service Provider or different Operators. Service composition can be dynamic,
167 e.g., at the time of request for a given Service, with choice of suitable TOSCA Node Templates
168 and TOSCA Relationship Templates. Both the structure of the Service as well as the TOSCA
169 Plans (or Business Process) could help with interoperability when Services span multiple do-
170 mains.

171 Section 11 and Section 11.2 describe the Service View as consisting of one or more Service
172 Components within the Service Provider’s infrastructure. Some of the Service Components in a
173 Service Provider’s management system, for example an OVC, maybe viewed as a Service by an
174 Operator. Additionally, Section 8.2.2 has a number of requirements related to Service configura-
175 tion and activation including topology, determining the necessary Service Components and con-
176 figurations, etc.

177 In particular, Section 8.2.4 identified the need for coordinated execution of the service delivery
 178 orchestration plan for Service Components implementation. To enable this coordinated execu-
 179 tion, a TOSCA Service Template can be useful since it provides the required set of Service
 180 Components, Resources and the relationship as well as dependencies for a given Service in-
 181 stance.

182 **A5-III.2 Example – TOSCA Topology Model for MEF Services**

183 An example TOSCA Topology Model is discussed for illustration purposes only. Formal defini-
 184 tion of TOSCA Topology Template, TOSCA Node Template and TOSCA Relationship Tem-
 185 plate is outside the scope of this document.

186 A topology model for a MEF Service can be for the Service View as well as the Resource View
 187 and the dependencies between them. As example, the TOSCA Node Types for TOSCA Topolo-
 188 gy of MEF Services can be as shown in Table A5-2 and can be related directly to the classes or
 189 objects in MEF Information Model specifications.

190

TOSCA Topology	Example TOSCA Node Types	Reference
Service View	1. MEF CE Service 2. EVC 3. EVC EndPoints 4. UNIs 5. OVC 6. OVC EndPoints 7. ENNIs	MEF 7.3 Classes [A5-4]
Resource View	1. FCs 2. LTPs 3. Ports 4. VNFs	ONF TR-512 OASIS TOSCA [A5-3]
Facilities View	Equipment, Media (e.g., Fiber)	

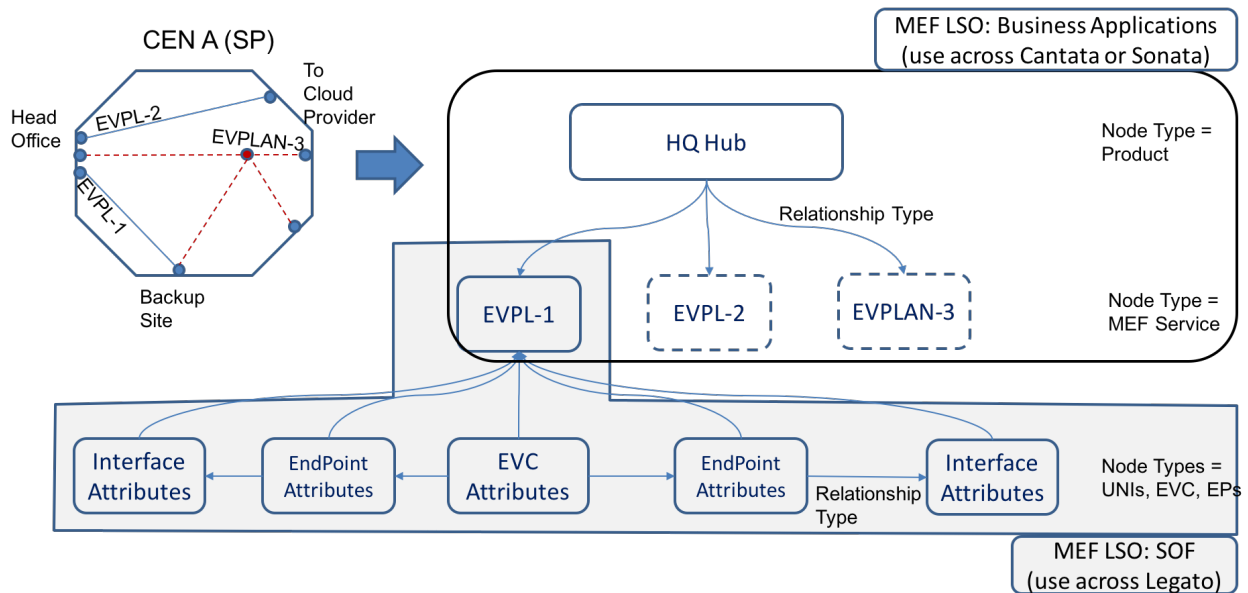
191 **Table A5-2: Example TOSCA Node Types for MEF Services**

192 Node Types can be based on individual Service attributes like EVC Type instead of the entire
 193 EVC class. Such granularity could help with dynamic Service composition by choosing suitable
 194 TOSCA Node Types and TOSCA Relationship Types. The Node Type definitions are left for
 195 further study.

196 For MEF Services, the TOSCA Topology view is a graph with Relationships between the TOS-
 197 CA Node Types such as those shown in Table A5-2. The association between Service Compon-
 198 ents or the dependencies to Resources can be identified with the TOSCA Relationship Tem-
 199 plates. As example, TOSCA Topology can be for a Product that might be offered as a bundle of
 200 multiple MEF Services (e.g., EVPL-1, EVPL-2 and EVPLAN-3) with TOSCA Relationships
 201 between TOSCA Node Types for Product and MEF Services. In this example, the MEF Services
 202 might be for different use cases of a given Customer, e.g., EVPL-1 for connecting Head Office to
 203 a Backup Site, EVPL-2 for connecting Head Office to peering with Cloud Provider, and,

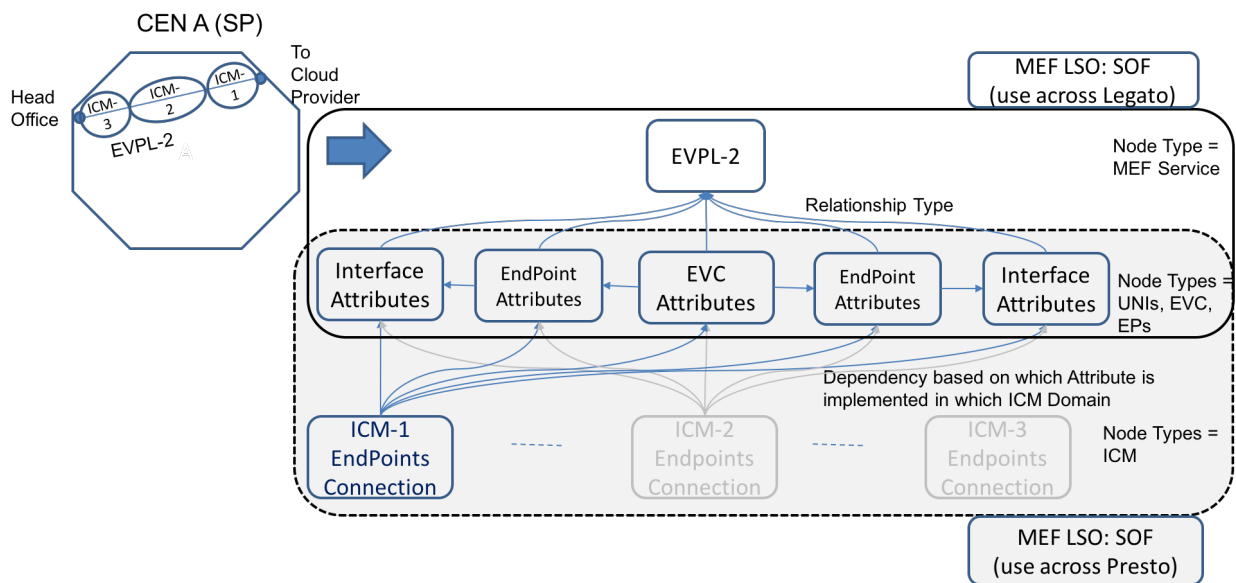
204 EVPLAN-3 for intranet. Each TOSCA Node for MEF Service can then shown to be with TOS-
 205 CA Relationship to TOSCA Node(s) for Service Components.

206 Specifically, in the context of MEF 55, the TOSCA Topology description for Product, e.g., HQ
 207 Hub with three MEF Services, could be used at the Business Applications Layer for use across
 208 Cantata or Sonata reference points. Likewise, the TOSCA Topology description for each MEF
 209 Service could be in Service Orchestration Function for use across Legato reference points. The
 210 TOSCA Topology for Product to Service is as shown in Figure A5-3 below:



211

212 **Figure A5-3: Example TOSCA Topology for Product to Service View**

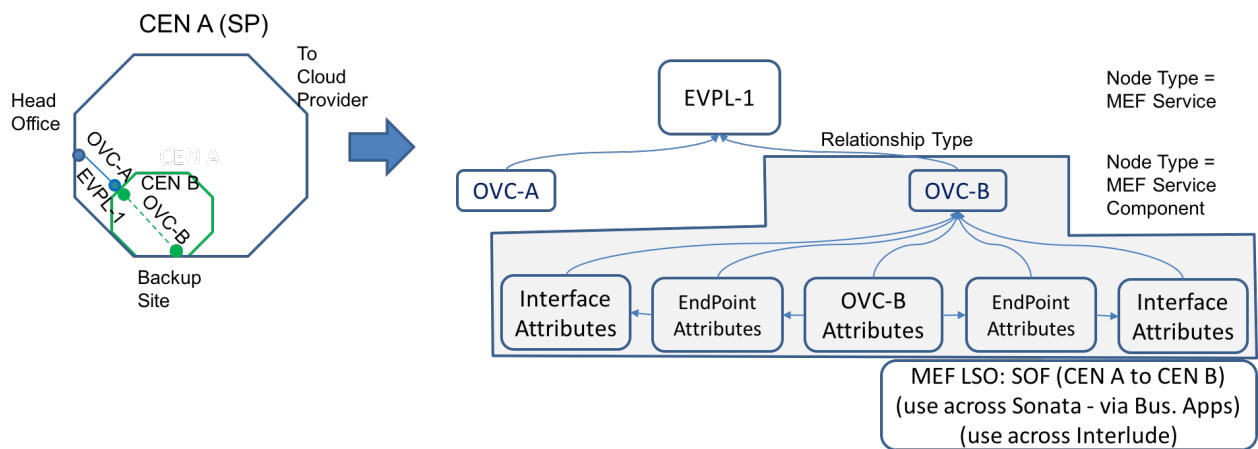


213

214 **Figure A5-4: Example TOSCA Topology for Service to Domain View**

215 CEN A might have one or more ICM Domains. For example, EVPL-2 might traverse three ICM
 216 domains. In addition to use of TOSCA description across the Legato reference point, SOF can
 217 express relationship of Service Components to a given ICM Domain as shown in Figure A5-4.

218 When the MEF Service is across more than one Operator domain, e.g., 2 CEN Operators, then,
 219 the TOSCA Topology view can be shown for each Service Component (OVC) in the EVC as in
 220 Figure A5-5 below. For example, EVPL-1 is shown to use OVC-A across CEN A and OVC-B
 221 across CEN B. With CEN A's SOF performing Service decomposition, TOSCA Topology de-
 222 scriptions can be used across Legato/Presto reference points within CEN A and across Sona-
 223 ta/Interlude reference points for requesting Service Components in CEN B. Figure A5-5 shows
 224 the SOF using Business Applications for sending the initial request for OVC-B related attributes
 225 via Sonata while using Interlude for Service Control.



226

227

Figure A5-5: Example TOSCA Topology for Service View across 2 Operators

228