

B2B2X Service Bundling Catalyst Project Paper

Project Findings

Participants



Service Provider
& “Bundler”



NFV Product
Supplier



Fibre Access
Network



Fibre Access
Network

Champions & Supporters



Providing Requirements, Viewing Results

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About the Project

This B2B Catalyst Project is assembled from components from the dynamic catalogs of three different suppliers. Supplier components used in the demonstration include an NFV firewall, IAAS and Fibre Access. This project extends the application of TMForum B2B best practices into the new domain of Network Function Virtualization and shows how an Agile business can leverage traditional and new technologies in concert.

The project shares machine readable product definitions between partners where the definitions are instantiated using the dynamic product service and resource patterns of the SID. The structure and rules of the bundled product are composed from supplier components.

Executive Summary

This project demonstrates and proves a number of key, important points:

1. That the B2B Touchpoints (from TMForum B2B2X) used extensively for fibre network access provisioning apply equally well to new generation cloud and NFV digital services.
2. That the B2B Touchpoints can be enacted through a range of interface technologies under the condition that they support a dynamic payload, noting that there are some limitations for some technology types for asynchronous communications and reliable messaging.
3. That dynamic payloads within messages can be structured through conformance to SID specifications

The project has produced a number of outputs, which form a valuable contribution to Framework and the project was presented with the 2014 award based on this framework contribution.

1. Recommendations of Best Practice for the use of existing SID patterns as
2. Tutorial on using SID specifications
3. Sample Messages and specifications for the 3 supplier products

The full value of specification driven dynamic APIs came together in the service bundling part of the demonstration. The service bundling function was performed by the new TMForum certified Telflow 3 product by DGIT. Service bundling dynamically consumed dynamic product definitions from suppliers and used them to immediately create and launch products.

Background Concepts

Of the four key building block of B2B2X this project focuses on;

1. Dynamic Data using established SID patterns
2. Process Touchpoint (B2B2X) suitability for different types of services
3. Implementation with different transport layer options (REST, ebXML, SOAP)



What are SID Characteristic Specifications / Characteristic Values?

The TMForum SID is an Industry Data Model which both has a structure to align to the eTom process framework and provides patterns which can be utilised to create production ready data models. The key structural building blocks of the SID are the ABE's (Aggregated Business Entities). The root ABE is intended to provide patterns for re-use across the other ABE's of the SID and defines the patterns for dynamic data specification and use. Data attributes are referred to as Characteristics in the SID and the patterns that are used in dynamic data specification are Characteristic Specification, Entity Specification and Entity Specification Relationship while the related data payloads follow the Characteristic Value pattern. Using this agreed approach for specification is fundamental to achieving re-usability and interoperability.

What is a process touchpoint?

A process touchpoint is a functional description of the join between two processes. In B2B2X there is an extensible library of Touchpoints which are used to bond the BUYER's process with the SUPPLIER's process. The principle is that TOUCHPOINT + DATA MODEL + TRANSPORT = API. Given that the data model is dynamic, we can re-use the Touchpoints for different products, so a practitioner should attempt to use a touchpoint from the library before inventing a new one.



Project Objectives

The project objectives were to;

Objective 1 Show Dynamic API's

Determine if the dynamic API approach as used in B2B2X can be re-applied to new generation technology, namely Network Function Virtualisation (NFV) and Cloud. B2B2X includes the use of TMforum SID patterns for specification of dynamic data and carriage of dynamic payloads.

Objective 2 – Re-usable touch-points

The hypothesis is that you can re-apply these Touchpoints form different types of products and services and that because the key parts of the transaction payload for these Touchpoints are configurable through the use of SID specifications. No programming is required.

Objective 3 – show applicability for different transport choices

As part of this objective, we are proving that the re-usable process Touchpoints of B2B2X may be used from both new and older generation services and that they can be used across a range of different transport layer technology, the established options and the new flavours of REST API and that a SID specification driven approach to dynamic data is applicable. The concept here is that you can establish a library of Touchpoints.

Contributions to Framework

Existing SID specifications can be applied across the different transport technologies and for new innovative services. Outputs of the project include;

1. Worked examples
2. How-To Guide on how to utilise the patterns from the SID root ABE to specify dynamic data and then represent dynamic data within message payloads.
3. Sample Messages

This builds from an earlier contribution to the TMForum from Australia's NBNC0, which was adopted by B2B2X as best practice. The contributed document is called Product Definition Technical Specification and is available either from the NBNC0 web site or as part of the TMF B2B2X partnering documents.

Sample specifications and sample messages, showing the specification and the related messages with responses. This sample messages are in XML and JSON format and designed for carriage over the three transport layer options supported by the catalyst.

The project has demonstrated how the SID Characteristic Specification and Characteristic Value approach may be adapted for the different API technologies. Specifically for this project we are using a combination of PSA, B2B2X ebXML, and TMF Rest ordering API. We did also identify that both SOAP and JMS versions of OSS/J could also be used with a specification driven approach.

About the Project Champions

Project Champions have become involved in the project for a range of reasons, summarised as follows;

1. **Case 1 : B2B2X UPGRADE** The Champion has implemented B2B2X Touchpoints at an earlier time and now considering a SID supported dynamic interface, so that a new interface version is not required each time a new product is released. The dynamic API will allow the Champion to move to a catalog driven B2B, increasing agility and reducing lifecycle costs.
2. **Case 2: REGULATED SEPERATION** In this case the champion is required to integrate with multiple broadband suppliers via an industry regulated dynamic API as a result of structural separation and Industry change in their market. In order to achieve an automated, flow through outcome they have the challenge of

consuming different products from different network operators. A catalog driven approach is seen as essential. The Catalyst project has provided them with some experience and useful insight into dynamic API's and multi-supplier scenarios.

3. **Case 3: BUSINESS TRANSFORMATION** In this case, the champion is looking for business transformation by leveraging Network Function Virtualisation to reduce the cost of underlying network infrastructure and improve business agility. They are also seeking better asset re-use across their product portfolios' and a better way of tapping into the innovation which is coming out of data centres that they wish to partner with. B2B2X promises to provide them with a standardised way to operationally integrate and a catalog driven approach. So that they can utilise products from their suppliers catalog's as resources with which they can build their products. When applied to internal integration, this approach allows for better re-usability of infrastructure assets. Internal infrastructure can be packaged for re-sue by multiple internal parties. New products in the transformed organisation would be configured by packaging internal resources with externally sourced resources from partners.
4. **Case 4: Service Bundler** In this case the champion wishes to plug into partners and create a valuable bundles of product for business customers. B2B2X allows the bundler to treat supplier products as resources when dynamically building products for market

SID Best Practice Recommendation

Framework Project : Information Framework

This recommendation takes the SID core patterns : Entity Specification/ Entity, Entity Specification Characteristic / Entity Characteristic, Entity Specification Characteristic / Entity, SpecCharacteristicValue, Entity Specification Relationship ; and provides a method to apply them to address practical operational needs for B2B and API's around having multiple systems sharing product, service or resource definitions as well as managing types and versions.

Participants in the Australian NBN Marketplace and Ultra-Fast Fibre (New Zealand UFB) are presently utilising this specification format. The dynamic data section shows what these specifications are, how these specifications are used to create product definitions, what each of the characteristics within a speciation are, how to build a specification, what a specification instance formed from the definition looks like. With Examples in both XML and JSON.

TMForum Programs impacted by the recommendations

B2B2X Partnering Project

The B2B2X Partnering project is already an adopter of this method. The B2B2X developers guide points to the NBNC Co Product Definition Specification. The benefit to B2B2X is that additional documentation is being provided to spell out how product specifications are built from characteristics and properties.

Digital Ecosystem Project

TMF 620 *Catalog Rest API (supports allows for communication between catalog's)*

TMF622 *Product Ordering Rest API Specification 1.06*

These interface specifications also define Product Specification using the Characteristic patterns from the SID. This recommendations extended the approach by;

1. Extend use a more complete set of SID Core patterns.

2. Provides a structure with respect to the characteristics and their properties used to build a product specification
3. Defines actual characteristic types and properties that can be used to build a product definition.
4. Contributed documents spell out how to do it, including example specifications and messages in XML and JSON.
5. Provides a method to manage product specification types and versions.
6. Aligns the Catalog Interface to real world implementations, with multiple parties operating at scale.
7. Still leaves policies and rules in the hands of specific implementations, given that;
 - a. This has a lessor relevance to integration between organisations than the product specification which includes structure, characteristics, relationships and properties.
 - b. The various solutions have a different approach to rules and policies, making it difficult to achieve agreement and even more difficult to achieve adoption.

We believe that this deals with a number of the practical requirements for catalog integration.

Catalog Project

“The Industry requires a standardised mechanism for sharing data between catalog’s for the purpose of creating new product offerings from many services and resources.”

GB978 Catalog to Catalog Guidebook, OCT 2013 defines product, service and resource catalog’s and methods for exchange of information between these catalog types. On page 50, GB978 talks about product policies being used to define products and the difficulties in applying a standardised approach, given different vendors may have different methods for implementing these policies. This has also been an issue in implementing catalog driven B2B in the markets that have adopted the NBNC0 method. The solution has been to use a product specification, built from a standardised set of characteristic types & relationships with a standardised set of properties. This provides the definition and structure to which a message exchanged between organisations adhere, but then leaves rules that consider external factors or the values of more than one characteristic to be implemented as a separate policy or rule. This is the ideal balance between the practical decision required to make integration between trading partners work and the realities imposed by different technology implementations.

Another practical reality related to exchanging rules or policies between organisations is that while the Buyer needs to know and consider what the Supplier’s product rules are, the actual rules implemented by the Buyer always differ from the Suppliers rules.

For the Catalog project, adopting this method for product, service and resource definition enriches the project, supports the work already done within the project and provides a base of adopting organisations and vendors who are operating at some scale.

Benefits to TMF Programs

There is a requirement to have a method to define configuration items. These configuration items include, but are not limited to product definitions. The benefits of having a standardised method and format for configuration items include being able to share configuration items between systems within an organisation as well as between trading partners when they are of different organisations.

This recommendation of best practice for the SID. Is to utilise existing SID patterns to for specifications (template) to structure this dynamic data. The proposal is utilise specifications to create a definition Schema which defines configurable items like products using the following reusable SID patterns.

1. Entity Specification / Entity (ES/E)
2. Characteristic Specification / Characteristic Value (CS/CV).

3. Entity Specification Relationship

These definitions or specifications are then to be used as templates by IT systems.

An Industry wide approach to Product description allows Buyers and Suppliers to manage trading partner relationships and product types and versions across a marketplace.

The Industry needs the support of the TMForum to encourage a uniform approach. A buyer can use supplier product definitions and create their own products definitions which use the supplier product definition as an input.

Wide adoption of a machine-readable Product Definition will allow for more efficient and reusable business systems to be constructed.

Dynamic Data Specification

A **Specification** is a grouping construct which provides structure to the dynamic data patterns (Characteristic Specification / Characteristic Value) available within the TMForum Information Model (SID).

Use cases for a specification include;

Applying structure to stored dynamic data, where a specification of a given type and version is used when writing the dynamic data. The same specification type and version needs to be used to interpret the dynamic data when reading.

Providing a "contract" for dynamic data exchanges between systems, including between organisations. A message is formed to be compliant to the specification and can then be interpreted or read using the specification as a template.

Rendering User Interfaces; A specification contains the base information required to render a user interface. Data collected from the User Interface forms a specification instance. This specification instance can then be used within messages for exchange with other systems, which also utilised the same type and version of the specification.

Specification Instances

A **Specification Instance** is the data captured when using the specification as a template. For example a product specification provides a template for a product order. The product specification instance is the product information within the order itself.

Characteristics

Characteristic Types

Currently, four characteristic types have been defined to build and model Specifications. Further detail of these types is provided below:

- Enumeration
- Key Value
- Range
- Collection

These are explained more fully in the detailed sections for each characteristic type.

Characteristic Properties

A characteristic property controls the isolated behaviour of the characteristic. Properties are described as follows;

Cardinality

Cardinality controls the number of instances of the characteristic within the specification instance. The minimum cardinality value is the minimum number of characteristic instances required. For example if the minimum cardinality is one then one instance must be provided in order for the specification instance to be compliant to the specification. Or another way of considering it is that in a field that providing a value is mandatory.

A specification instance can have characteristic instances up to the maximum number specified in the cardinality instance property. This is useful in dealing with multiplicity relationships like number of logical or physical ports on a piece of network equipment for example.

Default Value

The default value of the characteristic can be set automatically within the specification instance. The value of the characteristic is still able to be overwritten by the user. In the case of an Enumeration the default value of the characteristic is indicated against the applicable value in the enumerated list.

Unit of Measure (UOM)

The Unit of Measure is a user defined String that can be applied to provide further information on a characteristic and can be any character. For example a Unit of Measure can be applied to a price characteristic as "USD".

Read Only

The Read Only property allows the characteristic to be defined and visible, but not editable by the user. For example, the price of a product may be displayed, but not editable by the user.

Characteristic Types Detail

Enumeration

A list of values to select from of a given type (ie. String, Integer, Float, etc) from which a single value may be selected. The enumerated list may have optional properties applied including being made read only, having a default value, or units of measure for each value.

Service Template

Please Select ▼

Please Select

Bitstream 2 100/50 10/2.5

Bitstream 2 100/50 2.5/2.5

Bitstream 2 30/10 5/5

Supported Value Types

Type	Possible Values	Example
String	any String of characters	aString
Float	a number up to 7 decimal points	1.1234567
Integer	any whole number	8
DateTime	DD/MM/YYYY	14/01/2014

Properties of an Enumeration Characteristic

Property	Description
Read Only	Makes the value Read Only.
Unit of Measure	Applies a Unit of Measure to the field.
Default Value	Sets a value in the enumeration as the default.
Cardinality	Sets multiplicity as a range.

Enumeration XML Example

The XML code extract below is an example of the XML structure of the Enumeration specification characteristic in a Specification template. Note that all available supported types and properties of the types are defined in the XML structure. The user is able to select a value from the enumeration that will form part of the Specification Instance.

Enumeration

```

...
<SpecCharacteristic>
  <ID>Service Template</ID>          <!-- Unique Identifying ID of the Characteristic -->
  <Name>Service Template</Name>      <!-- Name of the Characteristic -->
  <Description />
  <Type>Enumerated</Type>           <!-- Characteristic Type defined -->
  <ReadOnly>>false</ReadOnly>         <!-- Read Only, value to true/false -->
  <MinCardinality>1</MinCardinality> <!-- Setting Min and Max Cardinality a minimum
of >1 makes it mandatory for for the number-->
  <MaxCardinality>1</MaxCardinality> <!-- multiples allowed to maximum Cardinality

```

```

<SpecCharacteristicValues>
  <SpecCharacteristicValue>      <!-- Defining a value of the Enumeration -->
    <Value>Bitstream 2 100/50 10/2.5</Value><!-- First Enumeration value -->
    <ValueType>String</ValueType> <!-- see supported value types -->
    <Default>false</Default>      <!-- not default, (property of the value) -->
    <UnitOfMeasure>EA</UnitOfMeasure>
  <SpecCharValueRelationships />
</SpecCharacteristicValue>
<SpecCharacteristicValue>
  <Value>Bitstream 2 100/50 2.5/2.5</Value> <!-- Second Enumeration value -->
  <ValueType>String</ValueType>             <!-- of type String -->
  <Default>false</Default>                 <!-- that is not the default -->
  <SpecCharValueRelationships />
</SpecCharacteristicValue>
<SpecCharacteristicValue>
  <Value>Bitstream 2 30/10 5/5</Value>     <!-- Third Enumeration value -->
  <ValueType>String</ValueType>             <!-- of type String -->
  <Default>false</Default>                 <!-- that is not the default -->
  <SpecCharValueRelationships />
</SpecCharacteristicValue>
</SpecCharacteristicValues>
<SpecCharacteristicRelationships />
</SpecCharacteristic>

```

...

Key Value

Name and Value that conforms to given data type (String, Integer, Float, DateTime). The Key Value may have optional properties applied including being made read only, having a default value, or units of measure for each value.

Super Fast Form
✕

Price (NZD)

Supported Value Types

Type	Possible Values	Example
String	a	aString
Boolean	1 or 0	1 (may be represented by a check box)
Float	a number up to 7 decimal points	1.1234567
Integer	any whole number	8
DateTime	DD/MM/YYYY	14/01/2014

Properties of Key Value Characteristics

Property	Description
----------	-------------

Read Only Makes the value Read Only.

Unit of Measure Applies a Unit of Measure to the field.

Default Value Sets a default value.

Cardinality Sets multiplicity as a range.

Key Value XML Example

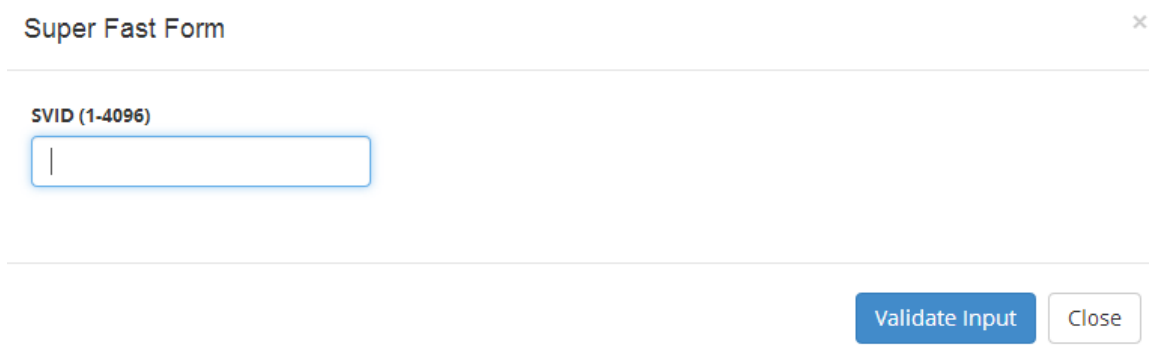
The code extract below is an example of the XML structure of the KeyValue specification characteristic in a Specification Template. Note that supported types and properties of the types are defined in the XML structure.

KeyValue

```
...
<SpecCharacteristic>
  <ID>Price</ID>                                <!-- Unique Identifying ID of the Characteristic -->
  <Name>Price</Name>                             <!-- Name of the Characteristic -->
  <Description />
  <Type>KeyValue</Type>                         <!-- Characteristic Type defined -->
  <ReadOnly>>false</ReadOnly>                   <!-- Setting Read Only to false -->
  <MinCardinality>0</MinCardinality>           <!-- Setting min/max Cardinality -->
  <MaxCardinality>1</MaxCardinality>
  <SpecCharacteristicValues>
    <SpecCharacteristicValue>                 <!-- Defining the structure of the KeyValue -->
      <ValueType>String</ValueType>           <!-- Setting the type as String -->
      <DefaultValue>00.00</DefaultValue>     <!--with a default value of "00.00 ->
      <UnitOfMeasure>NZD</UnitOfMeasure>     <!-- Unit of Measure as "NZD" -->
      <SpecCharValueRelationships />
    </SpecCharacteristicValue>
  </SpecCharacteristicValues>
  <SpecCharacteristicRelationships />
</SpecCharacteristic>
...
```

Range

A Key Value that accepts a single numeric value within a constrained range. The Key Value may have optional properties applied including being made read only, having a default value, or units of measure for each value.



Supported Types

Type	Possible Values	Example
Float	a number up to 7 decimal points	1.1234567

Properties of Range Characteristics

Property	Description
Read Only	Makes the value Read Only.
Unit of Measure	Applies a Unit of Measure to the field.
Default Value	Sets a default value.
Cardinality	Sets multiplicity as a range.

Range XML Example

The code extract below is an example of the XML structure of the Range specification characteristic in a Specification Template. Note that supported types and properties of the types are defined in the XML structure.

Range

```

...
<SpecCharacteristic>
  <ID>SVID</ID>                                <!-- Unique Identifying ID of the Characteristic -->
  <Name>SVID</Name>                             <!-- Name of the Characteristic -->
  <Description />
  <Type>Range</Type>                            <!-- Characteristic Type defined -->
  <ReadOnly>>false</ReadOnly>                    <!-- Setting Read Only to false -->
  <MinCardinality>0</MinCardinality>           <!-- Setting min/max Cardinality -->
  <MaxCardinality>1</MaxCardinality>
  <SpecCharacteristicValues>
    <SpecCharacteristicValue>
      <ValueType>Integer</ValueType>           <!-- structure of the Range -->
      <ValueFrom>1</ValueFrom>                 <!-- confines of the Range -->
      <ValueTo>4096</ValueTo>
      <SpecCharValueRelationships />
    </SpecCharacteristicValue>
  </SpecCharacteristicValues>
  <SpecCharacteristicRelationships />
</SpecCharacteristic>
...

```

Collection

A Collection is a characteristic that enables other characteristics to be created as children and be grouped. For example, a Collection of User Details could be created with children characteristics of First Name, Last Name and Phone Number. The grouping formed with collections is used a range of purposes including for presentation and to support rules, allowing a rule to be applied to a parent and apply to each of the child characteristics.

User Details

First Name *	Last Name *	Phone Number *
<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>	<input style="width: 90%;" type="text"/>

Properties of Collection Characteristic

Property	Description
----------	-------------

Cardinality	Sets multiplicity as a range.
-------------	-------------------------------

Collection XML Example

The code extract below is an example of the XML structure of the Collection specification characteristic in a Specification template.

Collection

```

...
<SpecCharacteristics>
  <SpecCharacteristic>
    <ID>User Details</ID>      <!-- Unique Identifying ID of the Characteristic -->
    <Name>User Details</Name>  <!-- Name of the Characteristic -->
    <Description/>
    <Type>Collection</Type>    <!-- Characteristic Type defined -->
    <ReadOnly>false</ReadOnly> <!-- Setting Read Only to false -->
    <MinCardinality>1</MinCardinality> <!-- Setting min/max Cardinality -->
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues/>
    <SpecCharacteristicRelationships>
      <SpecCharacteristicRelationship>
        <SpecCharacteristic> <!-- Child characteristic in the Collection ->
          <ID>First Name</ID>
          <Name>First Name</Name>
          <Description/>
          <Type>KeyValue</Type>
          <ReadOnly>false</ReadOnly>
          <MinCardinality>1</MinCardinality>
          <MaxCardinality>1</MaxCardinality>
          <SpecCharacteristicValues>
            <SpecCharacteristicValue>
              <ValueType>String</ValueType>
              <Default>false</Default>
              <SpecCharValueRelationships/>
            </SpecCharacteristicValue>
          </SpecCharacteristicValues>
        </SpecCharacteristic>
      </SpecCharacteristicRelationship>
    </SpecCharacteristicRelationships>
  </SpecCharacteristic>
</SpecCharacteristics>
  <SpecCharacteristicRelationship>
    <SpecCharacteristicRelationship>
      <SpecCharacteristic> <!-- Child characteristic in the Collection -->
        <ID>Last Name</ID>
        <Name>Last Name</Name>
        <Description/>
        <Type>KeyValue</Type>
        <ReadOnly>false</ReadOnly>
      </SpecCharacteristic>
    </SpecCharacteristicRelationship>
  </SpecCharacteristicRelationship>

```

```

        <MinCardinality>1</MinCardinality>
        <MaxCardinality>1</MaxCardinality>
        <SpecCharacteristicValues>
            <SpecCharacteristicValue>
                <ValueType>String</ValueType>
                <Default>>false</Default>
                <SpecCharValueRelationships/>
            </SpecCharacteristicValue>
        </SpecCharacteristicValues>
        <SpecCharacteristicRelationships/>
    </SpecCharacteristic>
</SpecCharacteristicRelationship>
<SpecCharacteristicRelationship>
    <SpecCharacteristic>                                !-- Child characteristic in the Collection -->
        <ID>Phone Number</ID>
        <Name>Phone Number</Name>
        <Description/>
        <Type>KeyValue</Type>
        <ReadOnly>>false</ReadOnly>
        <MinCardinality>1</MinCardinality>
        <MaxCardinality>1</MaxCardinality>
        <SpecCharacteristicValues>
            <SpecCharacteristicValue>
                <ValueType>String</ValueType>
                <Default>>false</Default>
                <SpecCharValueRelationships/>
            </SpecCharacteristicValue>
        </SpecCharacteristicValues>
        <SpecCharacteristicRelationships/>
    </SpecCharacteristic>
</SpecCharacteristicRelationship>
</SpecCharacteristicRelationships>
</SpecCharacteristic>
</SpecCharacteristics>
...

```

Specification XML Order Message Example

The XML extract below is an example of the XML structure of a Product Specification Instance.

```

...
<ID>ORD000000887897</ID>
<AccessSeekerInteraction>
    <ID>ORD000000887897</ID>
    <billingAccountID>PTR000000000019</billingAccountID>
</AccessSeekerInteraction>
<description/>
<BusinessInteractionLocation/>
<BusinessInteractionRelationship/>
<Note>
    <name>Order Note</name>
    <description/>
    <noteType>CustomerFacing</noteType>
    <CreatorName>Sally Fields</CreatorName>
    <CreationDate>2013-12-09T00:43:48Z</CreationDate>
</Note>
<orderType>Connect</orderType>
<ProductOrderComprisedOf>
    <quantity>
        <amount>1</amount>
    </quantity>
    <action>ADD</action>
    <AccessSeekerInteractionItem/>
    <ItemInvolvesLocation>
        <Place xsi:type="pla:TCFLocation">
            <ID>LOC000001807002</ID>
            <DescribedBy>
                <value>WANGANUI</value>
                <Characteristic>
                    <ID>Region</ID>
                </Characteristic>
            </DescribedBy>
        </Place>
    </ItemInvolvesLocation>
</ProductOrderComprisedOf>

```

```

    </DescribedBy>
    <Geocode/>
    <PhysicalAddress>
      <StreetNumber>2</StreetNumber>
      <StreetName>PORTAL</StreetName>
      <StreetType>STREET</StreetType>
      <Suburb>DURIE HILL</Suburb>
      <City>WANGANUI</City>
      <postcode>4500</postcode>
    </PhysicalAddress>
  </Place>
</ItemInvolvesLocation>
<ItemInvolvesProduct>
  <name>Bitstream 2</name>
  <DescribedBy>
    <value>Bitstream 2 100/50 10/2.5</value>
    <Characteristic>
      <ID>Service Template</ID>
      <name>Service Template</name>
    </Characteristic>
  </DescribedBy>
  <DescribedBy>
    <value>58.75</value>
    <Characteristic>
      <ID>Price</ID>
      <name>Price</name>
    </Characteristic>
  </DescribedBy>
  <DescribedBy>
    <value>None</value>
    <Characteristic>
      <ID>Enhanced Service Level</ID>
      <name>Enhanced Service Level</name>
    </Characteristic>
  </DescribedBy>
  <DescribedBy>
    <value>None</value>
    <Characteristic>
      <ID>Diversity</ID>
      <name>Diversity</name>
    </Characteristic>
  </DescribedBy>
  <DescribedBy>
    <value/>
    <Characteristic>
      <ID>E-NNI Port</ID>
      <name>E-NNI Port</name>
    </Characteristic>
  </DescribedBy>
  <DescribedBy>
    <value/>
    <Characteristic>
      <ID>End User (Customer) Details</ID>
      <name>End User (Customer) Details</name>
    </Characteristic>
  <CharacteristicValueReferences>
    <value>John Smith</value>
    <Characteristic>
      <ID>Customer Name</ID>
      <name>Customer Name</name>
    </Characteristic>
  </CharacteristicValueReferences>
  <CharacteristicValueReferences>
    <value/>
    <Characteristic>
      <ID>Business Name</ID>
      <name>Business Name</name>
    </Characteristic>
  </CharacteristicValueReferences>
  <CharacteristicValueReferences>
    <value>0423444332</value>
    <Characteristic>

```



```

        <ID>Contact Number</ID>
        <name>Contact Number</name>
    </Characteristic>
</CharacteristicValueReferences>
<CharacteristicValueReferences>
    <value/>
    <Characteristic>
        <ID>Alternate Contact Number</ID>
        <name>Alternate Contact Number</name>
    </Characteristic>
</CharacteristicValueReferences>
<CharacteristicValueReferences>
    <value>>false</value>
    <Characteristic>
        <ID>Non Building Access Point</ID>
        <name>Non Building Access Point</name>
    </Characteristic>
</CharacteristicValueReferences>
<CharacteristicValueReferences>
    <value>>false</value>
    <Characteristic>
        <ID>Building Owner Consent Obtained</ID>
        <name>Building Owner Consent Obtained</name>
    </Characteristic>
</CharacteristicValueReferences>
<CharacteristicValueReferences>
    <value>>false</value>
    <Characteristic>
        <ID>End User Location is MUC</ID>
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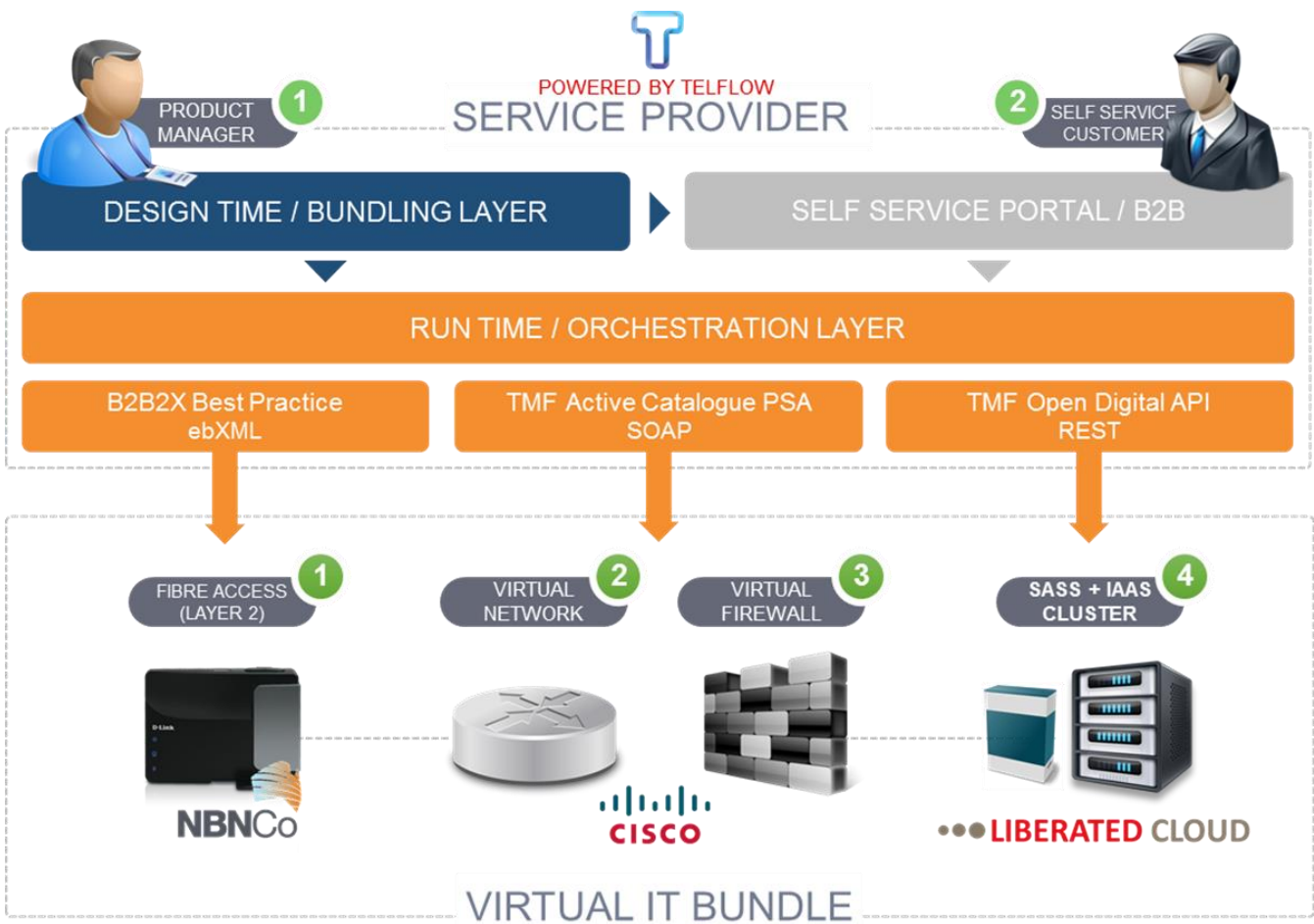
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  <category>Product Specification</category>
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</validFor>
<ProductOffering>
  <ID>POF0000000000000</ID>
</ProductOffering>
  </ItemInvolvesProduct>
</ProductOrderComprisedOf>
<AccessSeekerContact>
  <contactName>Greg Williams</contactName>
  <emailAddress>gwilliams@gmail.com</emailAddress>
</AccessSeekerContact>
</ProductOrder>
</ManageProductOrderRequest>
...

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Sample Specifications and Messages

Consider the Catalyst context diagram below. Sample specifications and messages are supplied as appendices.



Referring to the project over diagram above, samples are provided as following Appendices

1. Specification of the virtual IT bundle
2. Specification of Fibre Access Service
3. Sample Message, Fibre Access Service
4. Specification Cisco Virtual Data Centre
5. Sample message, Cisco virtual data centre
6. Specification Infrastructure as a service,
7. Sample Message, Infrastructure as a Service

ADDITIONAL RESOURCES

TM Forum B2B2X Partnering Accelerator

<http://www.tmforum.org/B2B2XPartneringAccelerator/15671/home.html>

DGIT TELFLOW

www.telflow.com

SID BEST PRACTICE

<http://dgit.biz/telflow-dynamic-product-implementation-contributed-to-the-tmforum/>

CISCO

<http://www.cisco.com/c/en/us/products/cloud-systems-management/prime-fulfillment/index.html>

Appendix 1 : Specification of the virtual IT bundle

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Appendix 2 – Specification of the Fibre Access Service

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Appendix 3 Sample Message, Fibre Access Service

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  xmlns:bin="http://www.nbnco.com.au/cim/common/businessInteraction/v4"
  xmlns:dns="http://www.nbnco.com.au/cim/manageProductOrder/v4"
  xmlns:msg="http://www.nbnco.com.au/cim/common/message/v4"
  xmlns:pla="http://www.nbnco.com.au/cim/common/place/v3"
  xmlns:prd="http://www.nbnco.com.au/cim/common/product/v4"
  xmlns:prj="http://www.nbnco.com.au/cim/common/project/v4"
  xmlns:rbe="http://www.nbnco.com.au/cim/common/rootBusinessEntity/v3"
  xmlns:res="http://www.nbnco.com.au/cim/common/resource/v3"
  xmlns:srv="http://www.nbnco.com.au/cim/common/service/v3"
  xmlns:tme="http://www.nbnco.com.au/cim/common/time/v4"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
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  <value>Standard</value>
  <Characteristic>
    <ID>Service Restoration SLA</ID>
    <type>NFAS</type>
  </Characteristic>
</DescribedBy>
<SpecifiedBy>
  <ID>TPL070000518001</ID>
  <version>2.3</version>
  <type>Product Specification</type>
  <category>Product Specification</category>
</SpecifiedBy>
</ItemInvolvesProduct>
<ReferencesProductOrderItem>
  <action>NO CHANGE</action>
  <ItemInvolvesProduct>
    <ID>NTD000765821494</ID>
    <SpecifiedBy>
      <ID>NTD</ID>
      <version>1.0</version>
      <type>Resource Specification</type>
      <category>Product Specification</category>
    </SpecifiedBy>
  </ItemInvolvesProduct>
  <ReferencesProductOrderItem>
    <action>ADD</action>
    <ItemInvolvesProduct>
      <DescribedBy>
        <value>0</value>
        <Characteristic>
          <ID>Port Id</ID>
          <type>UNID</type>
        </Characteristic>
      </DescribedBy>
      <DescribedBy>
        <value>Auto Negotiation (10/100/1000Mbps, Half/Full Duplex)</value>
        <Characteristic>
          <ID>Speed and Duplex</ID>
          <type>UNID</type>
        </Characteristic>
      </DescribedBy>
      <SpecifiedBy>
        <ID>UNID</ID>
        <version>1.0</version>
        <type>Resource Specification</type>
        <category>Product Specification</category>
      </SpecifiedBy>
    </ItemInvolvesProduct>
  </ReferencesProductOrderItem>
<ReferencesProductOrderItem>
  <action>ADD</action>
  <ItemInvolvesProduct>
    <DescribedBy>
      <value>0</value>
      <Characteristic>
        <ID>Port Id</ID>
        <type>UNIV</type>
      </Characteristic>
    </DescribedBy>
  </ItemInvolvesProduct>

```

```

    </DescribedBy>
    <SpecifiedBy>
      <ID>UNIV</ID>
      <version>1.0</version>
      <type>Resource Specification</type>
      <category>Product Specification</category>
    </SpecifiedBy>
  </ItemInvolvesProduct>
</ReferencesProductOrderItem>
</ReferencesProductOrderItem>
<ReferencesProductOrderItem>
  <action>ADD</action>
  <ItemInvolvesProduct>
    <DescribedBy>
      <value>D100_U40_Mbps_TC4_P</value>
      <Characteristic>
        <ID>Bandwidth Profile</ID>
        <type>AVCD</type>
      </Characteristic>
    </DescribedBy>
    <DescribedBy>
      <value>Inactive</value>
      <Characteristic>
        <ID>Access Loop Identification</ID>
        <type>AVCD</type>
      </Characteristic>
    </DescribedBy>
    <DescribedBy>
      <value>CVC012345678901</value>
      <Characteristic>
        <ID>CVC Id</ID>
        <type>AVCD</type>
      </Characteristic>
    </DescribedBy>
    <DescribedBy>
      <value>0</value>
      <Characteristic>
        <ID>NNI CVLAN Id</ID>
        <type>AVCD</type>
      </Characteristic>
    </DescribedBy>
    <SpecifiedBy>
      <ID>AVCD</ID>
      <version>1.0</version>
      <type>Service Specification</type>
      <category>Product Specification</category>
    </SpecifiedBy>
  </ItemInvolvesProduct>
</ReferencesProductOrderItem>
</ReferencesProductOrderItem>
<ReferencesProductOrderItem>
  <action>ADD</action>
  <ItemInvolvesProduct>
    <DescribedBy>
      <value>CVC001122334455</value>
      <Characteristic>
        <ID>CVC Id</ID>
        <type>AVCV</type>
      </Characteristic>
    </DescribedBy>
    <SpecifiedBy>
      <ID>AVCV</ID>
      <version>1.0</version>
      <type>Service Specification</type>
      <category>Product Specification</category>
    </SpecifiedBy>
  </ItemInvolvesProduct>
</ReferencesProductOrderItem>

```

```

</ProductOrderComprisedOf>
</ProductOrder>
</dns:ManageProductOrderRequest>

```

Appendix 4 Specification, Cisco Virtual Data Centre

```

<Specification>
  <ID>SPC000000003399</ID>
  <Name>Prime Virtual Network</Name>
  <Version>1.0</Version>
  <DescribedBy/>
  <Type>SupplierPartner</Type>
  <Status>Draft</Status>
  <SpecCharacteristics>
    <SpecCharacteristic>
      <ID>Organisation Name</ID>
      <Name>Organisation Name</Name>
      <Description/>
      <Type>KeyValue</Type>
      <ReadOnly>>false</ReadOnly>
      <MinCardinality>0</MinCardinality>
      <MaxCardinality>1</MaxCardinality>
      <SpecCharacteristicValues>
        <SpecCharacteristicValue>
          <ValueType>String</ValueType>
          <Default>>false</Default>
          <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
      </SpecCharacteristicValues>
      <SpecCharacteristicRelationships/>
    </SpecCharacteristic>
    <SpecCharacteristic>
      <ID>Tenant Name</ID>
      <Name>Tenant Name</Name>
      <Description/>
      <Type>KeyValue</Type>
      <ReadOnly>>false</ReadOnly>
      <MinCardinality>0</MinCardinality>
      <MaxCardinality>1</MaxCardinality>
      <SpecCharacteristicValues>
        <SpecCharacteristicValue>
          <ValueType>String</ValueType>
          <Default>>false</Default>
          <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
      </SpecCharacteristicValues>
      <SpecCharacteristicRelationships/>
    </SpecCharacteristic>
    <SpecCharacteristic>
      <ID>Topology Name</ID>
      <Name>Topology Name</Name>
      <Description/>
      <Type>Enumerated</Type>
      <ReadOnly>>false</ReadOnly>
      <MinCardinality>1</MinCardinality>
      <MaxCardinality>1</MaxCardinality>
      <SpecCharacteristicValues>
        <SpecCharacteristicValue>
          <Value>Single Zone</Value>
          <ValueType>String</ValueType>
          <Default>>false</Default>
          <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
        <SpecCharacteristicValue>

```

```

        <Value>Dual Zone</Value>
        <ValueType>String</ValueType>
        <Default>true</Default>
        <SpecCharValueRelationships/>
    </SpecCharacteristicValue>
</SpecCharacteristicValues>
<SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>VPN Name</ID>
    <Name>VPN Name</Name>
    <Description/>
    <Type>KeyValue</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>0</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <ValueType>String</ValueType>
            <Default>>false</Default>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>VRF Name</ID>
    <Name>VRF Name</Name>
    <Description/>
    <Type>KeyValue</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>0</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <ValueType>String</ValueType>
            <Default>>false</Default>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Scale Factor HWM</ID>
    <Name>Scale Factor HWM</Name>
    <Description/>
    <Type>Enumerated</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>1</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <Value>70</Value>
            <ValueType>Integer</ValueType>
            <Default>>false</Default>
            <UnitOfMeasure></UnitOfMeasure>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
        <SpecCharacteristicValue>
            <Value>80</Value>
            <ValueType>Integer</ValueType>
            <Default>true</Default>
            <UnitOfMeasure>%</UnitOfMeasure>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
        <SpecCharacteristicValue>
            <Value>90</Value>

```

```

        <ValueType>Integer</ValueType>
        <Default>>false</Default>
        <UnitOfMeasure>%</UnitOfMeasure>
        <SpecCharValueRelationships/>
    </SpecCharacteristicValue>
</SpecCharacteristicValues>
<SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Scale Factor LWM</ID>
    <Name>Scale Factor LWM</Name>
    <Description/>
    <Type>Enumerated</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>1</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <Value>10</Value>
            <ValueType>Integer</ValueType>
            <Default>>false</Default>
            <UnitOfMeasure>%</UnitOfMeasure>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
        <SpecCharacteristicValue>
            <Value>20</Value>
            <ValueType>Integer</ValueType>
            <Default>>true</Default>
            <UnitOfMeasure>%</UnitOfMeasure>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
        <SpecCharacteristicValue>
            <Value>30</Value>
            <ValueType>Integer</ValueType>
            <Default>>false</Default>
            <UnitOfMeasure>%</UnitOfMeasure>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Scale Factor Min</ID>
    <Name>Scale Factor Min</Name>
    <Description/>
    <Type>Range</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>1</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <ValueType>Integer</ValueType>
            <ValueFrom>1</ValueFrom>
            <ValueTo>20</ValueTo>
            <DefaultValue>1</DefaultValue>
            <Default>>false</Default>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Scale Factor Max</ID>
    <Name>Scale Factor Max</Name>
    <Description/>
    <Type>Range</Type>
    <ReadOnly>>false</ReadOnly>

```

```

    <MinCardinality>1</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
      <SpecCharacteristicValue>
        <ValueType>Integer</ValueType>
        <ValueFrom>5</ValueFrom>
        <ValueTo>40</ValueTo>
        <DefaultValue>5</DefaultValue>
        <Default>>false</Default>
        <SpecCharValueRelationships/>
      </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
  </SpecCharacteristic>
</SpecCharacteristic>
  <ID>Scale Factor Spare</ID>
  <Name>Scale Factor Spare</Name>
  <Description/>
  <Type>Range</Type>
  <ReadOnly>>false</ReadOnly>
  <MinCardinality>0</MinCardinality>
  <MaxCardinality>1</MaxCardinality>
  <SpecCharacteristicValues>
    <SpecCharacteristicValue>
      <ValueType>Integer</ValueType>
      <ValueFrom>0</ValueFrom>
      <ValueTo>5</ValueTo>
      <DefaultValue>0</DefaultValue>
      <Default>>false</Default>
      <SpecCharValueRelationships/>
    </SpecCharacteristicValue>
  </SpecCharacteristicValues>
  <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
  <ID>Gateway IP</ID>
  <Name>Gateway IP</Name>
  <Description/>
  <Type>KeyValue</Type>
  <ReadOnly>>false</ReadOnly>
  <MinCardinality>0</MinCardinality>
  <MaxCardinality>1</MaxCardinality>
  <SpecCharacteristicValues>
    <SpecCharacteristicValue>
      <ValueType>String</ValueType>
      <Default>>false</Default>
      <SpecCharValueRelationships/>
    </SpecCharacteristicValue>
  </SpecCharacteristicValues>
  <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
  <ID>Subnet Size</ID>
  <Name>Subnet Size</Name>
  <Description/>
  <Type>Enumerated</Type>
  <ReadOnly>>false</ReadOnly>
  <MinCardinality>0</MinCardinality>
  <MaxCardinality>1</MaxCardinality>
  <SpecCharacteristicValues>
    <SpecCharacteristicValue>
      <Value>8</Value>
      <ValueType>String</ValueType>
      <Default>>false</Default>
      <SpecCharValueRelationships/>
    </SpecCharacteristicValue>
  <SpecCharacteristicValue>

```

```

        <Value>16</Value>
        <ValueType>String</ValueType>
        <Default>>false</Default>
        <SpecCharValueRelationships/>
    </SpecCharacteristicValue>
</SpecCharacteristicValue>
    <Value>24</Value>
    <ValueType>String</ValueType>
    <Default>>true</Default>
    <SpecCharValueRelationships/>
</SpecCharacteristicValue>
</SpecCharacteristicValues>
<SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Network Address</ID>
    <Name>Subnet Start</Name>
    <Description/>
    <Type>KeyValue</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>0</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <ValueType>String</ValueType>
            <Default>>false</Default>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
</SpecCharacteristics>
<SpecificationRelationships/>
<Process>nfv-iaas</Process>
<Class>VirtualNetwork</Class>
<SpecificationTags/>
</Specification>

```

Appendix 5 – Sample Message Cisco Virtual Data Centre

```

<soapenv:Envelope
  xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:tran="http://psainitiative.org/wsd/Transactions"
  xmlns:tran1="http://psainitiative.org/TransactionsOperations"
  xmlns:tran2="http://psainitiative.org/Transactions">
  <soapenv:Header/>
  <soapenv:Body>
    <tran:TransactionRequest>
      <tran1:request transactionName="Create">
        <tran2:identification requestorServiceID="dd65b73b-8b2e-428c-a575-547b953378a0"
          requestorOperationID="44c12b4a-197b-4e41-aaeb-8cfd596fefaf"
          requestingSystemName="Telflow"/>
        <tran2:items>
          <tran2:item name="MozartCall" version="1.0" instancename="Telflow-B2B">
            <tran2:parameters>
              <tran2:parameter name="Scale Factor Min" value="1"/>
              <tran2:parameter name="Scale Factor LWM" value="20"/>
              <tran2:parameter name="Scale Factor Spare" value="1"/>
              <tran2:parameter name="Scale Factor Max" value="5"/>
              <tran2:parameter name="Subnet Size" value="24"/>
              <tran2:parameter name="Scale Factor HWM" value="80"/>
              <tran2:parameter name="Topology Name" value="Dual Zone"/>
            </tran2:parameters>
          </tran2:item>
        </tran2:items>
      </tran1:request>
    </tran:TransactionRequest>
  </soapenv:Body>
</soapenv:Envelope>

```



```

    </tran2:items>
  </tran1:request>
  <tran1:routing address="http://192.168.139.145:7001/TestServices/services/iQuery" protocol="WS-RPC"/>
</tran:TransactionRequest>
</soapenv:Body>
</soapenv:Envelope>

```

Appendix 6 – Liberated Cloud IAAS Specification

```

<Specification>
  <ID>SPC000000003489</ID>
  <Name>Cloud Storage</Name>
  <Version>1.0</Version>
  <DescribedBy/>
  <Type>SupplierPartner</Type>
  <Status>Draft</Status>
  <SpecCharacteristics>
    <SpecCharacteristic>
      <ID>Cloud Storage Name</ID>
      <Name>Name</Name>
      <Description/>
      <Type>KeyValue</Type>
      <ReadOnly>>false</ReadOnly>
      <MinCardinality>0</MinCardinality>
      <MaxCardinality>1</MaxCardinality>
      <SpecCharacteristicValues>
        <SpecCharacteristicValue>
          <ValueType>String</ValueType>
          <Default>>false</Default>
          <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
      </SpecCharacteristicValues>
      <SpecCharacteristicRelationships/>
    </SpecCharacteristic>
    <SpecCharacteristic>
      <ID>Cloud Storage Type</ID>
      <Name>Type</Name>
      <Description/>
      <Type>KeyValue</Type>
      <ReadOnly>>false</ReadOnly>
      <MinCardinality>0</MinCardinality>
      <MaxCardinality>1</MaxCardinality>
      <SpecCharacteristicValues>
        <SpecCharacteristicValue>
          <ValueType>String</ValueType>
          <Default>>false</Default>
          <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
      </SpecCharacteristicValues>
      <SpecCharacteristicRelationships/>
    </SpecCharacteristic>
    <SpecCharacteristic>
      <ID>Location</ID>
      <Name>Location</Name>
      <Description/>
      <Type>KeyValue</Type>
      <ReadOnly>>false</ReadOnly>
      <MinCardinality>0</MinCardinality>
      <MaxCardinality>1</MaxCardinality>
      <SpecCharacteristicValues>
        <SpecCharacteristicValue>
          <ValueType>String</ValueType>
          <Default>>false</Default>
          <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
      </SpecCharacteristicValues>
    </SpecCharacteristic>
  </SpecCharacteristics>
</Specification>

```

```

        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Cloud Storage Size</ID>
    <Name>Size</Name>
    <Description/>
    <Type>KeyValue</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>0</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <ValueType>String</ValueType>
            <Default>>false</Default>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Encryption</ID>
    <Name>Encryption</Name>
    <Description/>
    <Type>KeyValue</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>0</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <ValueType>Boolean</ValueType>
            <Default>>false</Default>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Redundancy Location</ID>
    <Name>Redundancy Location</Name>
    <Description/>
    <Type>KeyValue</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>0</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <ValueType>String</ValueType>
            <Default>>false</Default>
            <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
<SpecCharacteristic>
    <ID>Clustered</ID>
    <Name>Clustered</Name>
    <Description/>
    <Type>KeyValue</Type>
    <ReadOnly>>false</ReadOnly>
    <MinCardinality>0</MinCardinality>
    <MaxCardinality>1</MaxCardinality>
    <SpecCharacteristicValues>
        <SpecCharacteristicValue>
            <ValueType>String</ValueType>
            <Default>>false</Default>

```

```

        <SpecCharValueRelationships/>
        </SpecCharacteristicValue>
    </SpecCharacteristicValues>
    <SpecCharacteristicRelationships/>
</SpecCharacteristic>
</SpecCharacteristics>
</SpecificationRelationships/>
<Process>nfv-iaas</Process>
<SpecificationTags/>
</Specification>

```

Appendix 7 – Sample Message IAAS

```

{
  "externalID": "ORD000000007488",
  "description": "",
  "type": "commercial",
  "requestedCompletionDate": "2014-07-12",
  "relatedParties": [
    {
      "role": "customer",
      "reference": "MSISDN-0033689770600"
    },
    {
      "role": "partner",
      "reference": "http://192.170.139.240:5000/partnerManagement/partner/451"
    }
  ],
  "orderItems": [
    {
      "action": "add",
      "productOffering": {
        "id": "http://192.170.139.240:5000/catalogManagement/productOffering/8675309"
      },
      "product": {
        "productCharacteristics": [
          {
            "name": "Name",
            "value": "CD"
          },
          {
            "name": "Redundancy Location",
            "value": "London"
          },
          {
            "name": "Type",
            "value": "Elastic"
          },
          {
            "name": "Encryption",
            "value": "true"
          },
          {
            "name": "Location",
            "value": "Sydney"
          },
          {
            "name": "Verified Attributes",
            "value": "true"
          }
        ]
      }
    }
  ]
}

```

}