

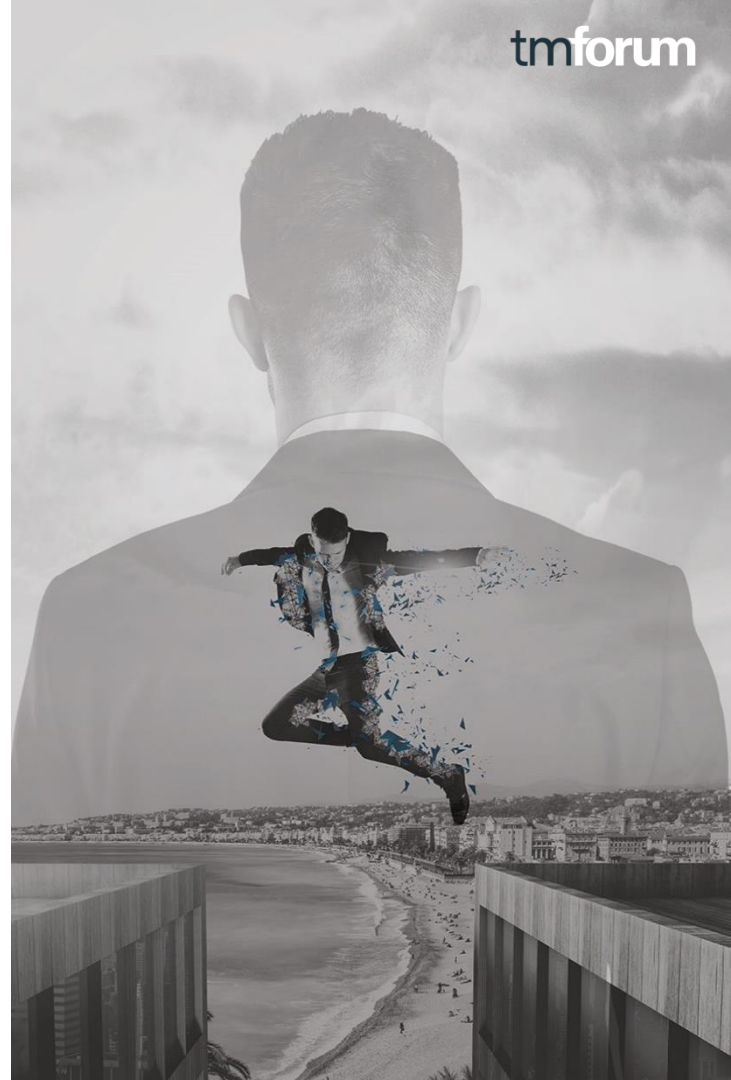


Automating Network as a Service

Using Operational Domain Management (ODM), TM Forum Open APIs and MEF LSO

TM Forum Digital Transformation World / 2018
Catalyst Program

tmforum



Project Description

- ▶ This Catalyst combines key industry thinking in marketplace integration and virtualised network management from the TM Forum and MEF.



- ▶ This project shows tangible upgraded customer experience & operational efficiency for the partners by combining these two standards.
- ▶ This is achieved via an incremental 3-phased approach.

The Team - Champions & Participants

Organisation	Role	Phase	Name	Title
<i>MEF</i>	<i>Champion</i>	<i>1 - 2 - 3</i>	<i>Daniel Bar-Lev</i>	<i>Director, Office of the CTO</i>
<i>PCCW Global</i>	<i>Champion</i>	<i>1</i>	<i>Shahar Steiff</i>	<i>AVP New Technology</i>
<i>Vodafone Group</i>	<i>Champion</i>	<i>1 - 2 - 3</i>	<i>Lester Thomas Iain Wilkinson</i>	<i>Chief IT Systems Architect Principal Enterprise Architect</i>
<i>Orange</i>	<i>Champion</i>	<i>1 - 2 - 3</i>	<i>Ludovic Robert</i>	<i>IT Senior Architect</i>
<i>Telstra</i>	<i>Champion</i>	<i>2 - 3</i>	<i>Guy Lupo Johanne Mayer</i>	<i>Head of Orchestration, Networks 2020 Evangelist – NaaS 2020</i>
<i>AT&T</i>	<i>Champion</i>	<i>3</i>	<i>Jenny Huang</i>	<i>Standards and Industry Alliances</i>
<i>DGIT Systems</i>	<i>Participant</i>	<i>1 - 2 - 3</i>	<i>Greg Tilton Andrew Larmour Sandeep Vasani Frank Wong Amandine Durand</i>	<i>Catalyst Lead Solution Architect Software Engineer Channels Development Manager Partner Program Manager</i>
<i>Inomial</i>	<i>Participant</i>	<i>1</i>	<i>Mark Lillywhite</i>	<i>CTO</i>
<i>Ciena BluePlanet</i>	<i>Participant</i>	<i>2 - 3</i>	<i>Sam Torrente Adan Pope Nick Twigg Mitchell Stafford</i>	<i>VP, Solutions Consulting Chief Information Technology Officer Senior Director APAC Solutions Architect</i>
<i>Riverbed</i>	<i>Participant</i>	<i>3</i>	<i>Joe Ruffles</i>	<i>Riverbed Catalyst Lead</i>
<i>Infosys</i>	<i>Participant</i>	<i>3</i>	<i>Anuroop Awasthi</i>	<i>Principal Consultant</i>

Our Champions



- & Aligns with Vodafone's structure, where multiple Local Markets leverage other Local Markets' or Group-wide Services
- & Vodafone implements Open API based Service Ordering for existing physical & new virtualised services.
- & Vodafone aligns to the MEF 'Third Network Vision'



- & The northbound interfaces of the TMF HIP Model align with our vision of abstraction of the network into a domain structure, and our vision of a NaaS (Networks as a Service) layer customised for Telstra's requirements.
- & Looking to standardize services exposure with TMF Open APIs



- & Orange supports MEF & TMF APIs to enable much smoother inter-carrier service delivery
- & Orange has been a leading API design contributor in the MEF and TMF working groups



- & Use TM Forum APIs and ONAP platform to realize the Quote-to-Cash processes of MEF services.
- & Promote and demonstrate how Open Source and Standards communities are working together, and their complementary elements.

Delivering the MEF LSO

“Managing a Marketplace of Customers and Partners with Carrier Ethernet and Virtualized Network Resources”

Communication Service Providers are under pressure to adapt to the changes brought about by network virtualization, convergence with IT and the pressing need to take control of their customer experiences.

New architecture is required which allows network operators and service providers to exploit dynamic virtualized networks and package them with other services.

The MEF LSO will provide a reference architecture that will help CSPs deal with these changes and will provide an approach to see the realisation of an agile, assured and orchestrated network.



Hear from the MEF ...

<https://www.youtube.com/watch?v=DVBdrIK547k>

MEF LIFECYCLE SERVICE ORCHESTRATION INTERFACES

INTERFACES USED IN PROJECT SHOWN ON MEF LSO ARCHITECTURE CONTEXT

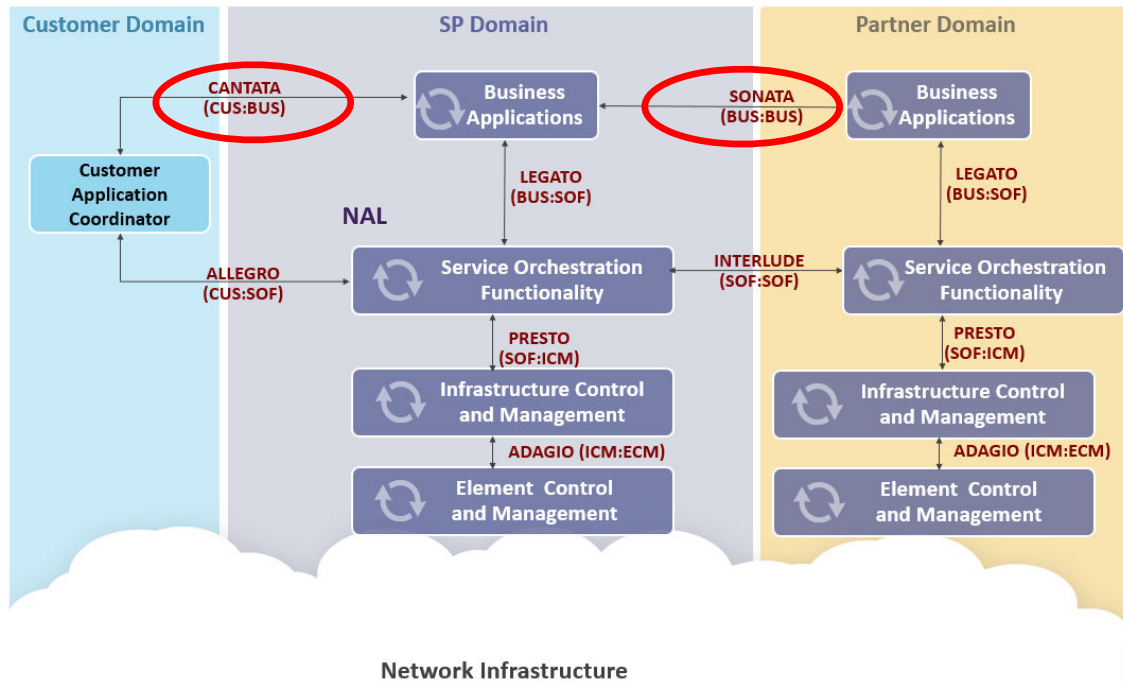
CANTATA

Phase 1 Dynamic rendering of customer self management UI in accordance to MEF LSO Cantata.

SONATA

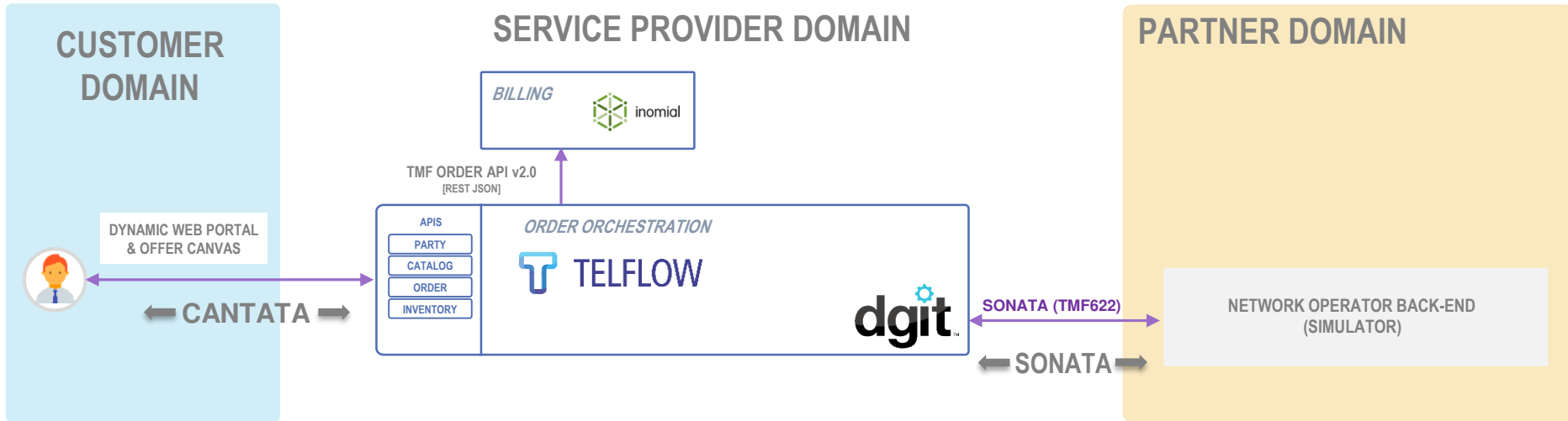
TMF622 with Sonata Payload for B2B

Phase 1 Used for Off-Net Orders to 5 operators



Phase 1 (May 2017)

We commenced by demonstrating how TMF Open API's may be used to deliver MEF orders to Partners.



MEF LIFECYCLE SERVICE ORCHESTRATION INTERFACES

INTERFACES USED IN PROJECT SHOWN ON MEF LSO ARCHITECTURE CONTEXT

CANTATA

Phase 1,2 Dynamic rendering of customer self management UI in accordance to MEF LSO.

SONATA

TMF622 with Sonata Payload for B2B

Phase 1 Used for Off-Net Orders to 5 operators

Phase 2 Used for single Off-Net ordering

NAL

Phase 2 (TMF640)

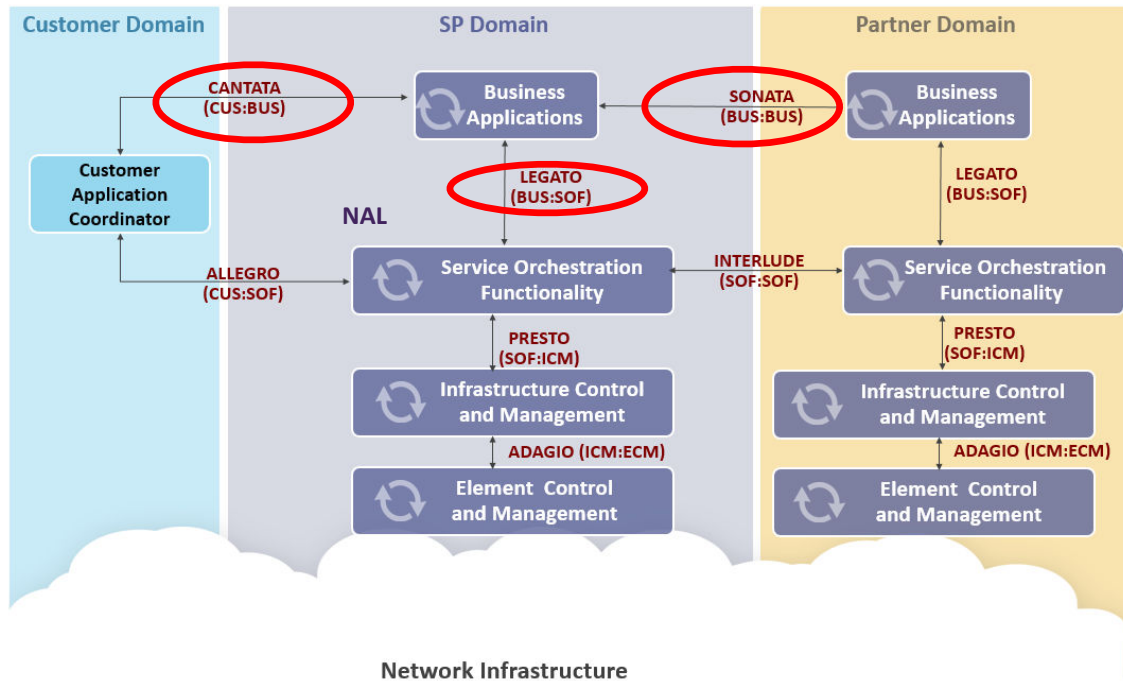
Network Abstraction Layer presenting a common set of TMForum API's to support an enablement layer for abstracted network services as per the ODM concepts introduced by one of our champions.

LEGATO

Phase 2 (TMF620 with Legato Payload)

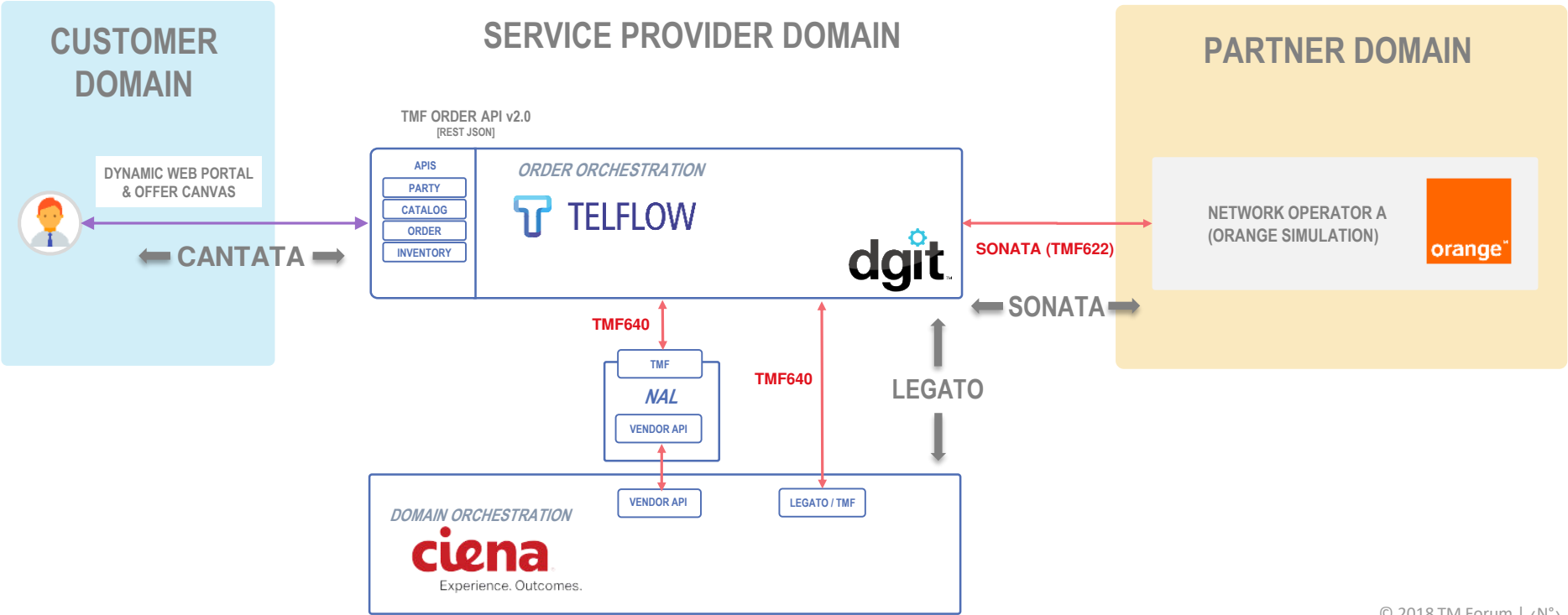
To prototype Telstra NaaS

To Ciena Network Service Orchestrator



Phase 2 (October 2017)

We followed by abstracting network architecture using MEF LSO and TMF API's.



MEF LIFECYCLE SERVICE ORCHESTRATION INTERFACES

INTERFACES USED IN PROJECT SHOWN ON MEF LSO ARCHITECTURE CONTEXT

CANTATA

Phase 1,2,3 Dynamic rendering of customer self management UI in accordance to MEF LSO.

SONATA

TMF622 with Sonata Payload for B2B

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Phase 2 (TMF640)

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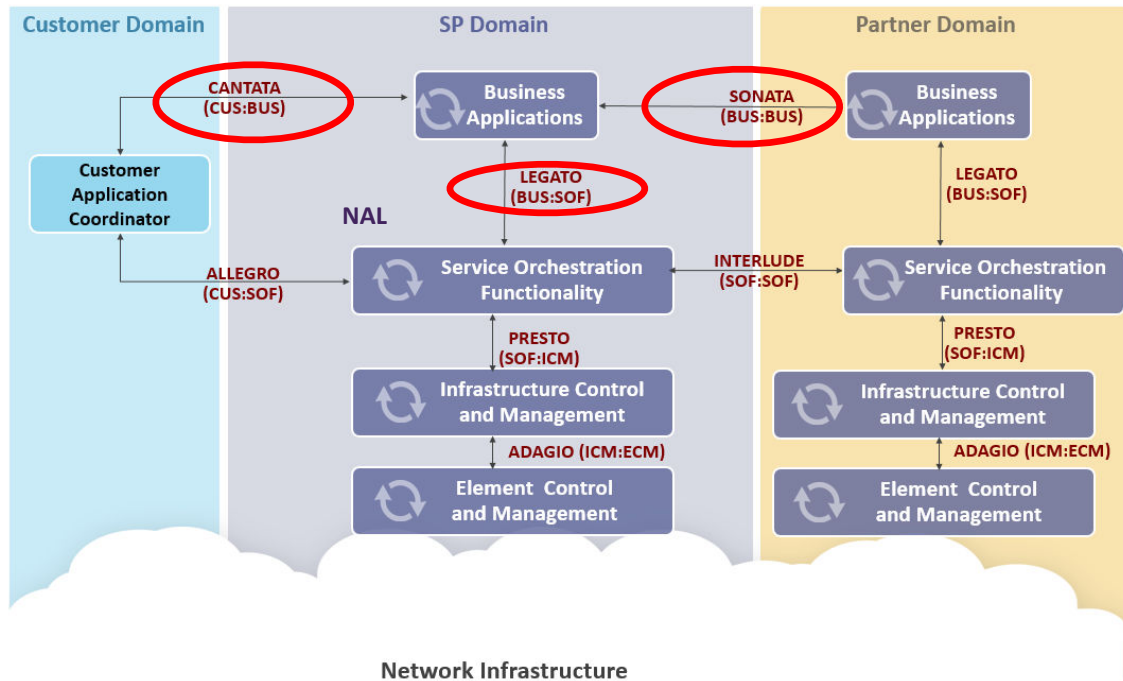
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Phase 3

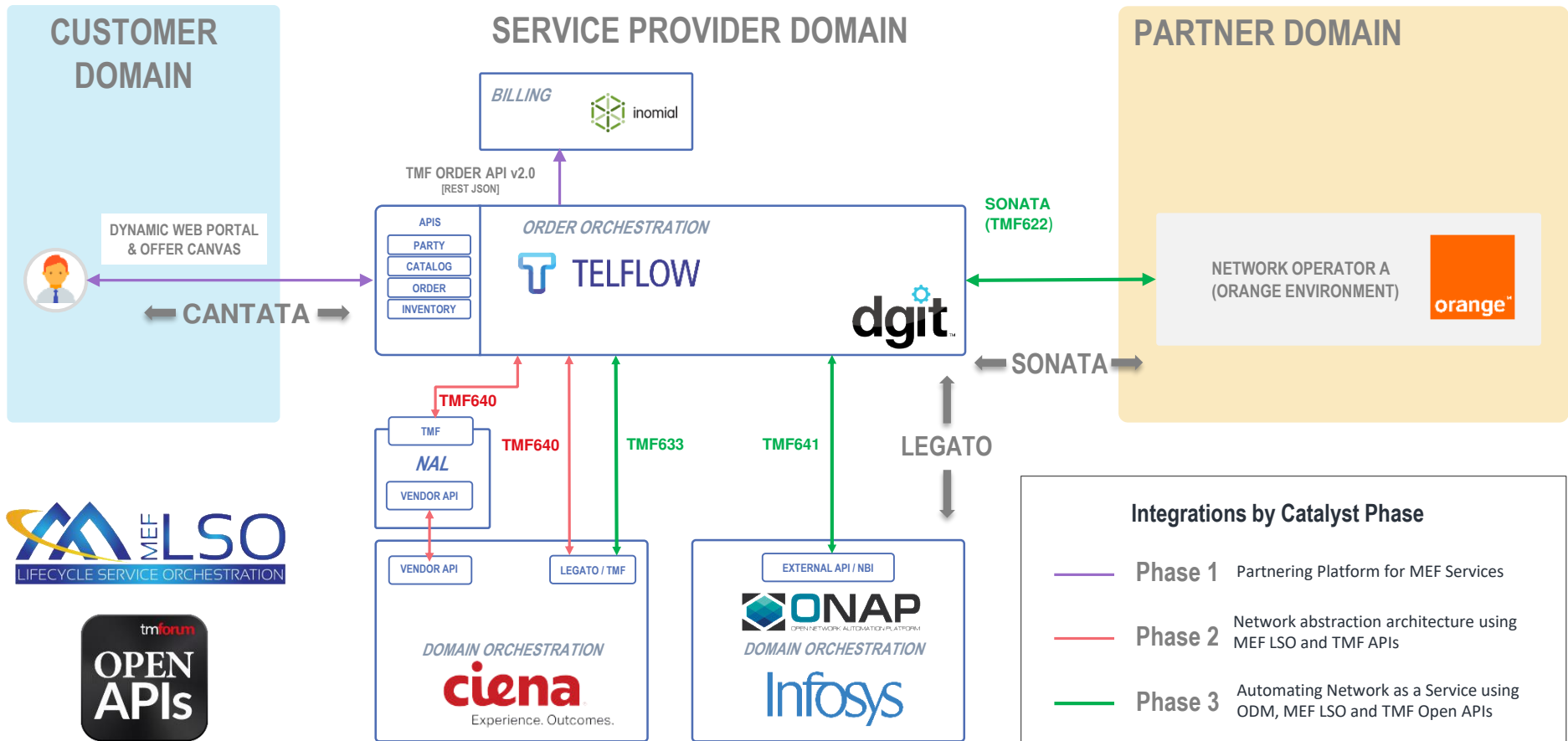
Re-usable **TMF641** processes to ONAP for vCPE & vFirewall

Adding Catalog APIs to Ciena Integration for Agility (**TMF633**)



AUTOMATING NETWORK AS A SERVICE

USING ODM, TM FORUM OPEN APIS & MEF LSO



Integrations by Catalyst Phase

- **Phase 1** Partnering Platform for MEF Services
- **Phase 2** Network abstraction architecture using MEF LSO and TMF APIs
- **Phase 3** Automating Network as a Service using ODM, MEF LSO and TMF Open APIs

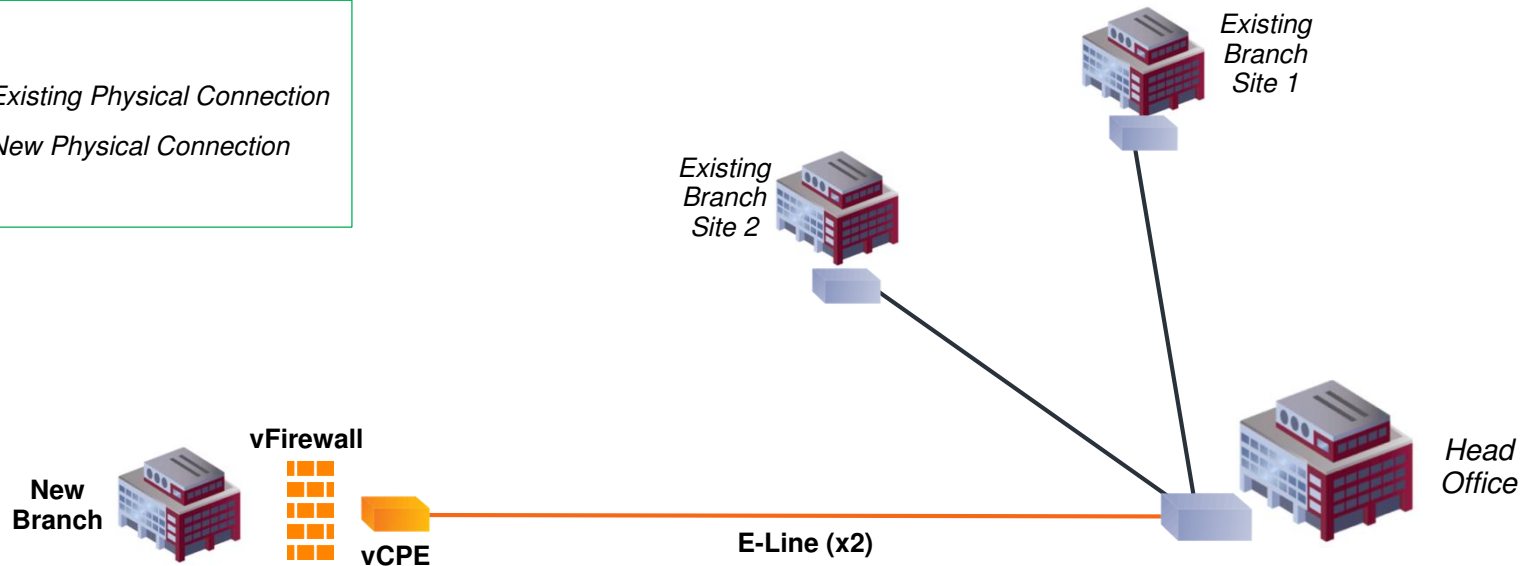
Phase 3 Network Scenario – Multi-site Multi-Domain Connectivity Product **tmforum**

This scenario shows how an operator may add an additional location to an existing enterprise connectivity solution.

The existing enterprise customer, Spark Logistics, has 2 existing locations and now wants to add an additional branch office to its network. The customer wants two diverse point to point connections from the main office to the branch site, with a vCPE and vFirewall provisioned at the site.

LEGEND

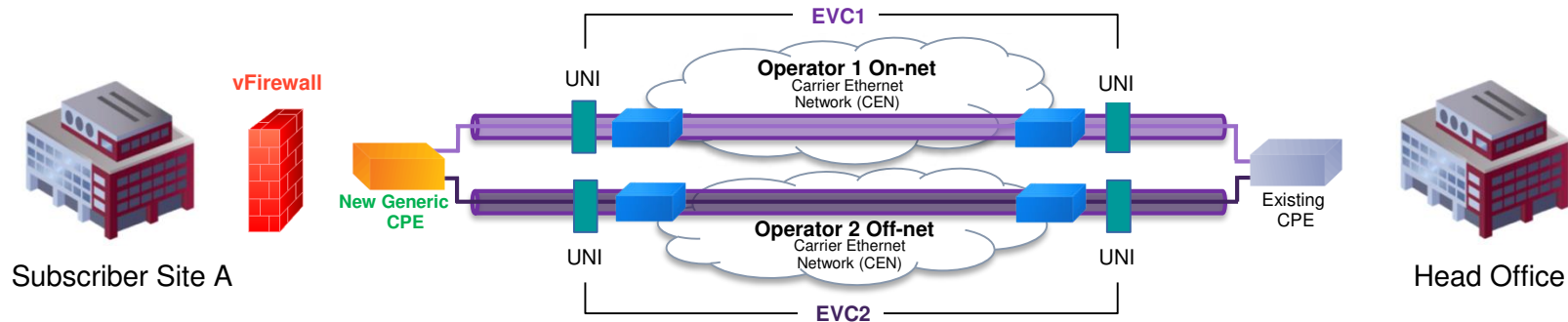
- Existing Physical Connection
- New Physical Connection



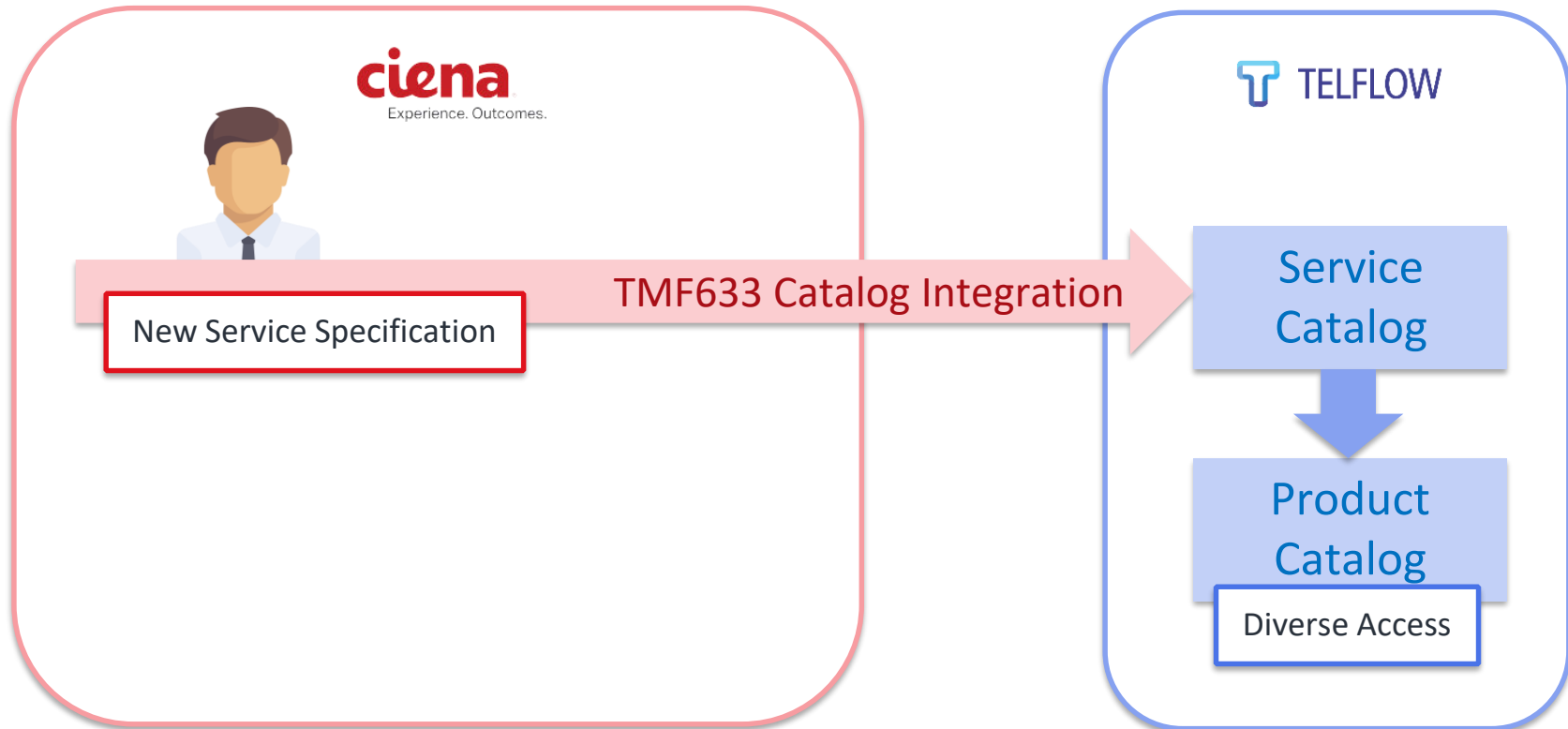
Phase 3 Network Scenario – Multi-site Multi-Domain Connectivity Product

We are therefore ordering a Managed Service offering for a subscriber at two sites, using multiple technologies fulfilled by multiple diverse domains:

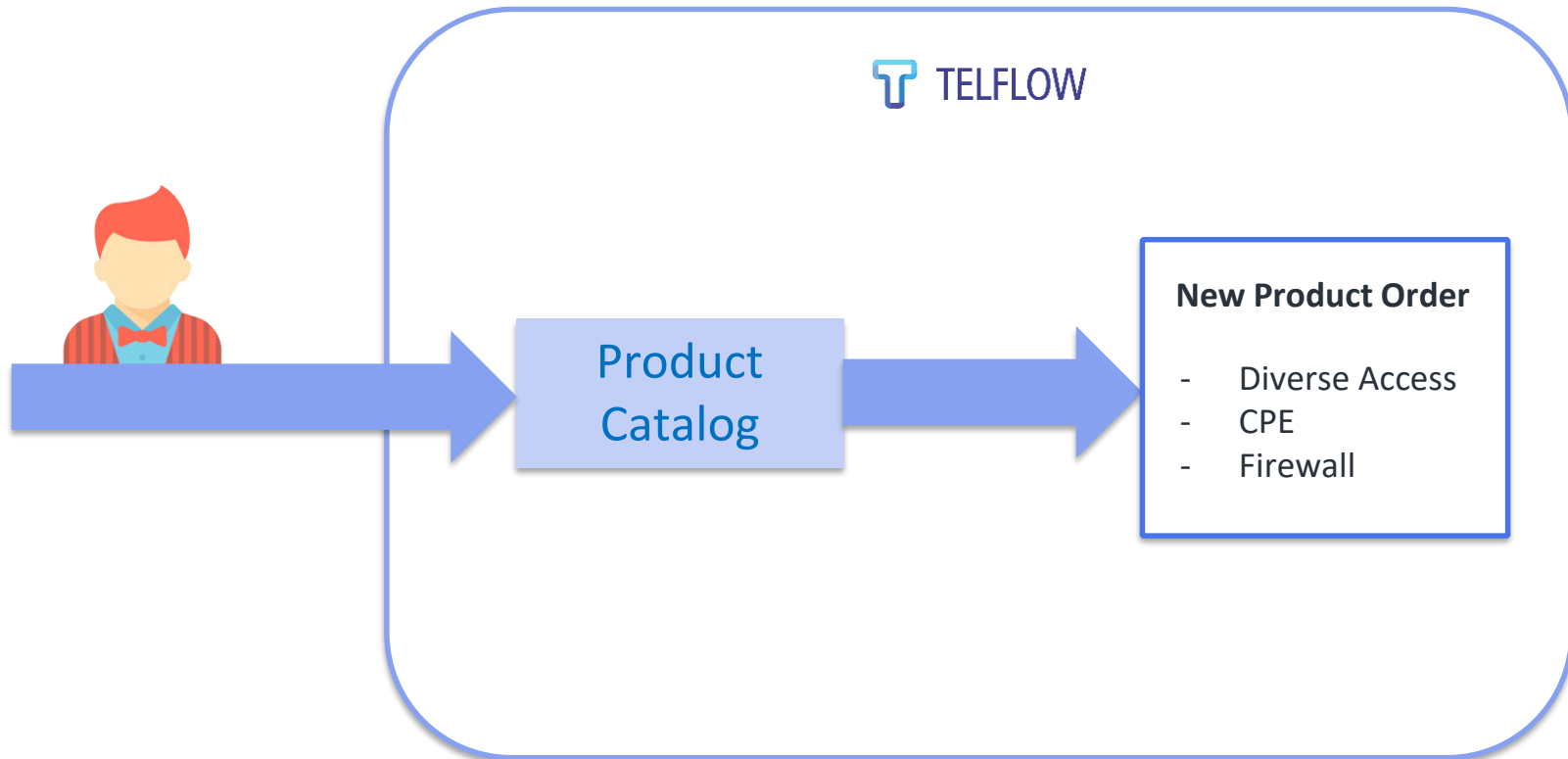
- **MEF E-LINE (On-Net)** service provided by Ciena exposed via *MEF Legato interface / TMF Open APIs*
- **MEF E-LINE (Off-Net)** service provided and orchestrated by Orange exposed via *MEF Sonata interface*
- **Virtual Firewall VNF** service orchestrated by ONAP (Infosys) via *MEF Legato interface / TMF Open APIs*
- With end to end cross domain automation conducted by Telflow (DGIT) acting as the Order Management system



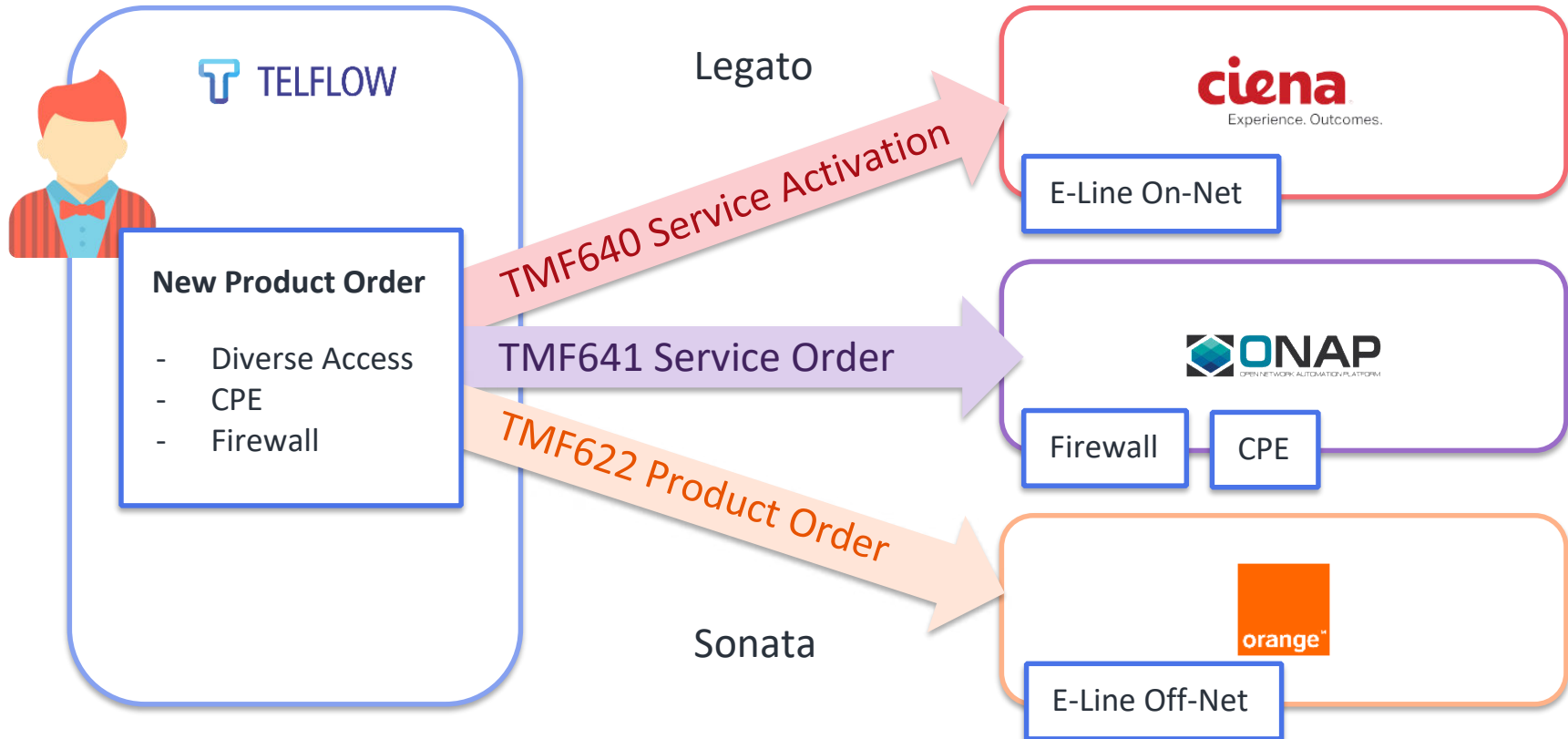
Phase 3 Network Scenario – Multi-site Multi-Domain Connectivity Product **tmforum**



Phase 3 Network Scenario – Multi-site Multi-Domain Connectivity Product **tmforum**



Phase 3 Network Scenario – Multi-site Multi-Domain Connectivity Product



Project Summary

- ▶ This Catalyst demonstrates TMF APIs used in an E2E catalog-driven network integration to the MEF Legato use case.
- ▶ The project also implements a HIP inspired architecture across operational network domains provided by Ciena and ONAP
- ▶ Telflow, powered by DGIT Systems, orchestrated the integration and provided a self-service ordering portal with an offer canvas experience.

Project Summary

- ▶The MEF LSO Architecture is realised through this project using TM Forum APIs while remaining conformant to MEF service definitions.
- ▶Together, we demonstrate orchestration of services across multiple providers and over diverse network technology domains, supporting CSP to shape automated, model-driven digital ecosystems.

Thank You

