

EXPERIENCE THE THRILL OF FOILING

Two Flying Dutchman stories demystified



SURFNET8



LEADING IN
SMART SECURE
PLATFORMS



1ST Network
Automation

TALKING ABOUT OUR NSO EXPERIENCES

Customers and partner perspectives



Wouter Huisman
Network Architect



Albert Lentink
Business Consultant



Vlada Milovanović
Transport Network Engineer

DIFFERENT AUTOMATION STRATEGIES



SURFNET8

Full Automated Network



LEADING IN
SMART SECURE
PLATFORMS

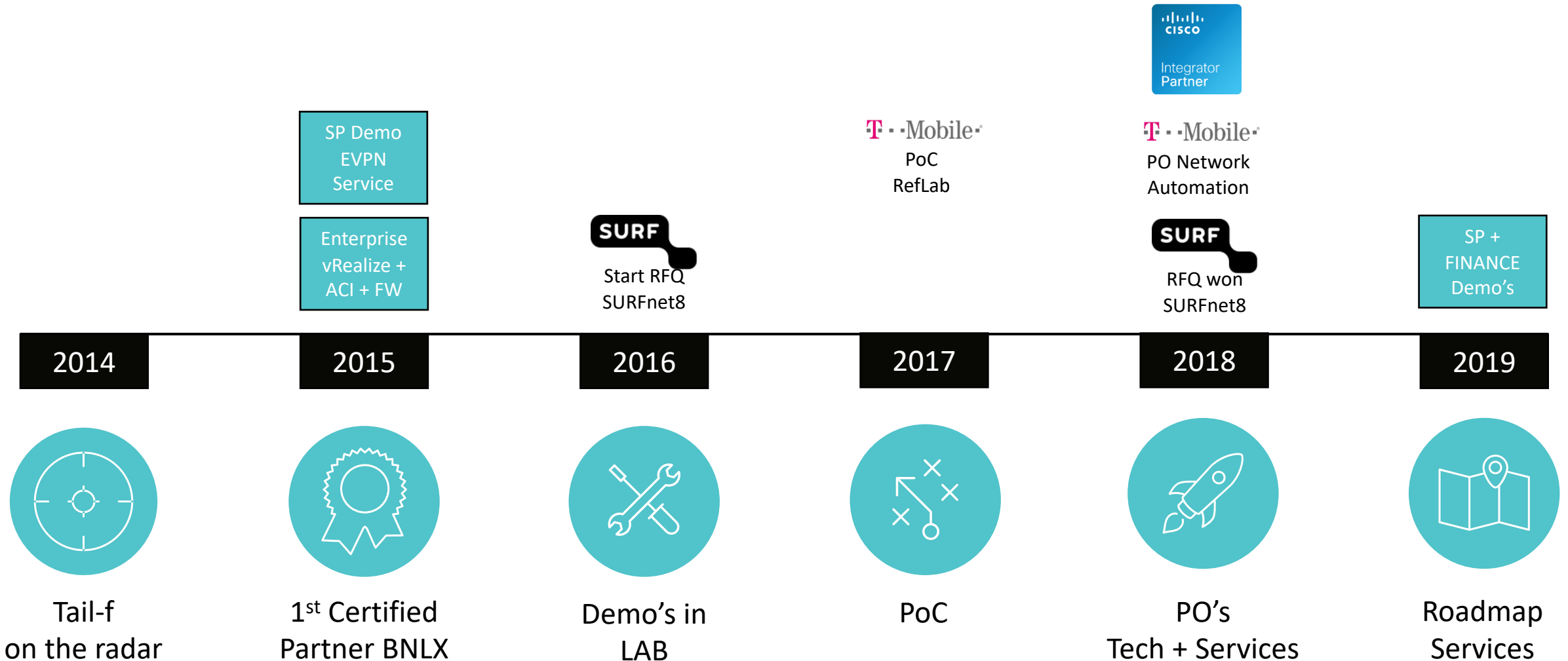
Technology & Services



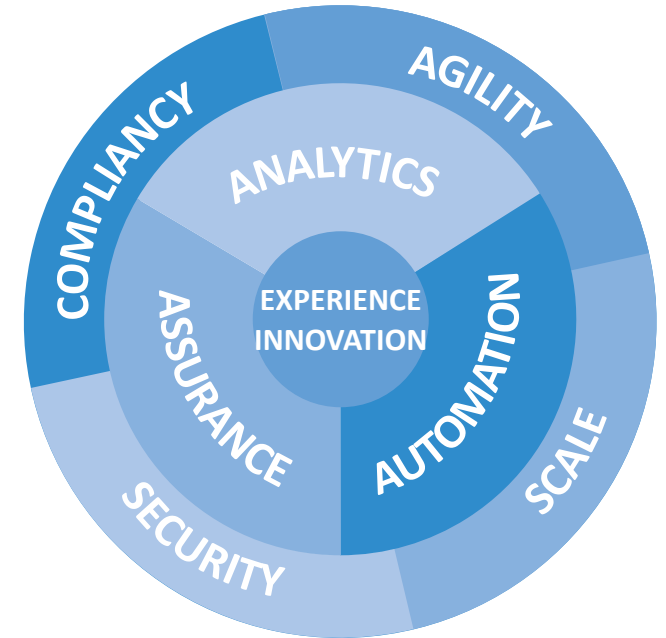
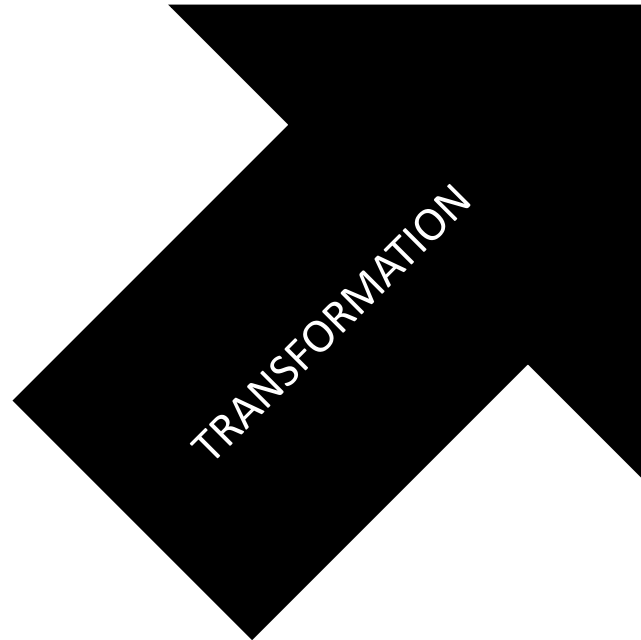
1ST Network
Automation

B2B Services

TELINDUS JOURNEY AND OUTCOMES



TELINDUS JOURNEY AND OUTCOMES





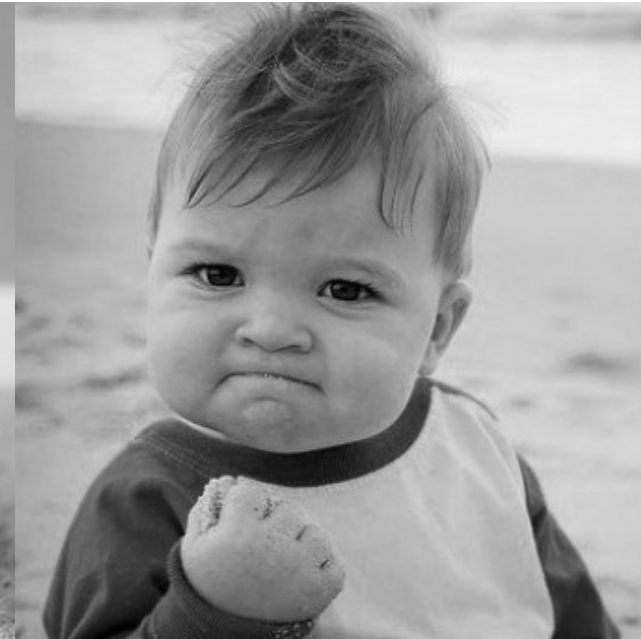
NOT A TYPICAL SMOOTH SAILING STORY

Flying Dutchman

By Albert Pinkham Ryder - Eigen Scan von Michael Gibson.
Taschen GmbH, 2006. ISBN 3-8228-5029-2, Publiek domein.

Emotions play a role

#SOTRUE



My existing service documentation is not good enough as requirement specs?

Why must I work on this?
How have we been defining/operating our services?

Actually this kind of makes sense.
Why are we doing ...?
What if we did ...?

Embracing methodology

#STARTSIMPLE



#EXPERIMENT
#SAFETY1ST
#FAIL

#NEXTLEVEL



SAIL INNOVATION
faster and smarter

ONE DESIGN

#FOILING

FLYING
PHANTOM

PHANTOM
international



#AGILITYANDSPEED



#LIFT

HELMSMAN
+ FLIGHT

WING
TRIMMER

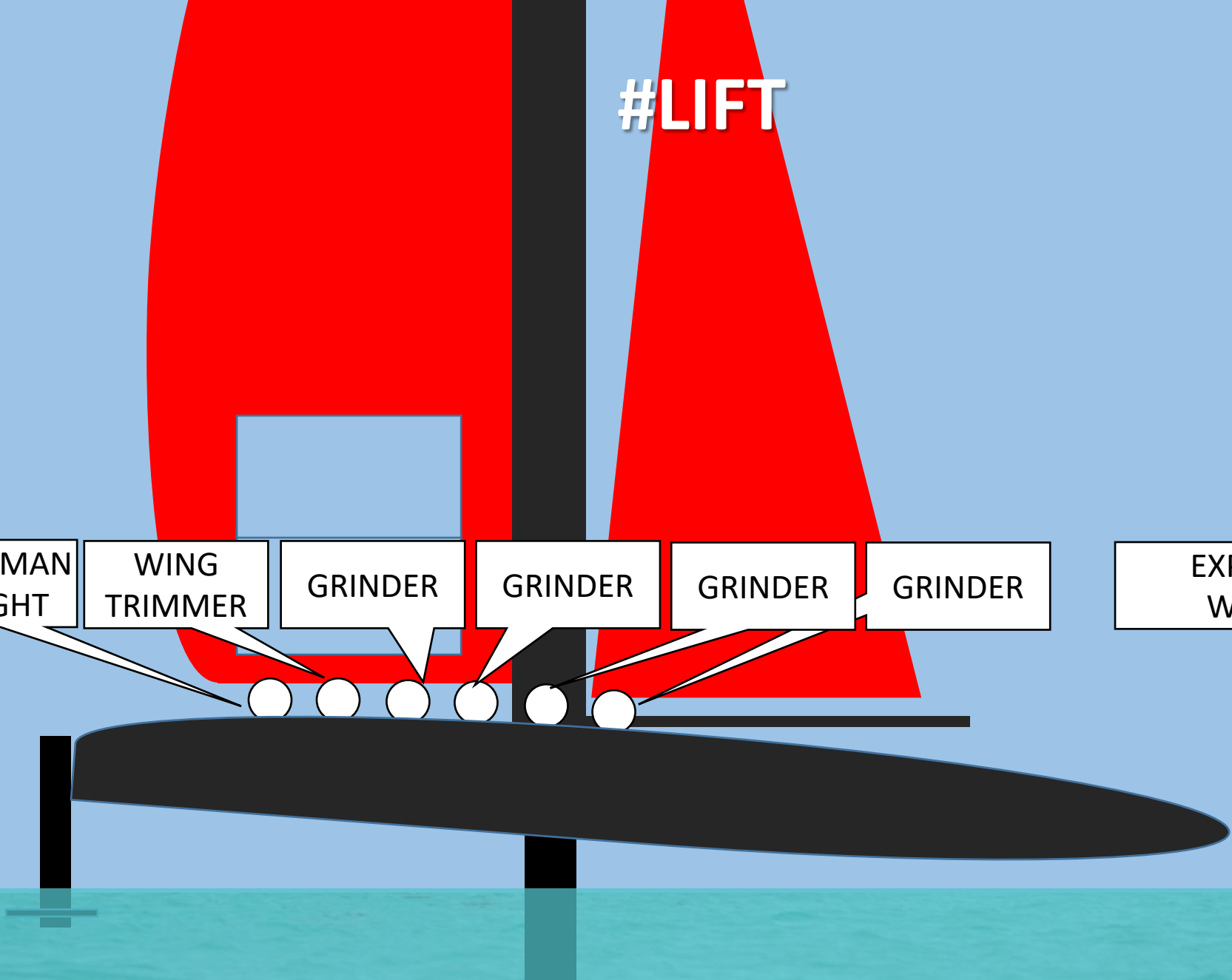
GRINDER

GRINDER

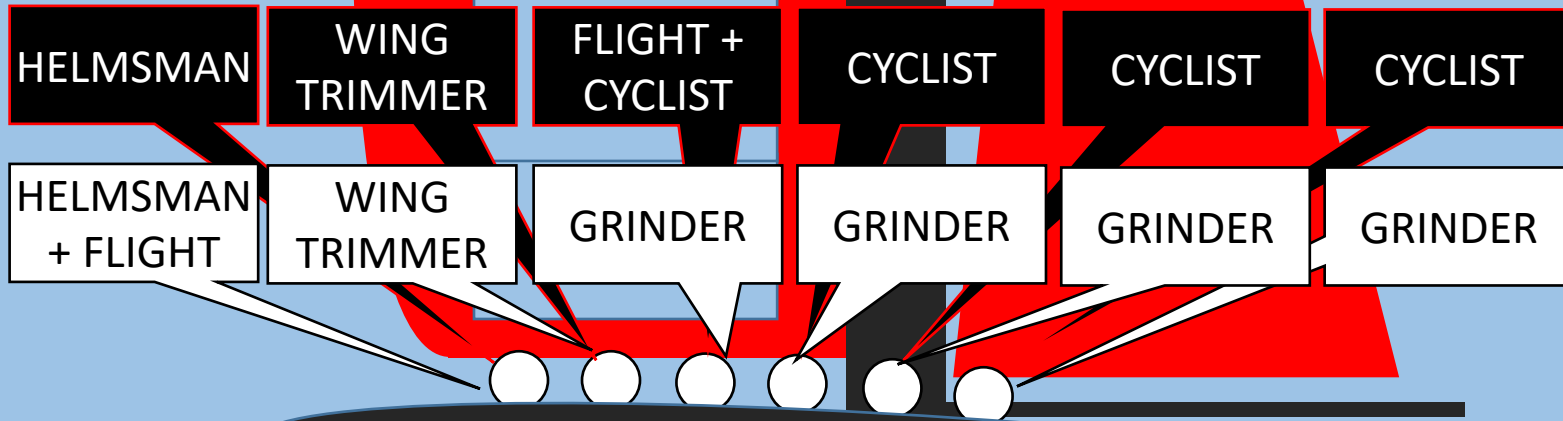
GRINDER

GRINDER

EXPERIENCED SAILORS
WITH FASTEST BOAT



#BEYONDANDABOVE #WHATIF



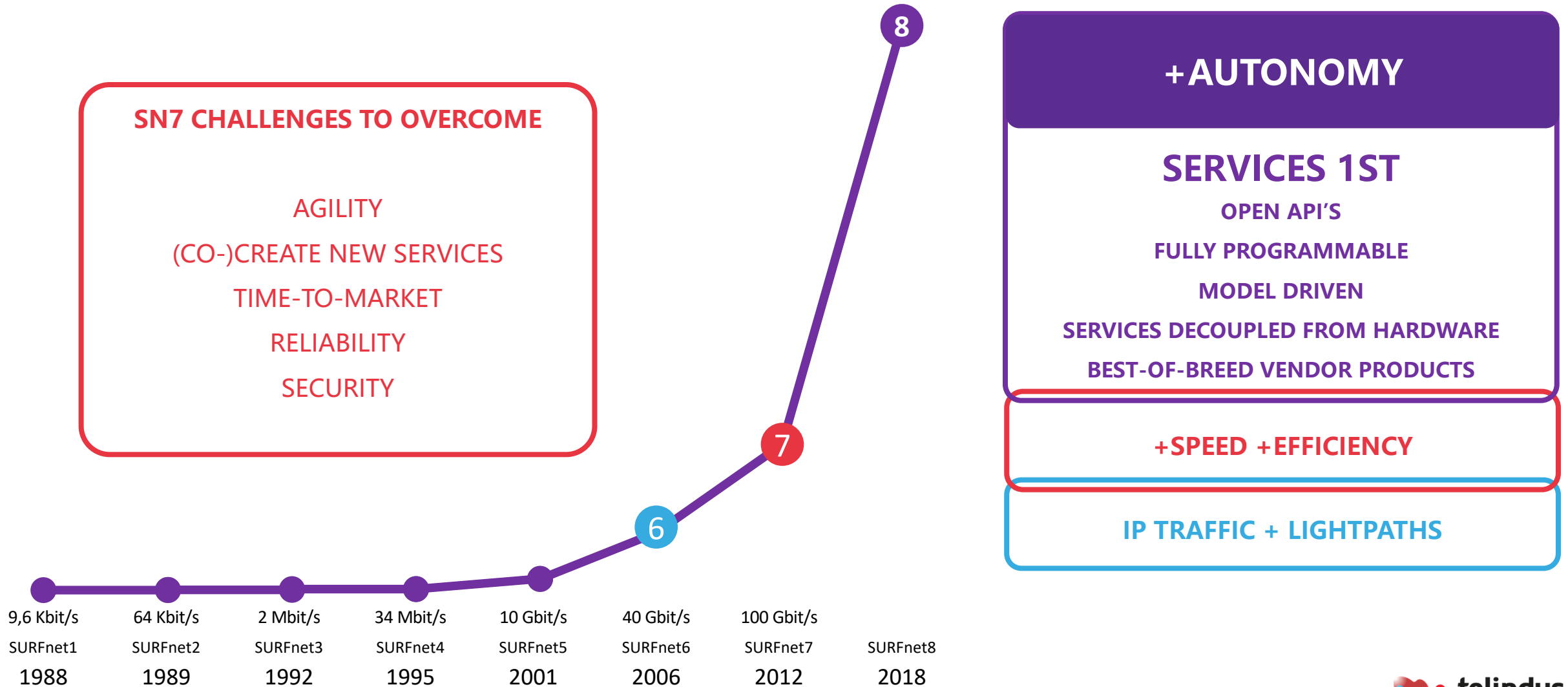
FRESH AND SMART SAILORS
WITH SUSTAINABLE FLIGHT

EXPERIENCED SAILORS
WITH FASTEST BOAT



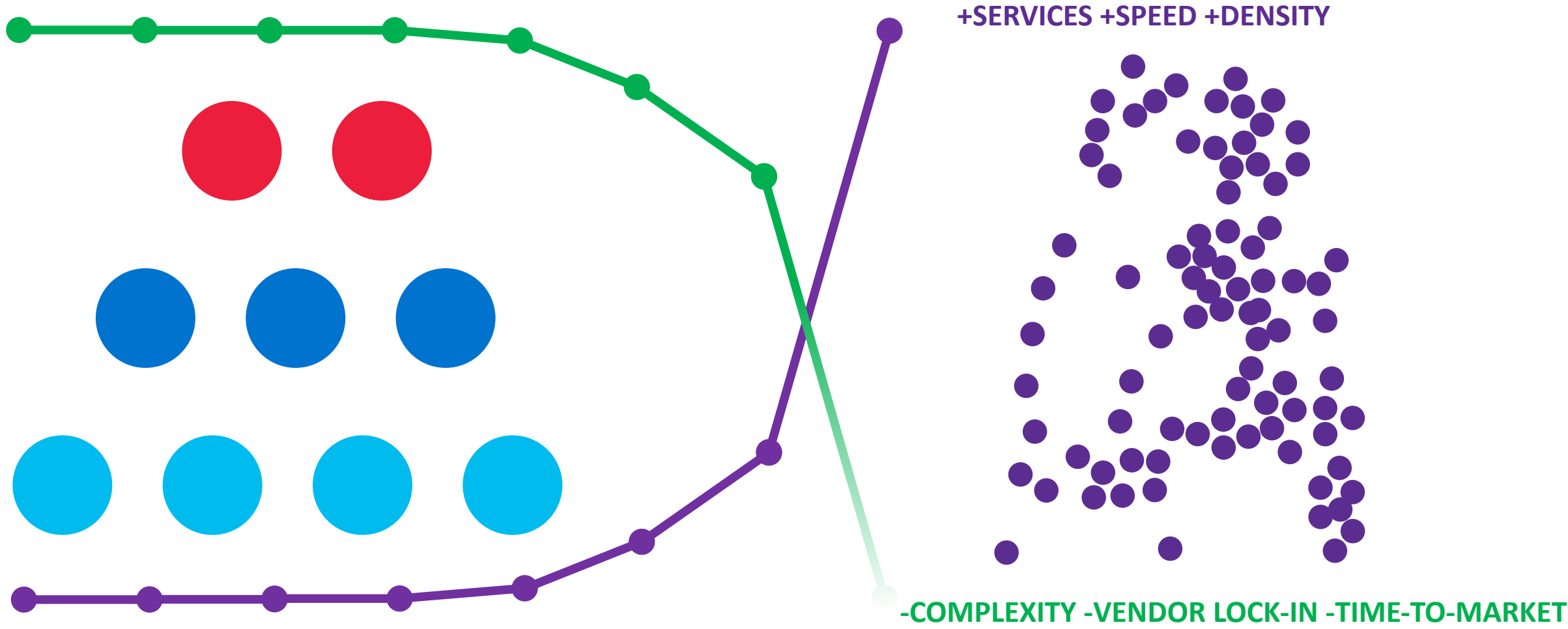
SURFNET EVOLUTION

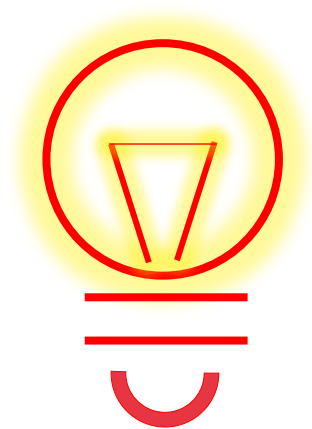
Telindus Proposed Design SURFnet8



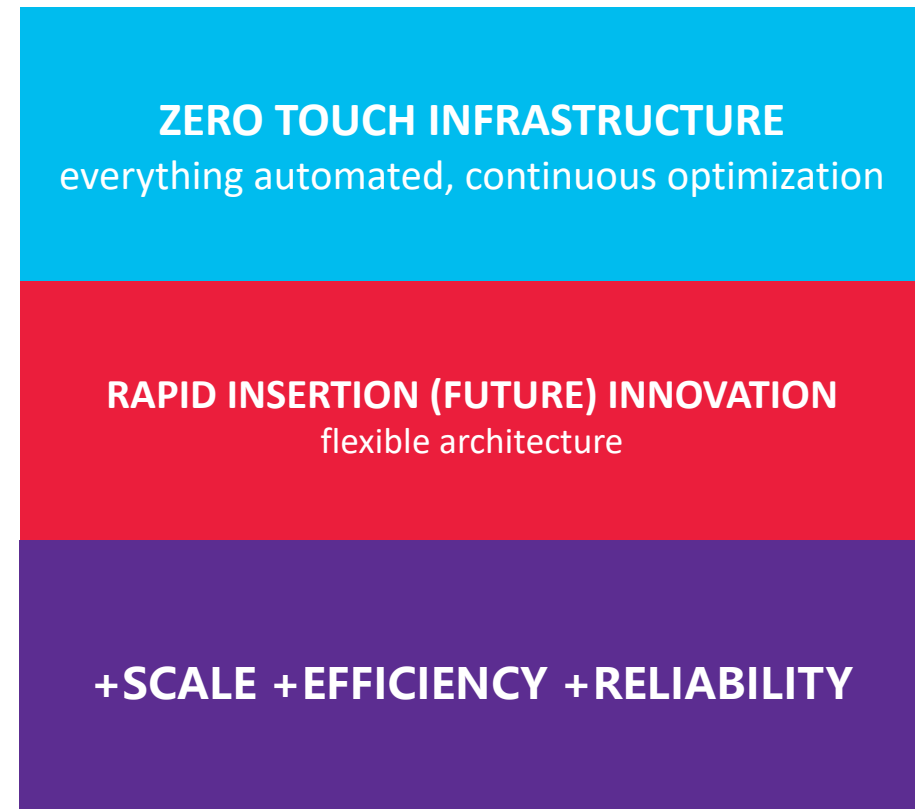
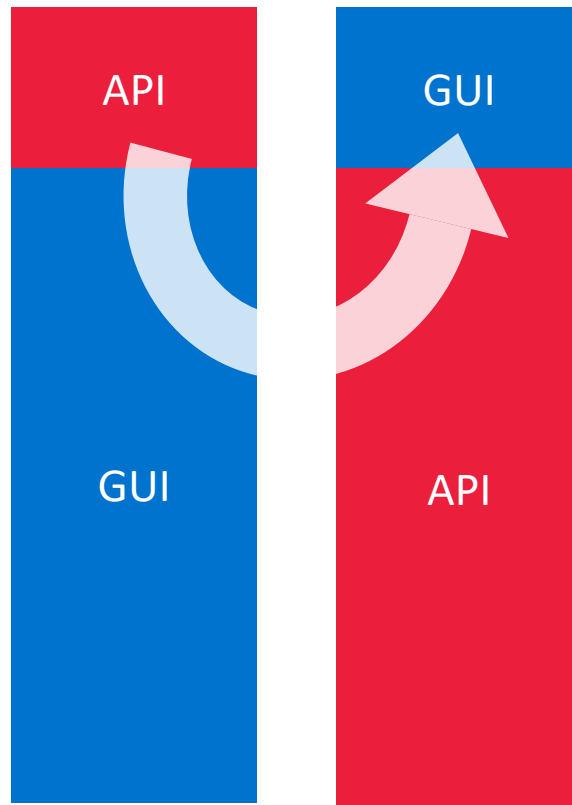
TRANSFORMATION TO SURFNET8

Scale connectivity beyond the network



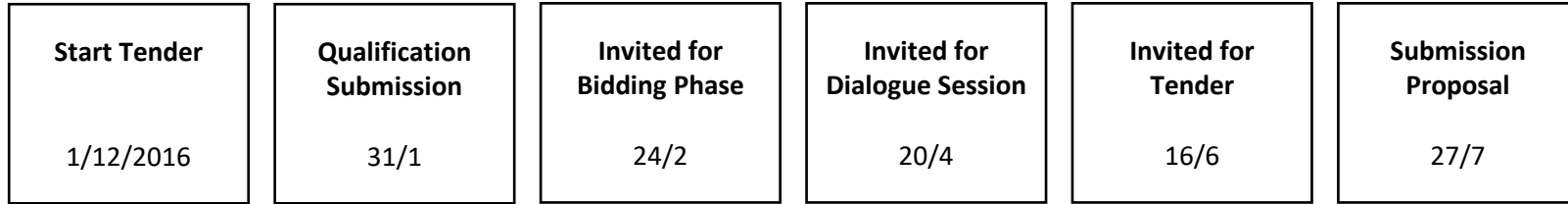


SERVICES
LAYER



Process Service Layer Tender

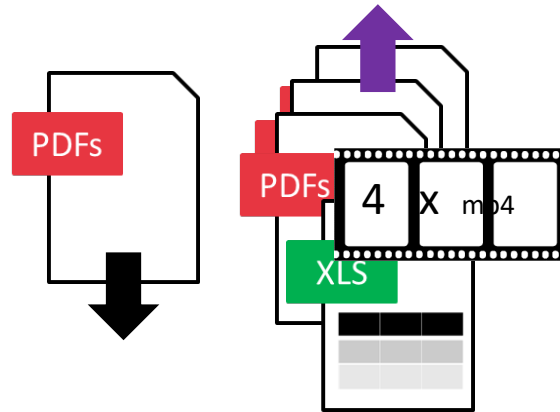
COMPETITIVE DIALOG PROCEDURE



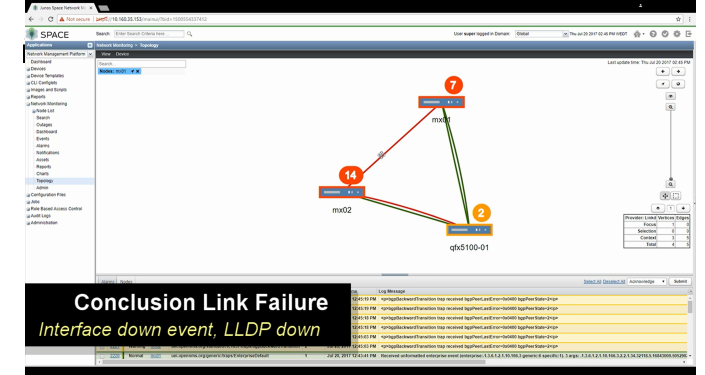
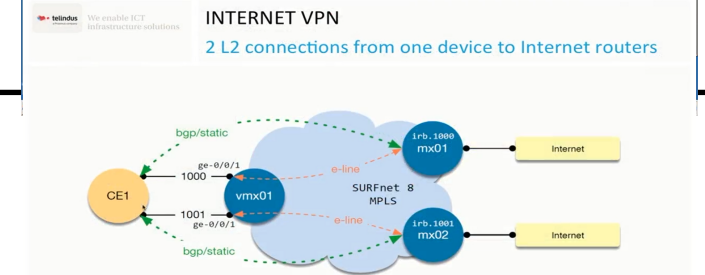
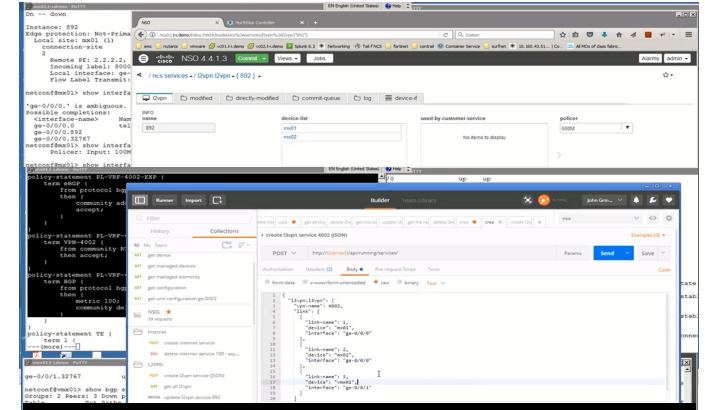
2016



2017



OUR DELIVERABLES



Process Service Layer Tender

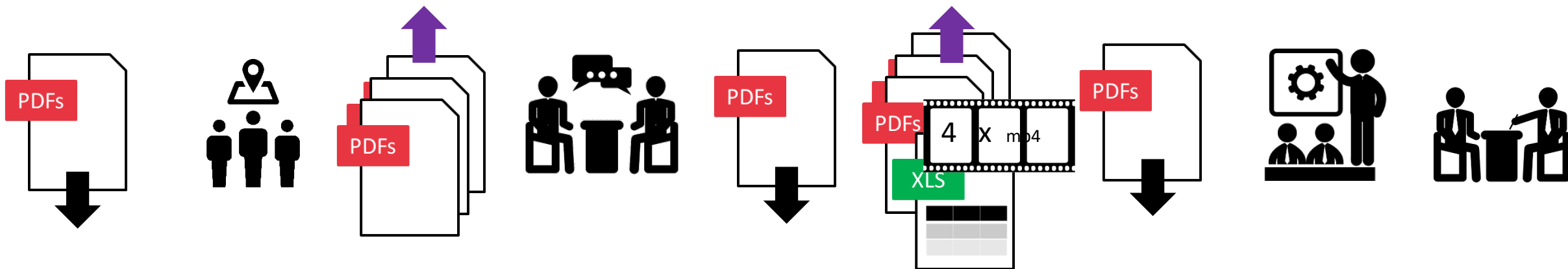
COMPETITIVE DIALOG PROCEDURE

Start Tender 1/12/2016	Qualification Submission 31/1	Invited for Bidding Phase 24/2	Invited for Dialogue Session 20/4	Invited for Tender 16/6	Submission Proposal 27/7	Provisionally Awarded Tender 13/9	Verification Tender 31/10	Contract Signed 27/11
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2016

2017

2018



T-Mobile

1ST Network
Automation

Welkom



Advisory Journey

Advisory Service Kickoff

Align objectives and outcomes



Pre-Workshop Surveys

Understand Business Objectives & Current Ecosystem (People, Process & Tools)



Onsite Workshop

Discovery & Analyze Sessions with Stake Holders



Review & Finalize

Consolidate Findings & Prepare Strategy Recommendation Report

Strategy Recommendation Read Out

Strategy Report Presentation & Next Steps



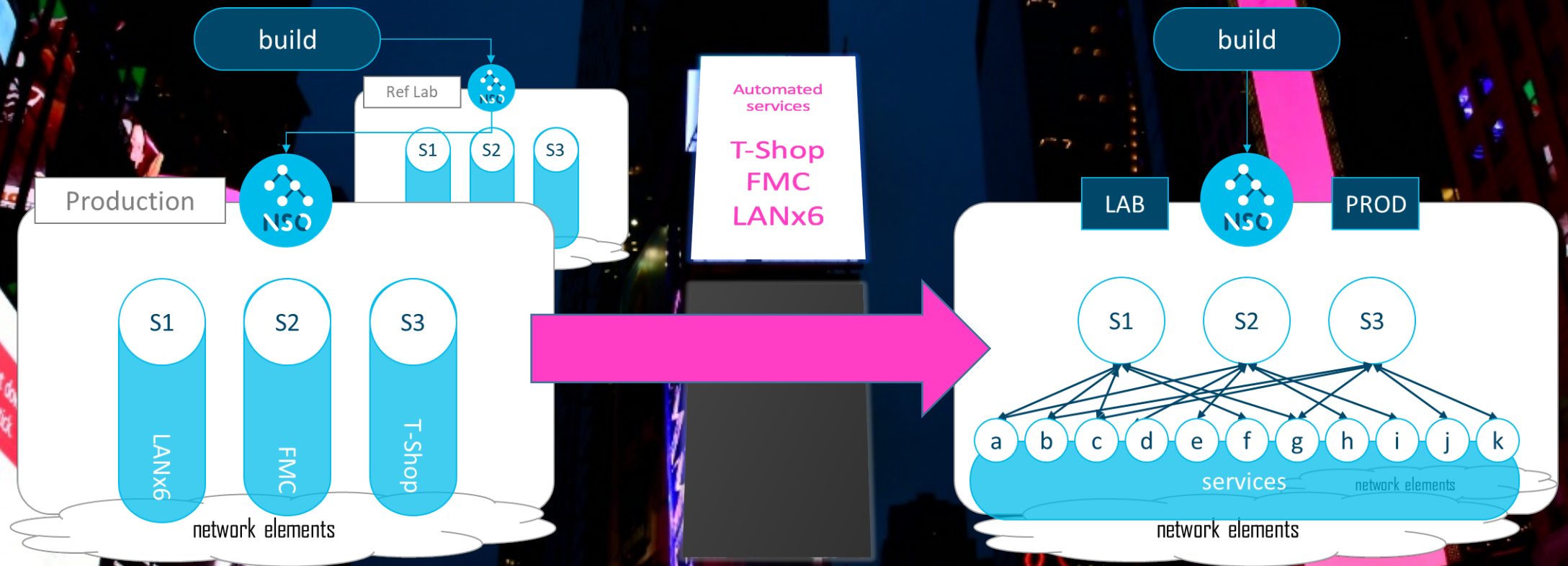
Orchestration & Automation Operations Transformation Service

Advisory Planning Kick-Off

PoC/PoV

Demos and Trials





Automated services

T-Shop

FMC

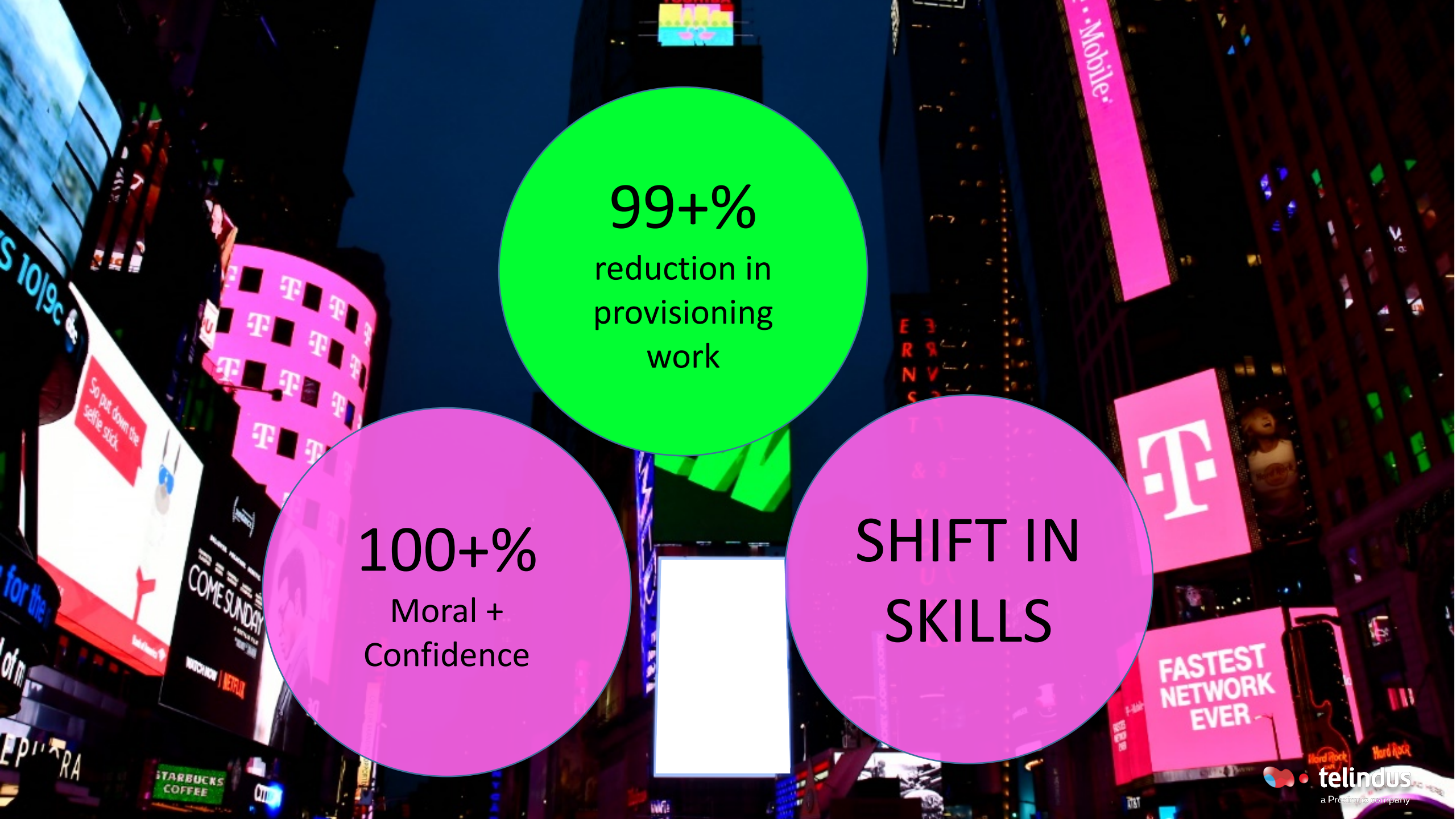
LANx6

Automation Fase 2

CI/CD

Roadmap

Backlog



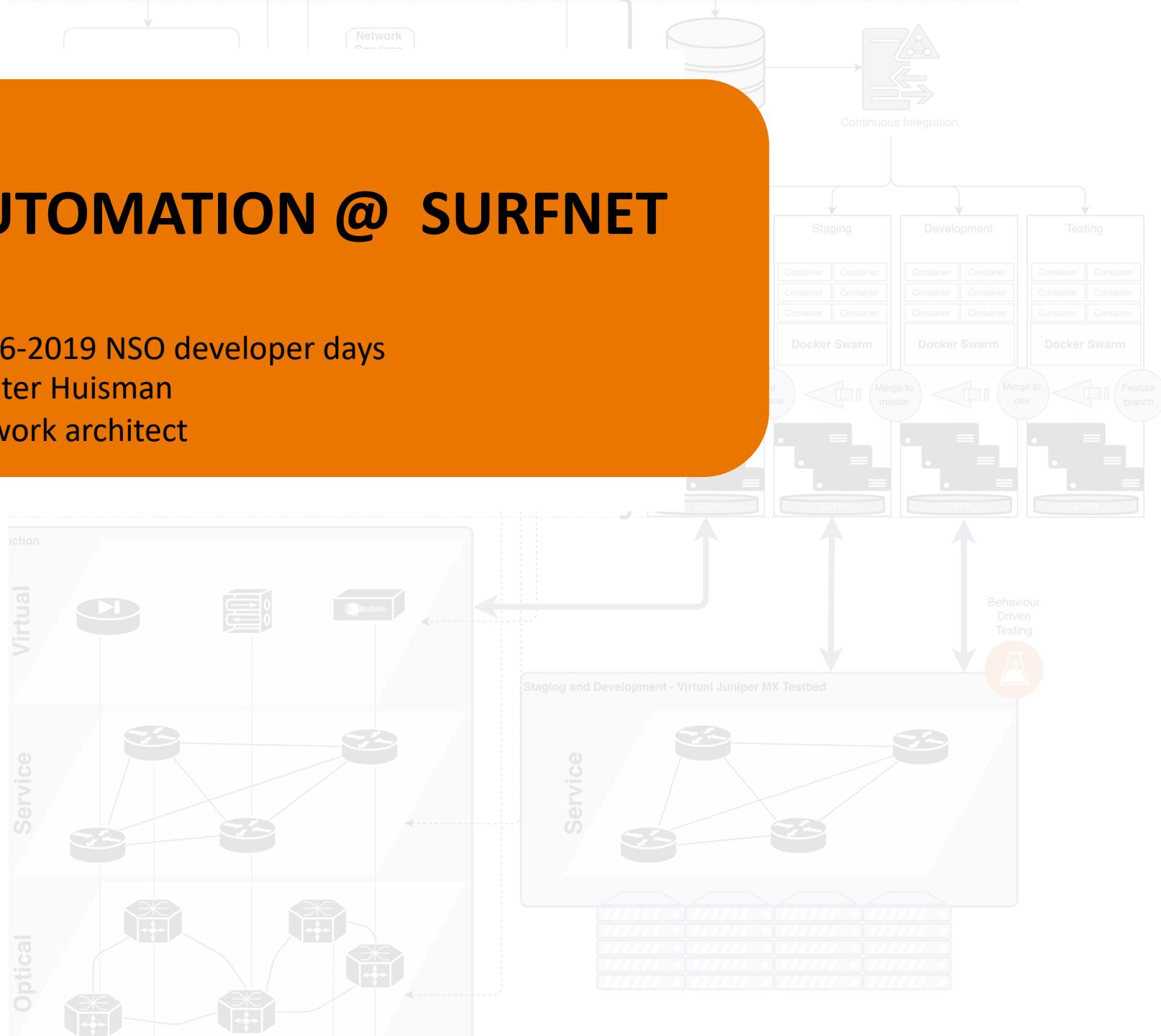
99+%
reduction in
provisioning
work

100+%
Moral +
Confidence

**SHIFT IN
SKILLS**

AUTOMATION @ SURFNET

19-06-2019 NSO developer days
Wouter Huisman
Network architect



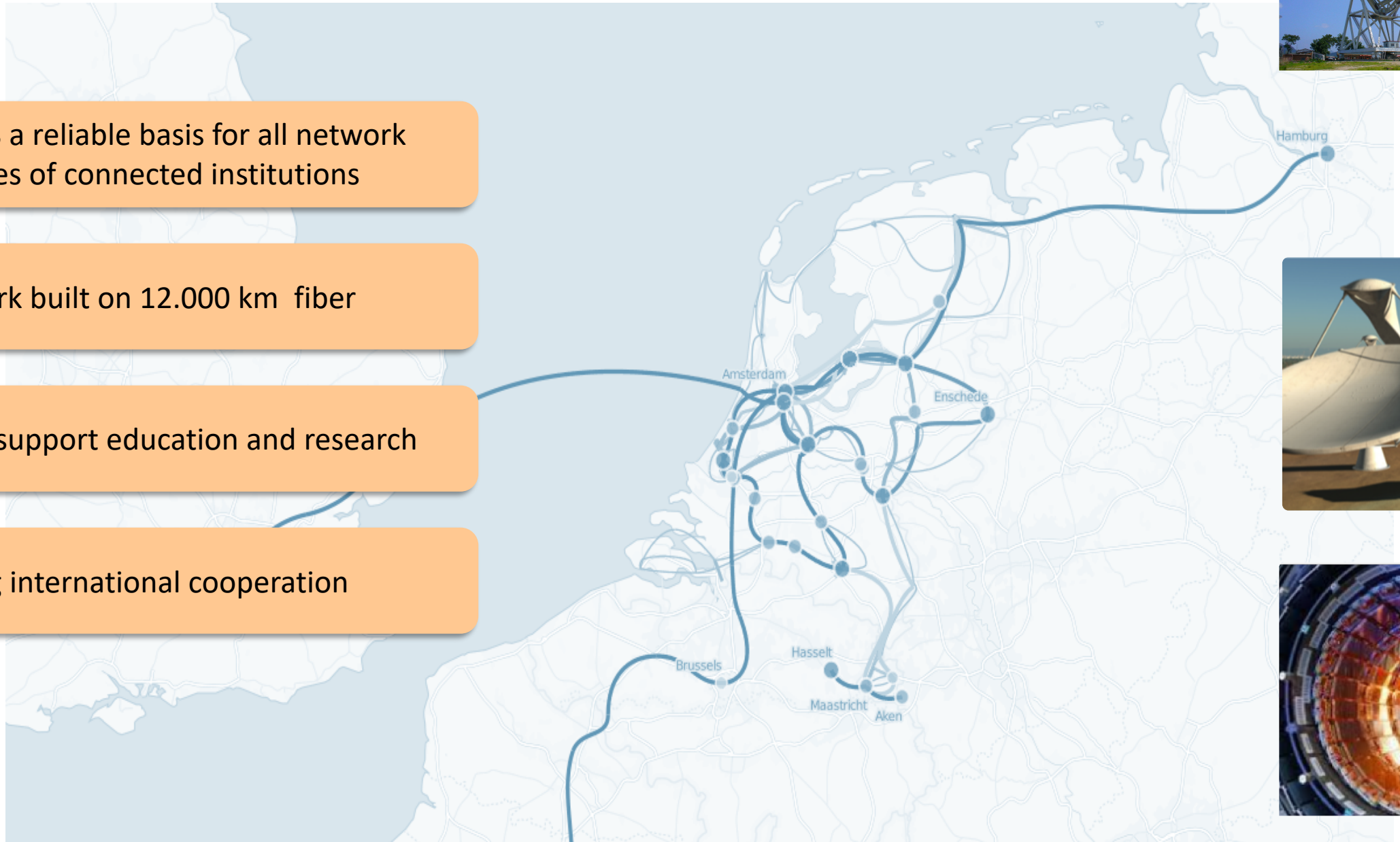
SURFnet Network

Since 1988 a reliable basis for all network activities of connected institutions

Network built on 12.000 km fiber

Tailored to support education and research

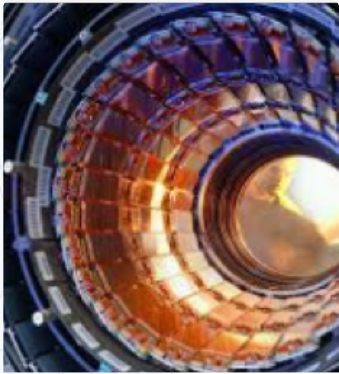
Strong international cooperation



JIVE



SKA

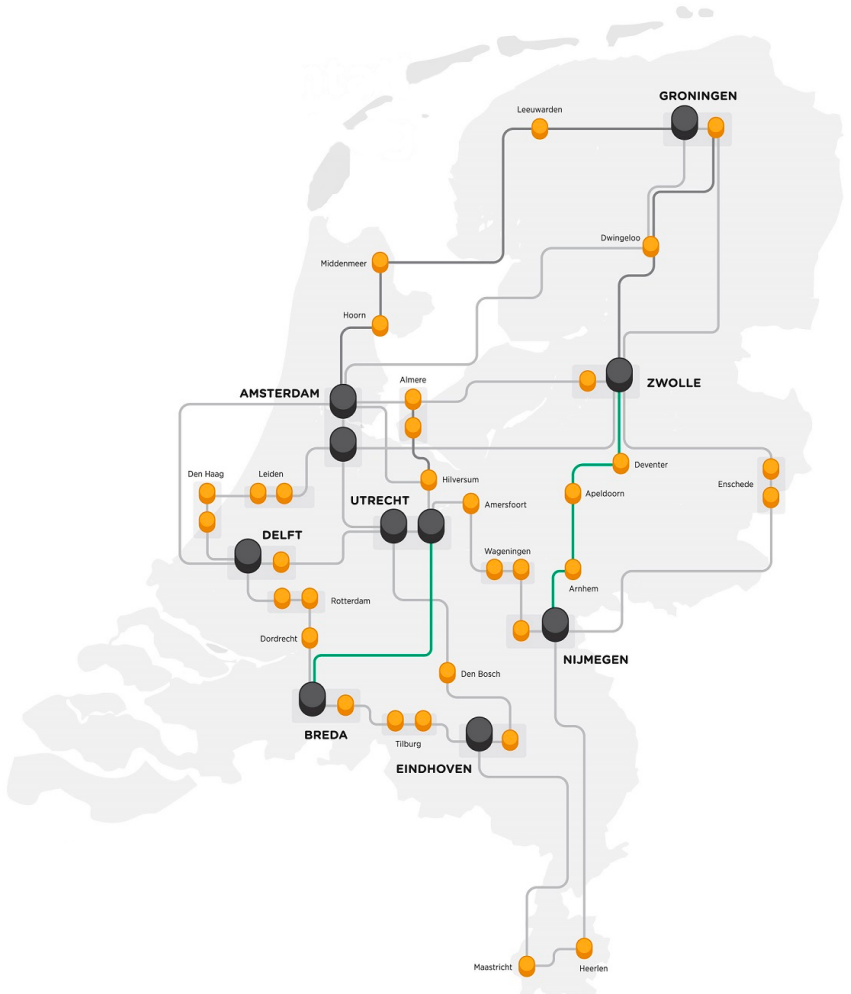
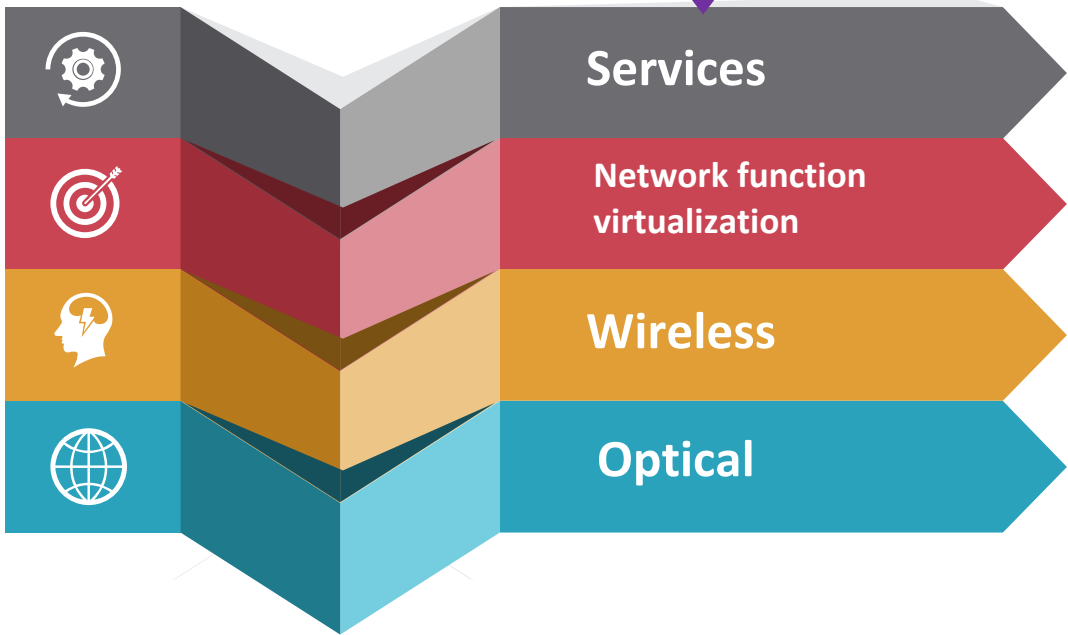


CERN

From network generations to technology domains



Orchestration & Automation



How did we start this project?

- MT commitment for continuous investment
- Formation of an automation team
 - Automation team of 3 SURFnet engineers with SW background
 - Attracted 5 SW developer (external)
- A lot of discussions and meetings – convincing people
- SW development in two week sprints – sharing progress with stakeholders

Ingredients for Orchestration utopia



Single Points of Truth

Solid information model

Standardized interfaces

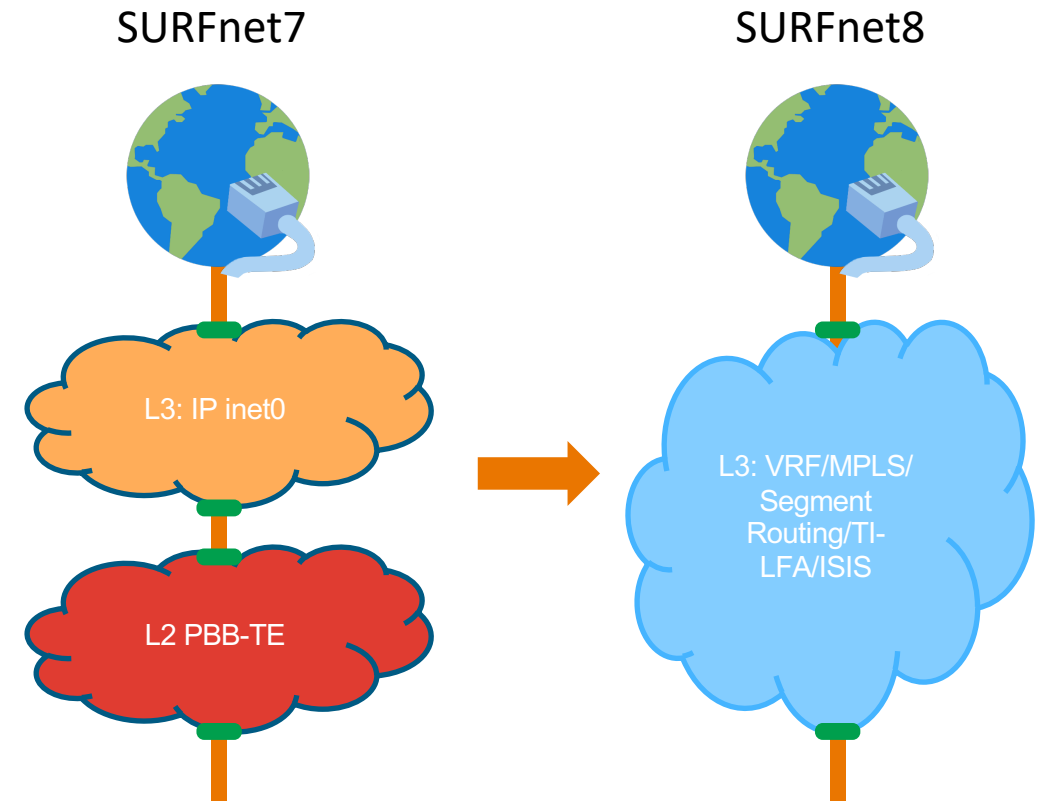
Automated administration

Predetermined service delivery

Unit and Integration tests

Simplify the network as much as possible

- Single HW vendor
- One service domain
 - All MPLS
 - Dynamic control plane – Segment Routing
- One OS & chipset
- Each node with same capabilities



Integrating with our Service Domain using NSO

```
augment /ncs:services {
  list ptp {
    tailf:info "Provide unique port ID";
    key name;
    unique "device interface";

    uses ncs:service-data;
    ncs:servicepoint ptp-servicepoint;

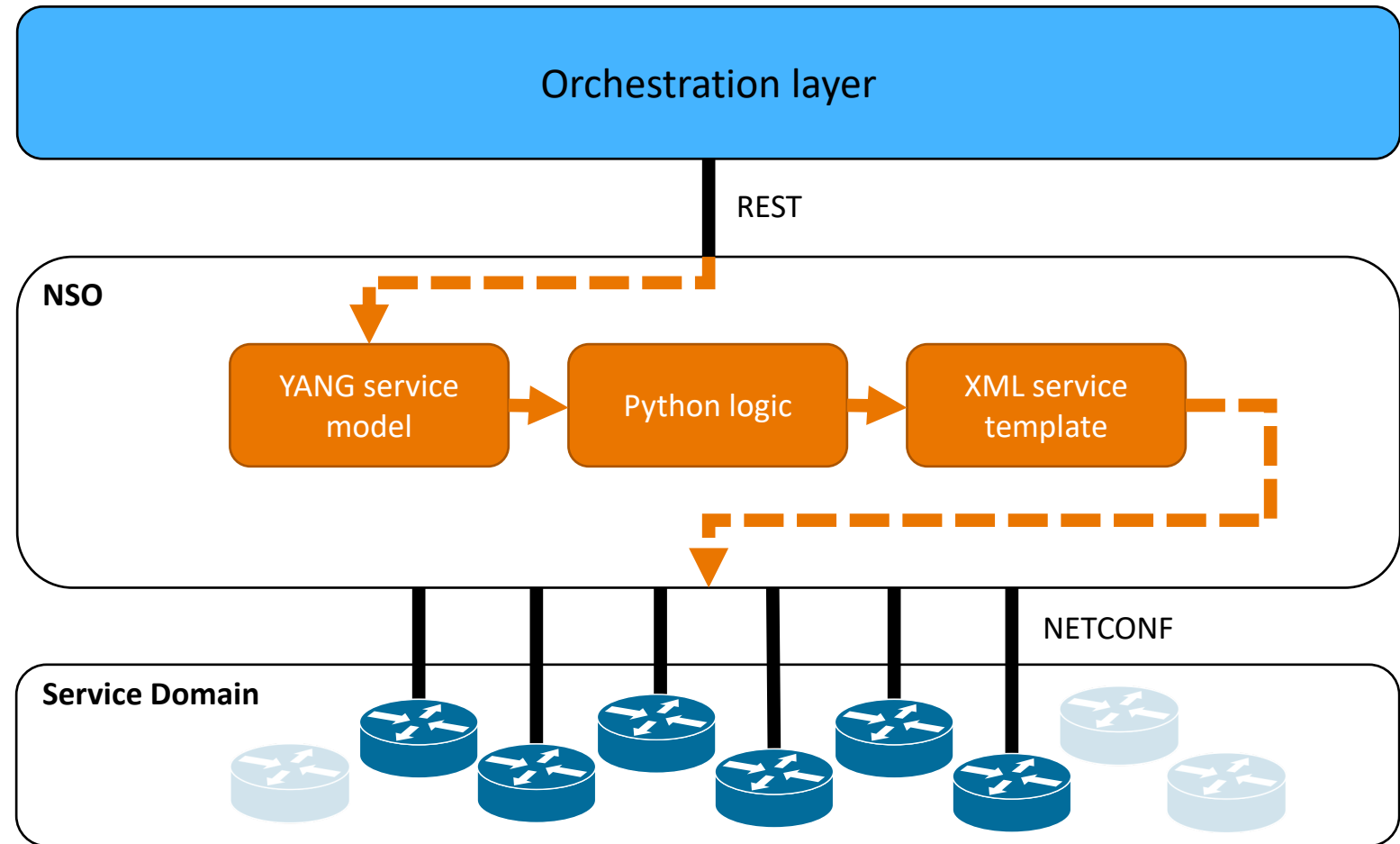
    leaf name {
      tailf:info "<uuid:string>";
      mandatory true;
      type string;
    }

    leaf device {
      tailf:info "Select device";
      mandatory true;
      type leafref {
        path "/ncs:devices/ncs:device/ncs:name";
      }
    }

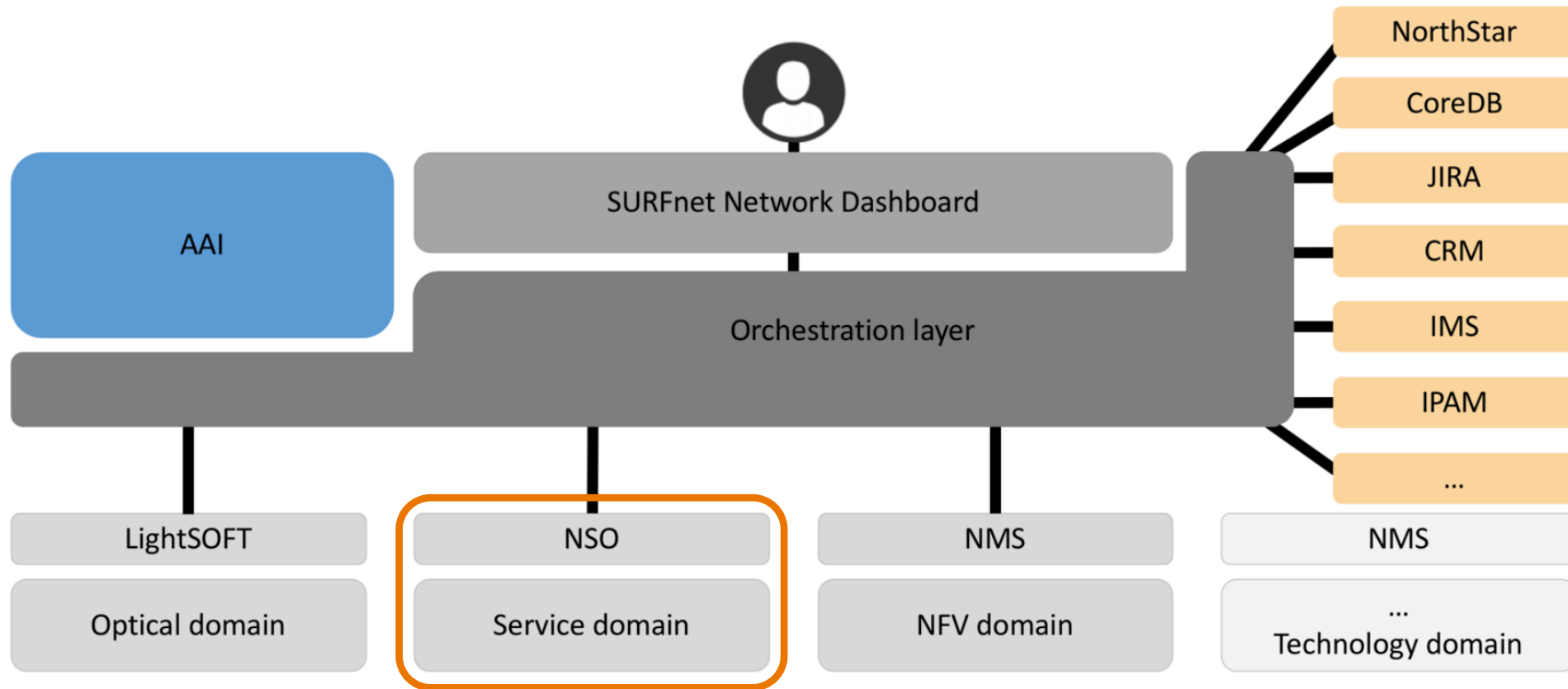
    leaf interface {
      tailf:info "Interface on device (eg xe-1/0/2)";
      mandatory true;
      type string;
    }

    uses surfnet:workflow_customer_service;

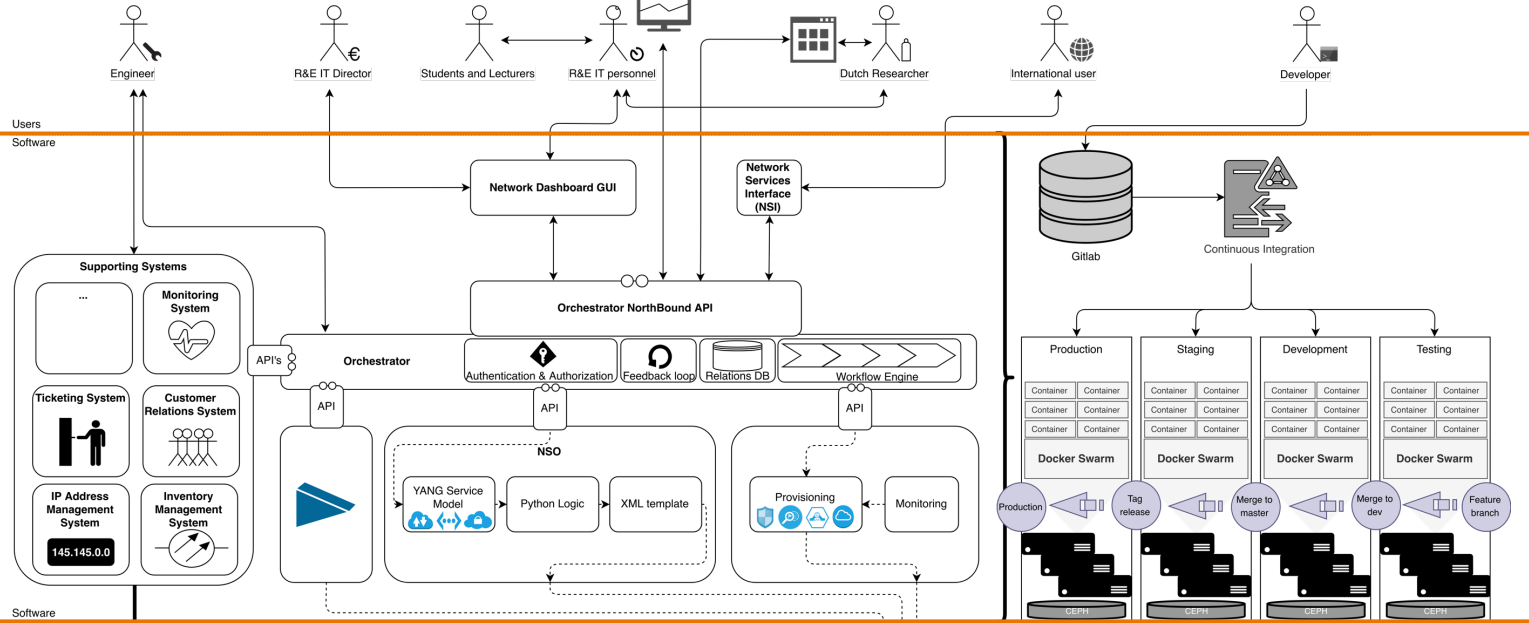
    leaf speed {
      when "not( starts-with(..interface, 'ae'))";
      tailf:info "Interface speed";
      type enumeration {
        enum "1g";
        enum "10g";
        enum "40g";
        enum "100g";
        enum "other";
      }
    }
  }
}
```



Highlevel overview network automation architecture

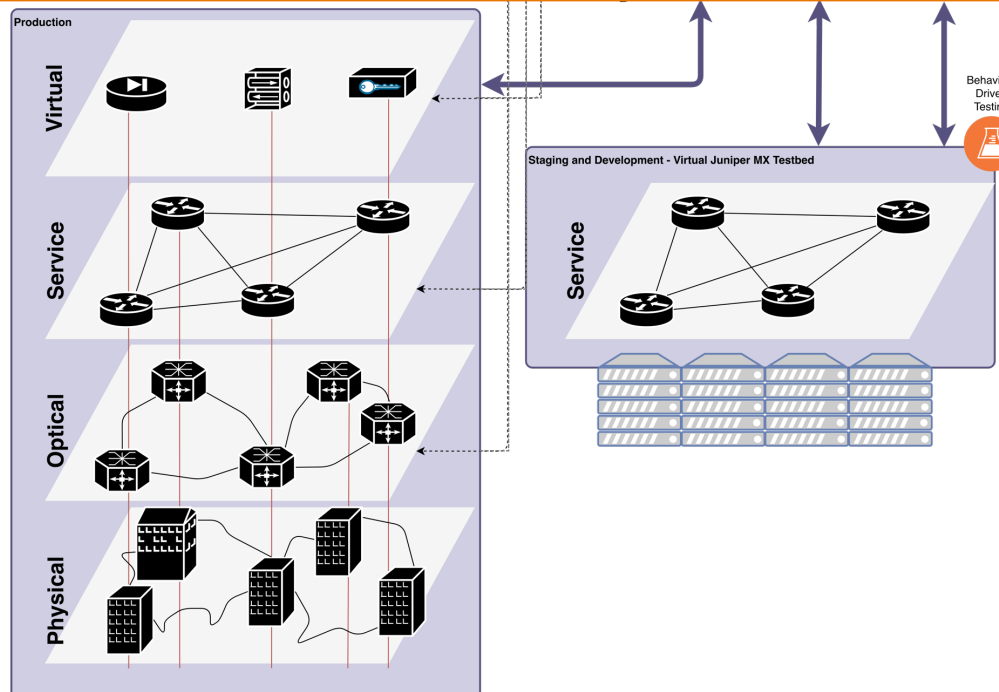


USERS



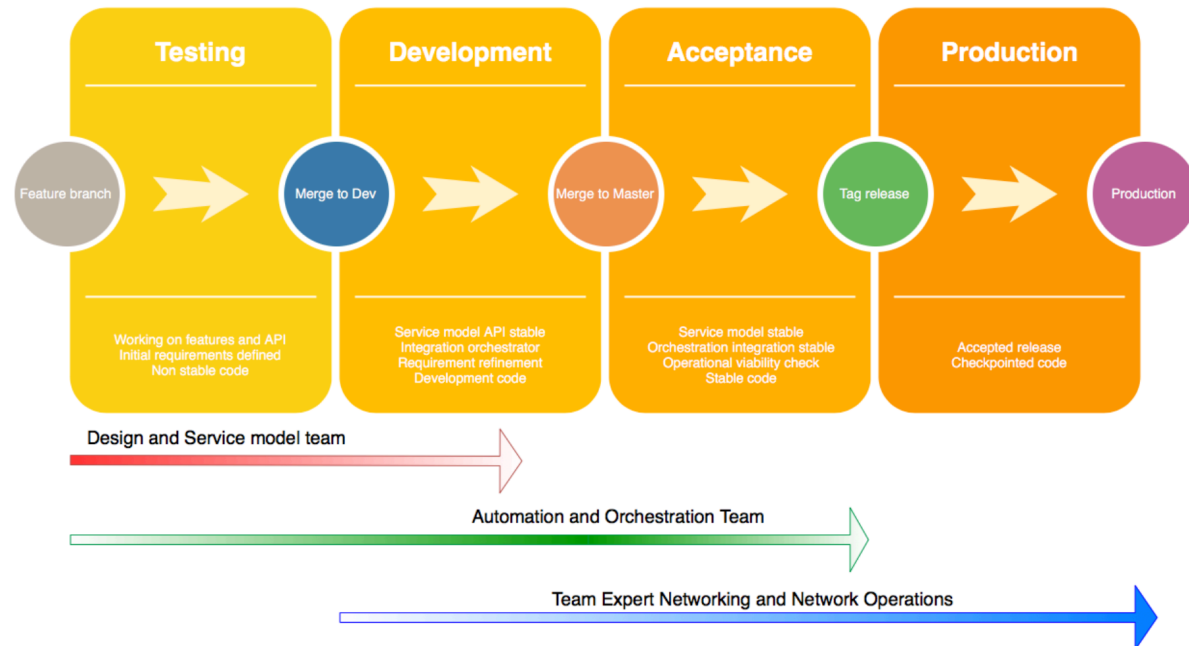
SOFTWARE

HARDWARE



How does a Virtual Testbed with NSO help?

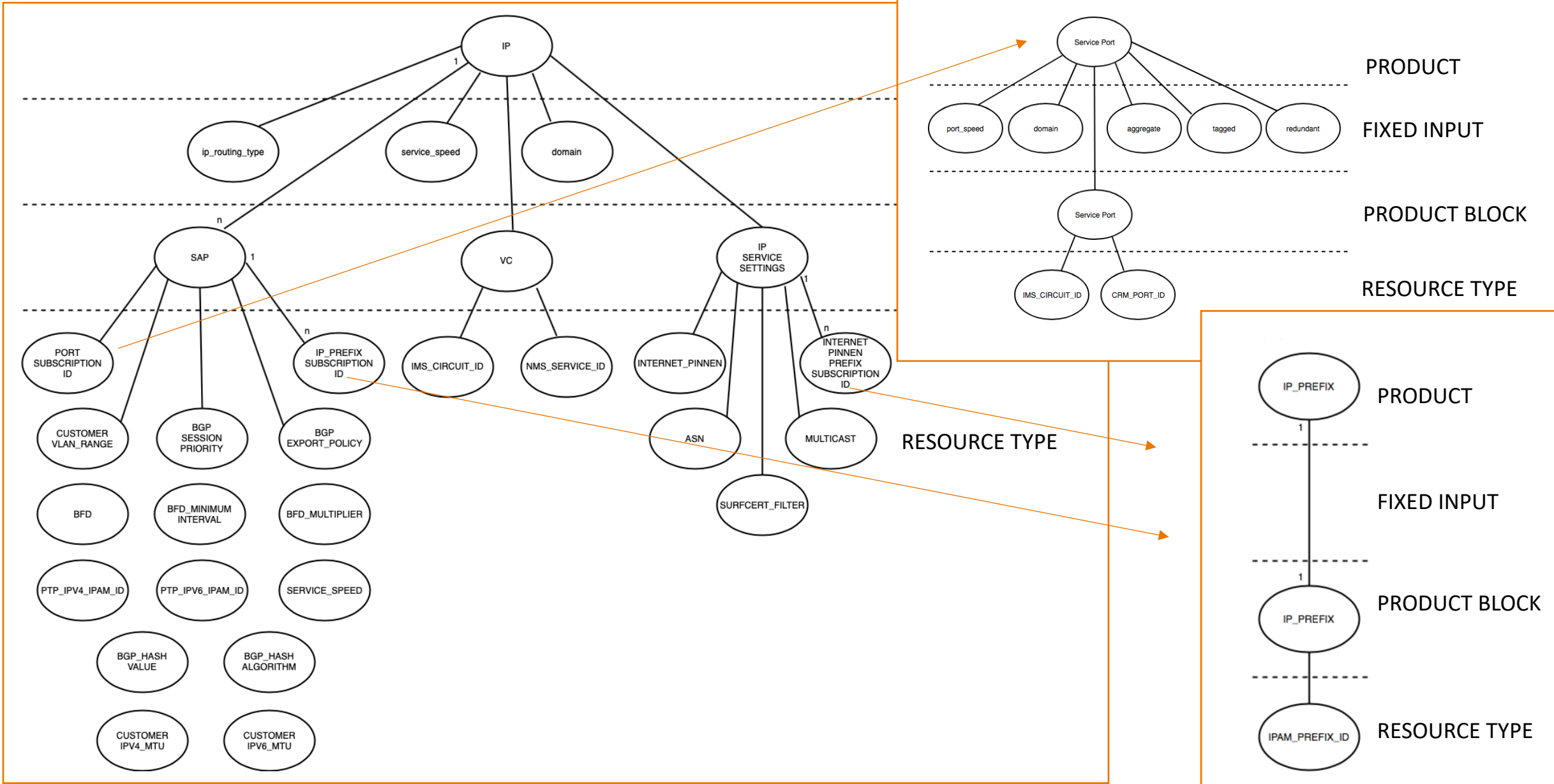
- Reliably testing of all network services
- Integration testing with the orchestration software and the network
- Fully reconfigurable and ability to “reset” to a known state



NSO service models products

- Customer Service products
 - Service Ports
 - IP Service
 - Lightpath (EPL)
 - ELAN Service
 - L3VPN Service
- NOC facing products
 - Nodes (network elements)
 - Core Links (between nodes)
 - IP peerings

Glue everything together: products and product blocks



Subscription

Subscription ID	258b099d-4df4-4195-a1fd-b538e3621ee2
Name	SN8 SURFInternet BGP
Description	NETSURF IP UT042A
Start date	11-6-2019 CET
End date	
Status	active
In sync	<input checked="" type="checkbox"/>
Customer	netSURF
Customer UUID	6ce9e76b-0c11-e511-80d0-005056956c1a

Fixed Inputs

domain	SURFNET8
ip_routing_type	BGP

Product Blocks

IPSS - IP Service Settings
Instance ID: f9ee2e74-930f-4a79-b960-189fa9543eaf

ASN	64850
INTERNETPINNEN	False
MULTICAST	True
SURFCERT_FILTER	default

SAP - Service Attach Point
Instance ID: 8a8209cc-aa66-47b3-8e4d-b940bb71a368

BFD	False
BFD_MINIMUM_INTERVAL	900
BFD_MULTIPLIER	3
BGP_EXPORT_POLICY	default
BGP_HASH_ALGORITHM	no
BGP_SESSION_PRIORITY	primary
CUSTOMER_IPV4_MTU	1500
CUSTOMER_IPV6_MTU	1500
IP_PREFIX_SUBSCRIPTION_ID	a2985b4a-d3f1-4205-8967-59f512ff6146
IP_PREFIX_SUBSCRIPTION_ID	6c5f44fd-28f3-4d58-ad6c-db294359b2ca
PORT_SUBSCRIPTION_ID	f71c1926-a69e-4a8f-bf89-ed27c6cd74cf
PTP_IPV4_IPAM_ID	3920
PTP_IPV6_IPAM_ID	3921
VLANRANGE	3333

VC - Virtual Circuit
Instance ID: 9f2e4c53-5f37-4989-9d55-8c60b9e9b8bc

IMS_CIRCUIT_ID	32649
NSO_SERVICE_ID	2e5e1a03-b077-4d94-bf54-54bb6767f496
SERVICE_SPEED	1000

- Actions**
- [Terminate Subscription](#)
 - [Modify SAP resource settings \(BGP settings, IPV4/6 MTU & VLAN RANGE if applicable\)](#)
 - [Remove port\(s\) from SN8 BGP IP](#)
 - [Change the IP Service Settings \(IPSS\)](#)
 - [Add port\(s\) to SN8 BGP IP](#)

Product

Name	SN8 SURFInternet BGP
Description	SN8 SURFInternet connection using BGP
Product type	IP
Tag	IPBGP
Status	active
Created	28-3-2019 13:47:05 CET
End date	

Processes

CREATE - sn8_request_bgp_ip	de7e033f-9c0d-4b55-9054-fe02347a1a1c
-----------------------------	--

Parent Subscriptions related to NETSURF IP UT042A

CUSTOMER	ID	DESCRIPTION	IN SYNC	PRODUCT	STATUS	TYPE	START DATE
netSURF	f71c1926	NETSURF SP UT042A 1 Gbit/s	<input checked="" type="checkbox"/>	SN8 Service Port 1G	active	SP	7-6-2019 CET
SURFnet bv	a2985b4a	SURFNET prefix 195.169.130.0/24 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET
SURFnet bv	6c5f44fd	SURFNET prefix 2001.610.512:/48 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET

Generic Service Settings for IP service

IPSS - IP Service Settings

Instance ID: f9ee2e74-930f-4a79-b960-189fa9543eaf

ASN	64850
INTERNETPINNEN	False
MULTICAST	True
SURFCERT_FILTER	default



Subscription

Subscription ID	258b099d-4df4-4195-a1fd-b538e3621ee2
Name	SN8 SURFInternet BGP
Description	NETSURF IP UT042A
Start date	11-6-2019 CET
End date	
Status	active
In sync	<input checked="" type="checkbox"/>
Customer	netSURF
Customer UUID	6ce9e76b-0c11-e511-80d0-005056956c1a

Fixed Inputs

domain	SURFNET8
ip_routing_type	BGP

Product Blocks

IPSS - IP Service Settings
Instance ID: f9ee2e74-930f-4a79-b960-189f9543eaf

ASN	64850
INTERNETPINNEN	False
MULTICAST	True
SURFCERT_FILTER	default

SAP - Service Attach Point
Instance ID: 8a8209cc-aaa6-47b3-8e4d-b94bbb71a368

BFD	False
BFD_MINIMUM_INTERVAL	900
BFD_MULTIPLIER	3
BGP_EXPORT_POLICY	default
BGP_HASH_ALGORITHM	no
BGP_SESSION_PRIORITY	primary
CUSTOMER_IPV4_MTU	1500
CUSTOMER_IPV6_MTU	1500
IP_PREFIX_SUBSCRIPTION_ID	a2985b4a-da3f-4205-8967-59f512ff6146
IP_PREFIX_SUBSCRIPTION_ID	6c5f44fd-28f3-4d58-ad6c-db294359b2ca
PORT_SUBSCRIPTION_ID	f71c1926-a69e-4a8f-bf89-ed27c6cd74cf
PTP_IPV4_IPAM_ID	3920
PTP_IPV6_IPAM_ID	3921
VLANRANGE	3333

VC - Virtual Circuit
Instance ID: 9f2e4c53-5f37-4989-9d55-8c60b9e988bc

IMS_CIRCUIT_ID	32649
NSO_SERVICE_ID	2e5e1a03-b077-4d94-bf54-54bb6767f496
SERVICE_SPEED	1000

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Product type	IP
Tag	IPBGP
Status	active
Created	28-3-2019 13:47:05 CET
End date	

Processes

CREATE - sn8_request_bgp_ip	de7e033f-9c0d-4b55-9054-fe02347a1a1c
-----------------------------	--------------------------------------

Parent Subscriptions related to NETSURF IP UT042A

CUSTOMER	ID	DESCRIPTION	IN SYNC	PRODUCT	STATUS	TYPE	START DATE
netSURF	f71c1926	NETSURF SP UT042A 1 Gbit/s	<input checked="" type="checkbox"/>	SN8 Service Port 1G	active	SP	7-6-2019 CET
SURFnet bv	a2985b4a	SURFNET prefix 195.169.130.0/24 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET
SURFnet bv	6c5f44fd	SURFNET prefix 2001.610.512/48 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET

Service Attach Point with service parameters

SAP - Service Attach Point

Instance ID: 8a8209cc-aaa6-47b3-8e4d-b94bbb71a368

BFD	False
BFD_MINIMUM_INTERVAL	900
BFD_MULTIPLIER	3
BGP_EXPORT_POLICY	default
BGP_HASH_ALGORITHM	no
BGP_SESSION_PRIORITY	primary
CUSTOMER_IPV4_MTU	1500
CUSTOMER_IPV6_MTU	1500
IP_PREFIX_SUBSCRIPTION_ID	+ a2985b4a-da3f-4205-8967-59f512ff6146
IP_PREFIX_SUBSCRIPTION_ID	+ 6c5f44fd-28f3-4d58-ad6c-db294359b2ca
PORT_SUBSCRIPTION_ID	+ f71c1926-a69e-4a8f-bf89-ed27c6cd74cf
PTP_IPV4_IPAM_ID	+ 3920
PTP_IPV6_IPAM_ID	+ 3921
VLANRANGE	3333



Subscription

Subscription ID	258b099d-4df4-4195-a1fd-b538e3621ee2
Name	SN8 SURFInternet BGP
Description	NETSURF IP UT042A
Start date	11-6-2019 CET
End date	
Status	active
In sync	<input checked="" type="checkbox"/>
Customer	netSURF
Customer UUID	6ce9e76b-0c11-e511-80d0-005056956c1a

Fixed Inputs

domain	SURFNET8
ip_routing_type	BGP

Product Blocks

IPSS - IP Service Settings
Instance ID: f9ee2e74-930f-4a79-b960-189f9543eaf

ASN	64850
INTERNETPINNEN	False
MULTICAST	True
SURFCERT_FILTER	default

SAP - Service Attach Point
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BFD_MINIMUM_INTERVAL	900
BFD_MULTIPLIER	3
BGP_EXPORT_POLICY	default
BGP_HASH_ALGORITHM	no
BGP_SESSION_PRIORITY	primary
CUSTOMER_IPV4_MTU	1500
CUSTOMER_IPV6_MTU	1500
IP_PREFIX_SUBSCRIPTION_ID	a2985b4a-d33f-4205-8967-59f512ff6146
IP_PREFIX_SUBSCRIPTION_ID	6c5f44fd-28f3-4d58-ad6c-db294359b2ca
PORT_SUBSCRIPTION_ID	f71c1926-a69e-4a8f-bf89-ed27c6cd74cf
PTP_IPV4_IPAM_ID	3920
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VLANRANGE	3333

VC - Virtual Circuit
Instance ID: 9f2e4c53-5f37-4989-9d55-8c60b9e9b8bc

IMS_CIRCUIT_ID	32649
NSO_SERVICE_ID	2e5e1a03-b077-4d94-bf54-54bb6767f496
SERVICE_SPEED	1000

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Status	active
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Processes

CREATE - sn8_request_bgp_ip	de7e033f-9c0d-4b55-9054-fe02347a1a1c
-----------------------------	--

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netSURF	f71c1926	NETSURF SP UT042A 1 Gbit/s	<input checked="" type="checkbox"/>	SN8 Service Port 1G	active	SP	7-6-2019 CET
SURFnet bv	a2985b4a	SURFNET prefix 195.169.130.0/24 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET
SURFnet bv	6c5f44fd	SURFNET prefix 2001.610.512:/48 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET

DETAILS WITH PHYSICAL AND LOGICAL CONNECTIVITY LIKE
OPTICS TYPE
NODE / SLOT / PORT
ODF

VC - Virtual Circuit

Instance ID: 9f2e4c53-5f37-4989-9d55-8c60b9e9b8bc

IMS_CIRCUIT_ID	+ 32649
NSO_SERVICE_ID	2e5e1a03-b077-4d94-bf54-54bb6767f496
SERVICE_SPEED	1000



Subscription

Subscription ID	258b099d-4df4-4195-a1fd-b538e3621ee2
Name	SN8 SURFInternet BGP
Description	NETSURF IP UT042A
Start date	11-6-2019 CET
End date	
Status	active
In sync	<input checked="" type="checkbox"/>
Customer	netSURF
Customer UUID	6ce9e76b-0c11-e511-80d0-005056956c1a

Fixed Inputs

domain	SURFNET8
ip_routing_type	BGP

Product Blocks

IPSS - IP Service Settings
Instance ID: f9ee2e74-930f-4a79-b960-189f9543eaf

ASN	64850
INTERNETPINNEN	False
MULTICAST	True
SURFCERT_FILTER	default

SAP - Service Attach Point
Instance ID: 8a8209cc-aa6-47b3-8e4d-b940bb71a368

BFD	False
BFD_MINIMUM_INTERVAL	900
BFD_MULTIPLIER	3
BGP_EXPORT_POLICY	default
BGP_HASH_ALGORITHM	no
BGP_SESSION_PRIORITY	primary
CUSTOMER_IPV4_MTU	1500
CUSTOMER_IPV6_MTU	1500
IP_PREFIX_SUBSCRIPTION_ID	a2985b4a-d3f1-4205-8967-59f512ff6146
IP_PREFIX_SUBSCRIPTION_ID	6c5f44fd-28f3-4d58-ad6c-db294359b2ca
PORT_SUBSCRIPTION_ID	f71c1926-a69e-4a8f-bf89-ed27c6cd74cf
PTP_IPV4_IPAM_ID	3920
PTP_IPV6_IPAM_ID	3921
VLANRANGE	3333

VC - Virtual Circuit
Instance ID: 9f2e4c53-5f37-4989-9d55-8c60b9e9b8bc

IMS_CIRCUIT_ID	32649
NSO_SERVICE_ID	2e5e1a03-b077-4d94-bf54-54bb67679496
SERVICE_SPEED	1000

- Actions**
- [Terminate Subscription](#)
 - [Modify SAP resource settings \(BGP settings, IPV4/6 MTU & VLANRANGE if applicable\)](#)
 - [Remove port\(s\) from SN8 BGP IP](#)
 - [Change the IP Service Settings \(IPSS\)](#)
 - [Add port\(s\) to SN8 BGP IP](#)

Product

Name	SN8 SURFInternet BGP
Description	SN8 SURFInternet connection using BGP
Product type	IP
Tag	IPBGP
Status	active
Created	28-3-2019 13:47:05 CET
End date	

Processes

CREATE - sn8_request_bgp_ip	de7e033f-9c0d-4b55-9054-fe02347a1a1c
-----------------------------	--

Parent Subscriptions related to NETSURF IP UT042A

CUSTOMER	ID	DESCRIPTION	IN SYNC	PRODUCT	STATUS	TYPE	START DATE
netSURF	f71c1926	NETSURF SP UT042A 1 Gbit/s	<input checked="" type="checkbox"/>	SN8 Service Port 1G	active	SP	7-6-2019 CET
SURFnet bv	a2985b4a	SURFNET prefix 195.169.130.0/24 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET
SURFnet bv	6c5f44fd	SURFNET prefix 2001.610.512:/48 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET

LIFE CYCLE MANAGEMENT ACTIONS

Actions

[Terminate Subscription](#)

[Modify SAP resource settings \(BGP settings, IPV4/6 MTU & VLANRANGE if applicable\)](#)

[Remove port\(s\) from SN8 BGP IP](#)

[Change the IP Service Settings \(IPSS\)](#)

[Add port\(s\) to SN8 BGP IP](#)



Subscription

Subscription ID	258b099d-4df4-4195-a1fd-b538e3621ee2
Name	SN8 SURFinternet BGP
Description	NETSURF IP UT042A
Start date	11-6-2019 CET
End date	
Status	active
In sync	<input checked="" type="checkbox"/>
Customer	netSURF
Customer UUID	6ce9e76b-0c11-e511-80d0-005056956c1a

Fixed Inputs

domain	SURFNET8
ip_routing_type	BGP

Product Blocks

IPSS - IP Service Settings
Instance ID: f9ee2e74-930f-4a79-b960-189f9543eaf

ASN	64850
INTERNETPINNEN	False
MULTICAST	True
SURFCERT_FILTER	default

SAP - Service Attach Point
Instance ID: 8a8209cc-aa6-47b3-8e4d-b940bb71a368

BFD	False
BFD_MINIMUM_INTERVAL	900
BFD_MULTIPLIER	3
BGP_EXPORT_POLICY	default
BGP_HASH_ALGORITHM	no
BGP_SESSION_PRIORITY	primary
CUSTOMER_IPV4_MTU	1500
CUSTOMER_IPV6_MTU	1500
IP_PREFIX_SUBSCRIPTION_ID	a2985b4a-da3f-4205-8967-59f512ff6146
IP_PREFIX_SUBSCRIPTION_ID	6c5f44fd-28f9-4d58-ad6c-db294359b2ca
PORT_SUBSCRIPTION_ID	f71c192e-a69e-4a8f-bf89-ed27e6cd74cf
PTP_IPV4_IPAM_ID	3920
PTP_IPV6_IPAM_ID	3921
VLANRANGE	3333

VC - Virtual Circuit
Instance ID: 9f2e4c53-5f37-4989-9d55-8c60b9e988bc

IMS_CIRCUIT_ID	32649
NSO_SERVICE_ID	2e5e1a03-b077-4d94-bf54-54bb6767f496
SERVICE_SPEED	1000

- Actions**
- [Terminate Subscription](#)
 - [Modify SAP resource settings \(BGP settings, IPV4/MTU & VLANRANGE if applicable\)](#)
 - [Remove port\(s\) from SN8 BGP IP](#)
 - [Change the IP Service Settings \(IPSS\)](#)
 - [Add port\(s\) to SN8 BGP IP](#)

Product

Name	SN8 SURFinternet BGP
Description	SN8 SURFinternet connection using BGP
Product type	IP
Tag	IPBGP
Status	active
Created	28-3-2019 13:47:05 CET
End date	

Processes

CREATE - sn8_request_bgp_ip	de7e033f-9c0d-4b55-9054-fe02347a1a1c
-----------------------------	--

Parent Subscriptions related to NETSURF IP UT042A

CUSTOMER	ID	DESCRIPTION	IN SYNC	PRODUCT	STATUS	TYPE	START DATE
netSURF	f71c192e	NETSURF SP UT042A 1 Gbit/s	<input checked="" type="checkbox"/>	SN8 Service Port 1G	active	SP	7-6-2019 CET
SURFnet bv	a2985b4a	SURFNET prefix 195.169.130.0/24 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET
SURFnet bv	6c5f44fd	SURFNET prefix 2001.610.512/48 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET

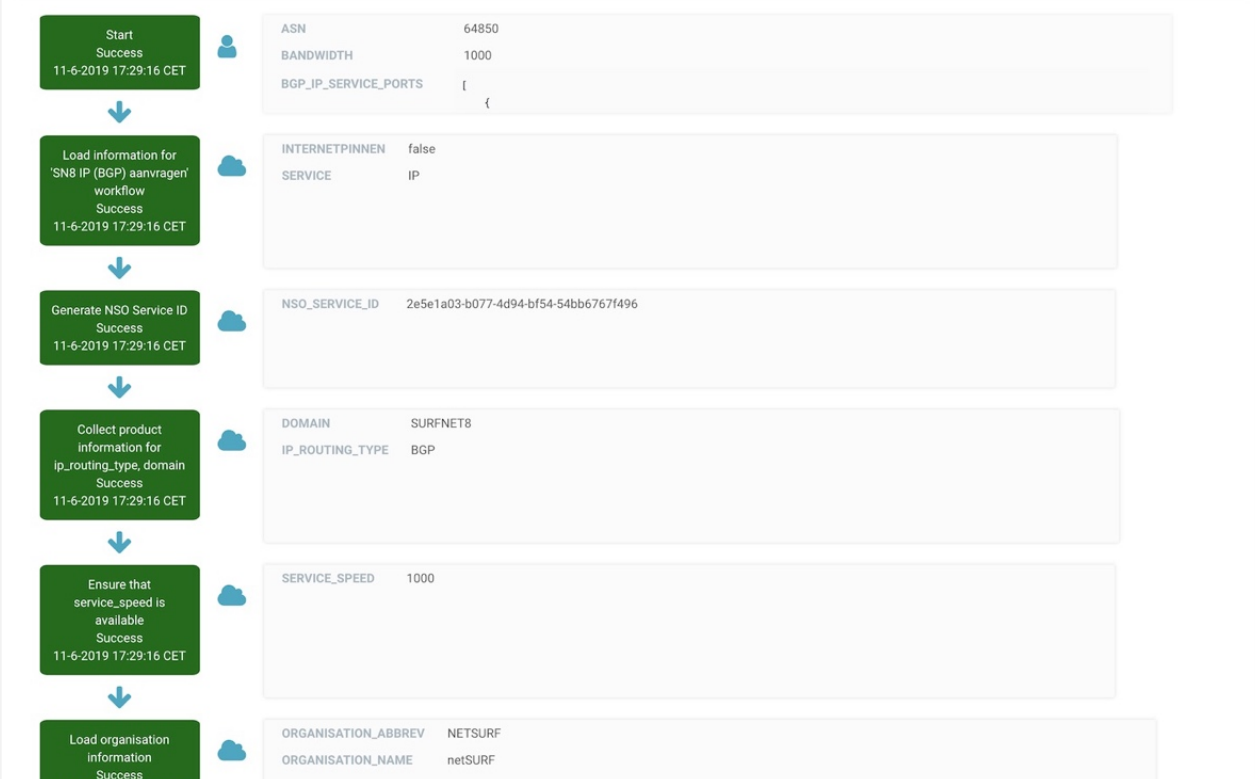
WORKFLOW PROCESS OF CREATION

PROCESS

Process SN8 SURFinternet BGP of workflow sn8_request_bgp_ip for netSURF SHOW DETAILS SHOW STATE INPUT SHOW RAW JSON

[SHOW SUBSCRIPTION RELATED BY THIS CREATE PROCESS](#)

STATUS	Completed
ASSIGNEE	SYSTEM
CURRENT STEP	Done
STARTED	11-6-2019 17:29:16 CET
LAST UPDATED	11-6-2019 17:32:45 CET



Subscription

Subscription ID	258b099d-4df4-4195-a1fd-b538e3621ee2
Name	SN8 SURFInternet BGP
Description	NETSURF IP UT042A
Start date	11-6-2019 CET
End date	
Status	active
In sync	<input checked="" type="checkbox"/>
Customer	netSURF
Customer UUID	6ce9e76b-0c11-e511-80d0-005056956c1a

Fixed Inputs

domain	SURFNET8
ip_routing_type	BGP

Product Blocks

IPSS - IP Service Settings

Instance ID: f9ee2e74-930f-4a79-b960-189f9543eaf

ASN	64850
INTERNETPINNEN	False
MULTICAST	True
SURFCERT_FILTER	default

SAP - Service Attach Point

Instance ID: 8a8209cc-aa65-47b3-8e4d-b940bb71a368

BFD	False
BFD_MINIMUM_INTERVAL	900
BFD_MULTIPLIER	3
BGP_EXPORT_POLICY	default
BGP_HASH_ALGORITHM	no
BGP_SESSION_PRIORITY	primary
CUSTOMER_IPV4_MTU	1500
CUSTOMER_IPV6_MTU	1500
IP_PREFIX_SUBSCRIPTION_ID	a2985b4a-da3f-4205-8967-59f512ff6146
IP_PREFIX_SUBSCRIPTION_ID	6c5f44fd-28f3-4d58-ad6c-db294359b2ca
PORT_SUBSCRIPTION_ID	f71c1926-a69e-4a8f-bf89-ed27c6cd74cf
PTP_IPV4_IPAM_ID	3920
PTP_IPV6_IPAM_ID	3921
VLANRANGE	3333

VC - Virtual Circuit

Instance ID: 9f2e4c53-5f37-4989-9d55-8c60b9e98b8c

IMS_CIRCUIT_ID	32649
NSO_SERVICE_ID	2e5e1a03-b077-4d94-bf54-54bb676f496
SERVICE_SPEED	1000

- ### Actions
- [Terminate Subscription](#)
 - [Modify SAP resource settings \(BGP settings, IPV4/6 MTU & VLAN RANGE if applicable\)](#)
 - [Remove port\(s\) from SN8 BGP IP](#)
 - [Change the IP Service Settings \(IPSS\)](#)
 - [Add port\(s\) to SN8 BGP IP](#)

Product

Name	SN8 SURFInternet BGP
Description	SN8 SURFInternet connection using BGP
Product type	IP
Tag	IPBGP
Status	active
Created	28-3-2019 13:47:05 CET
End date	

Processes

CREATE - sn8_request_bgp_ip	de7e033f-9c0d-4b55-9054-fe02347a1a1c
-----------------------------	--

Parent Subscriptions related to NETSURF IP UT042A

CUSTOMER	ID	DESCRIPTION	IN SYNC	PRODUCT	STATUS	TYPE	START DATE
netSURF	f71c1926	NETSURF SP UT042A 1 Gbit/s	<input checked="" type="checkbox"/>	SN8 Service Port 1G	active	SP	7-6-2019 CET
SURFnet bv	a2985b4a	SURFNET prefix 195.169.130.0/24 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET
SURFnet bv	6c5f44fd	SURFNET prefix 2001.610.512/48 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET

WORKFLOW PROCESS OF CREATION

Success
11-6-2019 17:29:17 CET

Load port information
Success
11-6-2019 17:29:17 CET

Create subscription
Success
11-6-2019 17:29:17 CET

Create Process
Subscription relation
Success
11-6-2019 17:29:17 CET

Load IP Prefix
Subscriptions
Success
11-6-2019 17:29:17 CET

Prepare BGP SAP
settings with defaults
Success
11-6-2019 17:29:17 CET

```
HUMAN_SERVICE_SPEED 1 Gbit/s
IMS_SERVICE_CODE IP
SERVICE_PORTS [
  {
    "ims_service_id": 32619,
    "ims_service_speed": "1000BASE-LX",
    "pop_site": "UT042A",
    "port": "0/1/5",
    "port_id": 676988,
    "port_mode": "tagged",
    "port_name": "UT042A_SP_TAGGED_NETSURF_F71C1926",
    "port_node": "UT042A~JNX-02",
    "port_node_type": "HX204",
    "port_patchposition": "FAKE_SN7-ODF_02/06 (SC/PC)",
    "subscription_id": "f71c1926-a69e-4a8f-bf89-ed27c6cd74cf",
    "tag": "SP",
    "vlan": "3333"
  }
]
```

SUBSCRIPTION_NAME NETSURF IP UT042A

SUBSCRIPTION_ID 258b099d-4df4-4195-a1fd-b538e3621ee2

```
INTERNETPINNEN_PREFIX_SUBSCRIPTION_ID
INTERNETPINNEN_PREFIXES
IP_PREFIXES [
  {

```

```
SAP1 {
  "bfd": {
    "enabled": false,
    "minimum_interval": 900,
    "multiplier": 3
  },
  "bgp_export_policy": "default",
  "bgp_hash_algorithm": "no",
  "bgp_session_priority": "primary",
  "customer_ipv4_mtu": 1500,
  "customer_ipv6_mtu": 1500,
  "ip_prefix_subscriptions": "a2985b4a-da3f-4205-8967-59f512ff6146,6c5f44fd-28f3-4d58-ad6c-db294359b2ca",
  "ipv4_prefixlen": "/31",
  "port_subscription_id": "f71c1926-a69e-4a8f-bf89-ed27c6cd74cf",
  "service_port": [
    {
      "port_mode": "tagged",
      "subscription_id": "f71c1926-a69e-4a8f-bf89-ed27c6cd74cf",
      "vlan": "3333"
    }
  ],
  "vlanrange": "3333"
}
```

Subscription

Subscription ID	258b099d-4df4-4195-a1fd-b538e3621ee2
Name	SN8 SURFInternet BGP
Description	NETSURF IP UT042A
Start date	11-6-2019 CET
End date	
Status	active
In sync	<input checked="" type="checkbox"/>
Customer	netSURF
Customer UUID	6ce9e76b-0c11-e511-80d0-005056956c1a

Fixed Inputs

domain	SURFNET8
ip_routing_type	BGP

Product Blocks

IPSS - IP Service Settings

Instance ID: f9ee2e74-930f-4a79-b960-189f9543eaf

ASN	64850
INTERNETPINNEN	False
MULTICAST	True
SURFCERT_FILTER	default

SAP - Service Attach Point

Instance ID: 8a8209cc-aaa6-47b3-8e4d-b94bbb71a368

BFD	False
BFD_MINIMUM_INTERVAL	900
BFD_MULTIPLIER	3
BGP_EXPORT_POLICY	default
BGP_HASH_ALGORITHM	no
BGP_SESSION_PRIORITY	primary
CUSTOMER_IPV4_MTU	1500
CUSTOMER_IPV6_MTU	1500
IP_PREFIX_SUBSCRIPTION_ID	a2985b4a-da3f-4205-8967-59f512ff6146
IP_PREFIX_SUBSCRIPTION_ID	6c5f44fd-28f9-4d58-ad6c-db294359b2ca
PORT_SUBSCRIPTION_ID	f71c1926-a69e-4a8f-bf89-ed27ecfd74cf
PTP_IPV4_IPAM_ID	3920
PTP_IPV6_IPAM_ID	3921
VLANRANGE	3333

VC - Virtual Circuit

Instance ID: 9f2e4c53-5f37-4989-9d55-8c60b9e9b8bc

IMS_CIRCUIT_ID	32649
NSO_SERVICE_ID	2e5e1a03-b077-4d94-bf54-54bb6767f496
SERVICE_SPEED	1000

Actions

- [Terminate Subscription](#)
- [Modify SAP resource settings \(BGP settings, IPV4/6 MTU & VLAN RANGE if applicable\)](#)
- [Remove port\(s\) from SN8 BGP IP](#)
- [Change the IP Service Settings \(IPSS\)](#)
- [Add port\(s\) to SN8 BGP IP](#)

Product

Name	SN8 SURFInternet BGP
Description	SN8 SURFInternet connection using BGP
Product type	IP
Tag	IPBGP
Status	active
Created	28-3-2019 13:47:05 CET
End date	

Processes

CREATE - sn8_request_bgp_ip	de7e033f-9c0d-4b55-9054-fe02347a1a1c
-----------------------------	--

Parent Subscriptions related to NETSURF IP UT042A

CUSTOMER	ID	DESCRIPTION	IN SYNC	PRODUCT	STATUS	TYPE	START DATE
netSURF	f71c1926	NETSURF SP UT042A 1 Gbit/s	<input checked="" type="checkbox"/>	SN8 Service Port 1G	active	SP	7-6-2019 CET
SURFnet bv	a2985b4a	SURFNET prefix 195.169.130.0/24 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET
SURFnet bv	6c5f44fd	SURFNET prefix 2001:610:512::/48 (SURFnet8)	<input checked="" type="checkbox"/>	IP Prefix	active	IP_PREFIX	24-1-2019 CET

WORKFLOW PROCESS OF CREATION

11-6-2019 17:29:52 CET

Update name of IMS service
Success
11-6-2019 17:29:52 CET

Update subscription
Success
11-6-2019 17:29:53 CET

Load SAP instance IDs.
Success
11-6-2019 17:29:53 CET

Update the description field of PTP prefixes
Success
11-6-2019 17:29:53 CET

Deploy the SURFNET8 BGP service model
Success
11-6-2019 17:29:59 CET

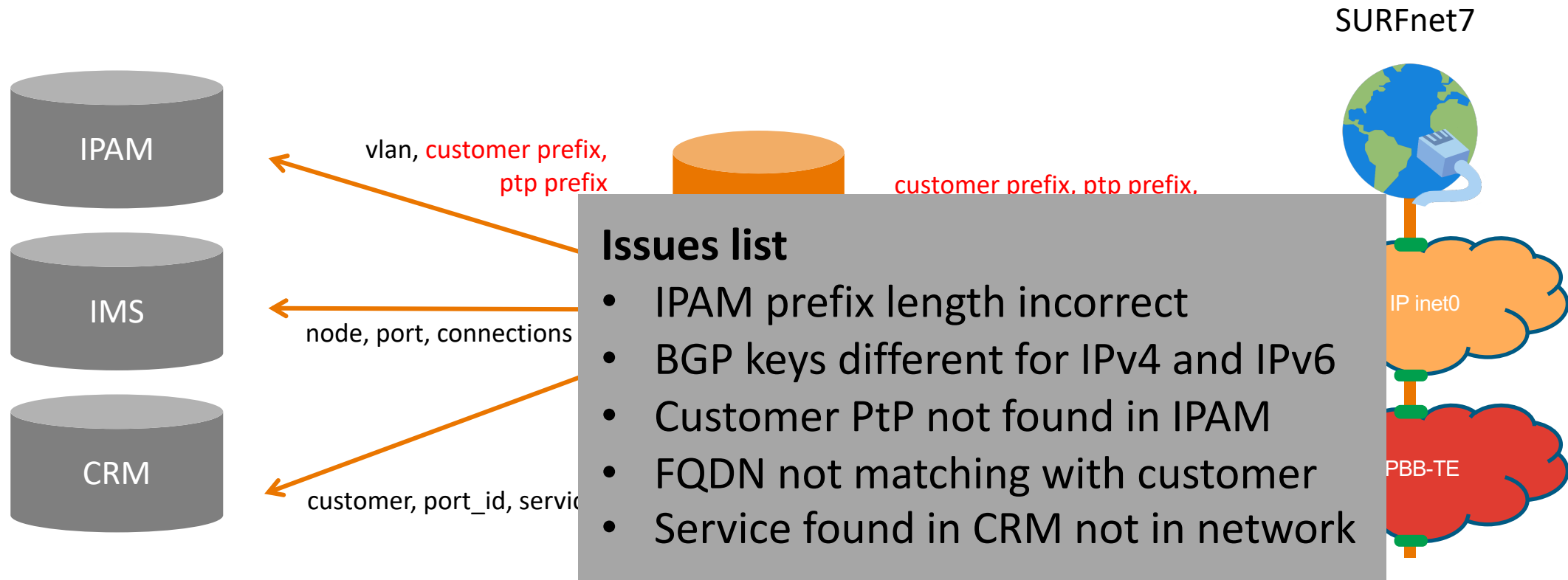
```
mer surf.net",
-02.surf.net",
...
"ipv4_surfside": "145.145.2.218",
"ipv6_clientside": "2001:610:fc7:0:145:145:2:219",
"ipv6_surfside": "2001:610:fc7:0:145:145:2:218"
}
```

```
IMS_CIRCUIT_NAME UT042A_IP_BGP_NETSURF_258b099d
```

```
SAP1 {
  "instance_id": "8a8209cc-aaa6-47b3-8e4d-b94bbb71a368"
}
```

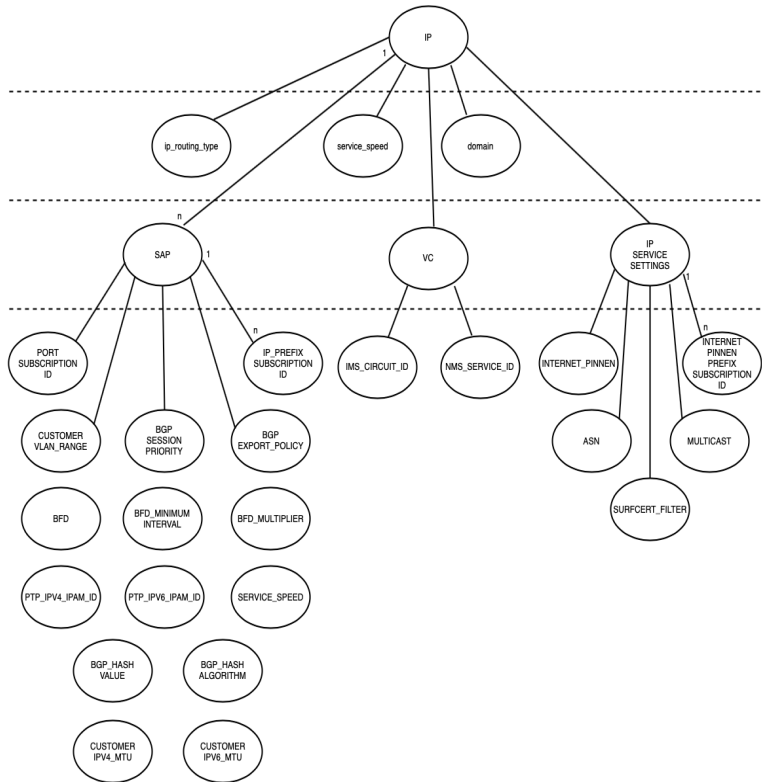
```
NSO_PAYLOAD {
  "l3internet:l3internet-bgp": {
    "cust_asn": "64850",
    "customer_name": "NETSURF",
    "endpoints": [
      {
        "bfd_enabled": false,
        "bgp_session_priority": "primary",
        "device": "ut042a-jnx-02",
        "export_policy": "default",
        "instance_id": "8a8209cc-aaa6-47b3-8e4d-b94bbb71a368",
        "interface": "xe-0/1/5",
        "ipv4_address": "145.145.2.218/31",
        "ipv4_mtu": 1500,
        "ipv4_prefixes": [
          {
            "prefix": "195.169.130.0/24"
          }
        ],
        "ipv4_remote_address": "145.145.2.219",
        "ipv6_address": "2001:610:fc7:0:145:145:2:218/127",
        "ipv6_mtu": 1500,
        "ipv6_prefixes": [
          {
            "prefix": "2001:610:512::/48"
          }
        ],
        "ipv6_remote_address": "2001:610:fc7:0:145:145:2:219",
        "speed": "1000",
        "vlan_id": "3333"
      }
    ],
    "name": "2e5e1a03-b077-4d94-bf54-54bb6767f496",
    "pinnen_prefixes": [],
    "subscription_id": "258b099d-4df4-4195-a1fd-b538e3621ee2",
    "surfcert_filter": "default"
  }
}
```

Import and validate brownfield SURFnet7 network services

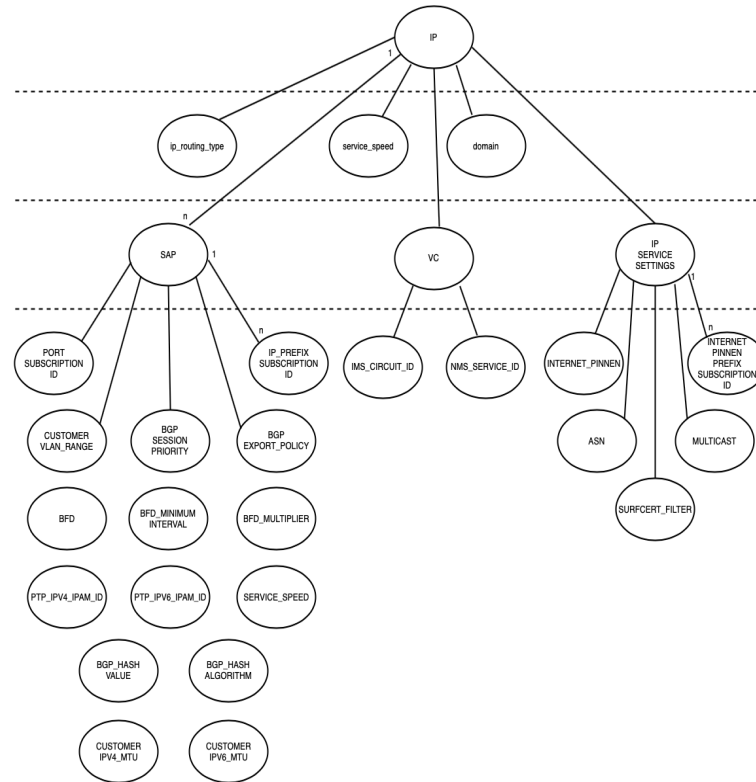


Migration from SN7 to SN8

SN7 IP



SN8 IP





SURF

DO WE FOIL?

- NSO service model development is rather quick
- Developing workflows is slower
- Dependent on other less reliable applications
- It is complex, a lot of testing needed
- Need to appreciate the rigid procedures, no shortcuts for quick fixes



**NEW PROCUREMENT
MODEL**

NEW RESULTS

SHOW RESULTS FAST

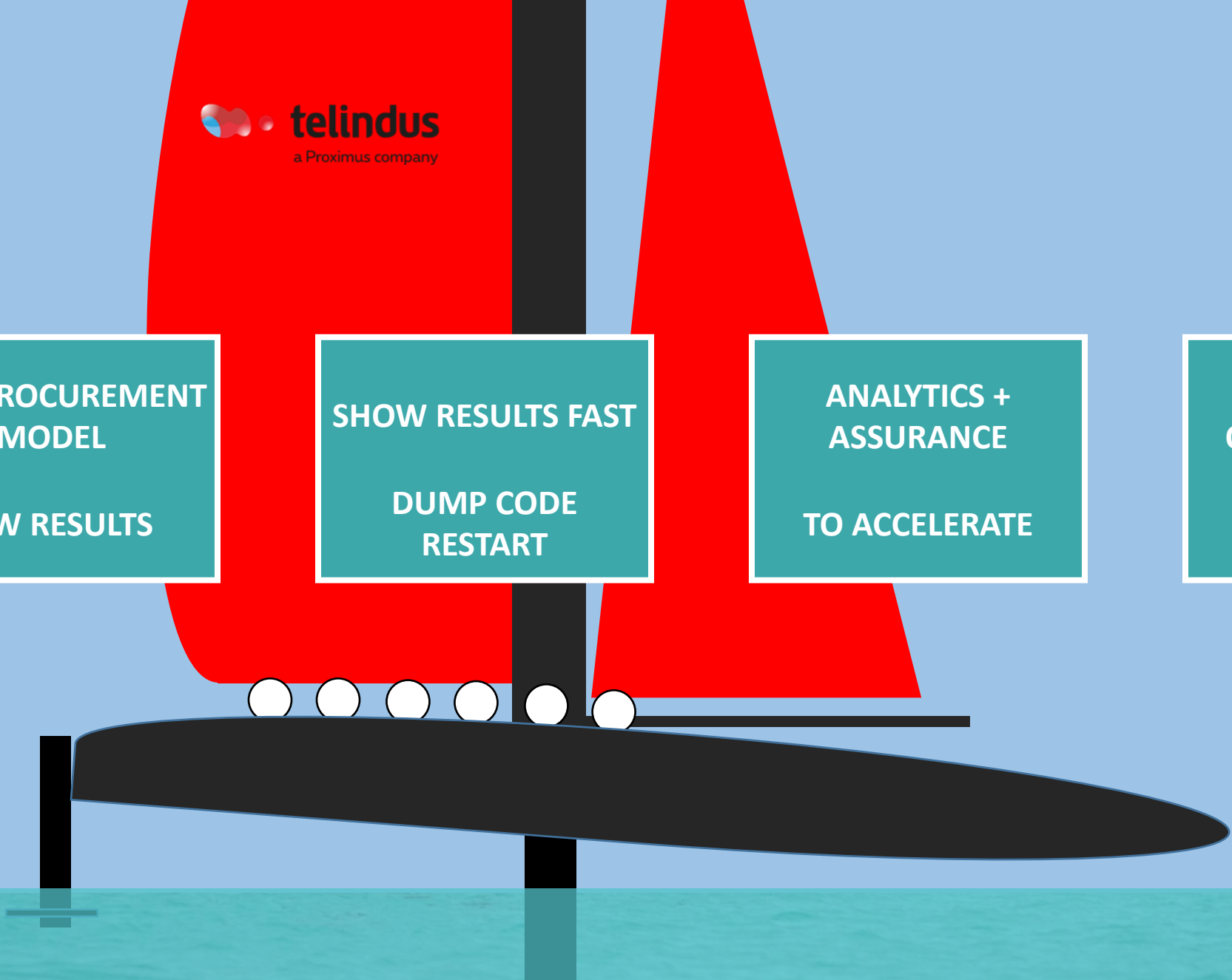
**DUMP CODE
RESTART**

**ANALYTICS +
ASSURANCE**

TO ACCELERATE

**THRILL TO FLY
OVER OBSTACLES**

PRICELESS



DIFFERENT AUTOMATION STRATEGIES? NSO WORKS



SURFNET8

Full Automated Network



LEADING IN
SMART SECURE
PLATFORMS

Technology & Services



1ST Network
Automation

B2B Services

EXPERIENCE THE THRILL OF FOILING