Roadmap of Intent-driven CCVPN use-case in R11

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# History of CCVPN and Its Evolution

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## E2E Network Slicing

- **Phase I**: CSMF, NSMF
- **Phase II**: E2E network slicing across AN, TN, and CN
- **Phase III**: Modify Slice

## CCVPN (Transport Network Service)

- **Phase I**: E2E L2 (E-LINE) service (cross-domain, cross-layer)
- **Phase II**: E2E L1 (OTN) service (cross-domain)
- **Phase III**: E2E L1 (OTN) service (cross-domain, cross-layer)

## Intent-based Networking

- **Phase I**: IBN framework and lifecycle management
- **Phase II**: Intent-based Cloud Leased Line

### Key Development Phases
- **Phase I**: Development of basic services.
- **Phase II**: Integration with E2E network slicing.
- **Phase III**: Expansion to include cloud leased line service.
- **Phase IV**: Further integration and support for new technologies.
Recap of Transport Slicing Feature Highlights

- Built an architecture for Transport Slicing
  - Standards-based, model-driven, aligned with ETSI ZSM Framework
  - Can be integrated with E2E Network Slicing (as TN NSSMF), yet without losing the generality of CCVPN
- Implemented the following TN NSSMF operations on TN NSSI
  - Allocate
  - Deallocate
  - Activate
  - Deactivate
  - Modify
E2E Orchestration of Network Slicing

Transport slicing solution needs to be:
• X-haul agnostic
• Consumer agnostic
• Self-contained and deployable
• Federated solution
CCVPN can be implemented as a **Transport Management Domain**, which offers management services via standardized interfaces and also offers closed loop capability.

This modular design enables CCVPN services to be consumed by or work with other use-cases. E.g., The IBN use-case can consume CCVPN management services to deliver a complete E2E intent solution.
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Intent-based Networking Concepts

Based on draft-irtf-nmrg-ibn-concepts-definitions [1]:

- **Intent Fulfillment**
  - Intent ingestion and interaction with users
  - Intent translation
  - Orchestration: configure/provision

- **Intent Assurance**
  - Performance data monitoring
  - Intent compliance assessment
    - continuously monitor & compare actual vs. intended configs
  - Intent compliance actions: learn/plan/render
  - Abstraction and reporting

- **Intent Control Loops**
  - “Inner” loop: classic zero-touch closed loop within a management domain
  - “Outer” loop: E2E service manage domain closed loop; intent exchange – involves end user

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How IBN and CCVPN work together to offer an E2E intent solution


Figure 1: Intent Life-cycle
CCVPN (or Transport MD) offers the so-called "Service Intent". Its NBI is a model-driven, intent-like interface. And it enables closed-loop to support service assurance.

IBN and CCVPN, when federated together, may offer the complete implementation of an Intent-Based System (IBS).
CCVPN Support for IBN: Intent-based Cloud Leased Line

IBN use case, which provides E2E service management for Intent

CCVPN use case, which provides transport networking support to the IBN use case
Kohn: continue to support IBN and E2E Network Slicing

- Support for the **Cloud Leased Line** service
  - **FR1**: E-LINE (P2P connection) support for the cloud leased line service delivery

- **Closed-loop automation** of CCVPN services
  - **FR2**: Closed-loop enhancement in DCAE: Enhance slice analysis MS to use DCAE SDK dmaap-client lib

- CCVPN support for **Transport Slicing**
  - **FR3**: TN NSSMF NBI enhancement to align with latest IETF specification (SO changes)
  - **FR4**: Open source IETF/ACTN network domain controller simulator
### Requirements/Features

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<td>Create architectural framework to support the IBN</td>
<td>Support user-triggered Intent modification closed-loop</td>
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<td>Support for Cloud Leased Line (CLL) service</td>
<td>CLL service delivery (create, delete, and modify) using E-TREE service model</td>
<td>Support CLL traffic protection and UUI display of CLL</td>
<td>CLL enhancement (FR1)</td>
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<td>CCVPN closed-loop operations</td>
<td>Closed-loop framework for CLL</td>
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<td>- Open source IETF/ACTN network controller simulator (FR4)</td>
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TN Management Domain (ETSI ZSM)

- **ZSM Management Domain** is an architectural solution that satisfies our design requirements.
- **Management Domain**: “A scope of management that federates together management services, that enables their exposure towards external service consumers, and that is delineated by a business, administrative or other boundary.”

Implementing transport slicing as a management domain (source: ZSM 003)
Demo Setup

ONAP
(Intent-based CLL service automation)

CLL Service User

Intent User Interface

ZSM architecture

IETF/ACTN Interface

Physical network controller (domain A)

Physical network controller (domain B)

Physical network domain A

Physical network domain B

Campus network

DC