The ETSI ZSM Framework Architecture

Presented by: **Uwe Rauschenbach**  
Nokia | ETSI ZSM rapporteur

For: **SDN NFV World Congress**  
The Hague

8.10.2018
Motivation

Virtualization allows networks to evolve much quicker than in the past. Network management needs to keep pace.

→ No „one size fits all“, need flexible composition of network management services

→ Decoupled evolution

Introduction of NFV and Network slicing increase scale, complexity and TCO

→ Automation of network management is the answer
ZSM: A framework rather than a system

We need a flexible management framework, not a fixed management system.

✓ Management services that can be composed; support for service exposure and service integration
✓ Model-driven, open, intent based interfaces
✓ Separation of management concerns: Domains, End-to-End; encapsulation of complexity
✓ Shared data (stored, streamed) as the lifeblood of automation
✓ Closed loops at various levels as the driver of automation

→ Deployment flexibility, open for evolution!
ZSM framework architecture

Inter-domain Integration Fabric

Management Domain

Intra-domain Integration Fabric

Domain Control

Domain Orchestration

Domain Intelligence

Domain Assurance

Other Management Domains

Common Data Services

Integration Fabric

Physical

Virtual

Cloud

Logical Groups of Management Services

E2E Service Management Domain

Intra-domain Integration Fabric

E2E Service Orchestration

E2E Service Intelligence

E2E Service Assurance

Logical Groups of Management Services

Digital Storefront
(Automated Customer & Business Management)

ZSM

(Source: ETSI GS ZSM002)
ZSM architecture feature: Separation of concerns in management

Management Domain (aka Network Management Domain)
• Scope of management delineated by e.g. organizational or technological boundaries
• Manages resources and services based on these
• Exposes management services and decouples the inner domain details from the outside world
• Can consume management services from other management domains

E2E Service Management Domain
• Manages E2E services that span multiple management domains
• Exposes management services
• Coordinates between management domains

(Source: ETSI GS ZSM002)
ZSM architecture feature: Service-based

The ZSM architecture is based on management services which are exposed by management domains, including the E2E service management domain.

The integration fabric allows cross-domain service exposure and composition.

- Management data transport (transport of streaming data to subscribers)
- Management service exposure (service publication, discovery, consumption)
- Management service control (e.g. authorization, access control, throttling...)

(Source: ETSI GS ZSM002)
Management domain services

Domain orchestration services automate workflows and processes to handle instantiation and lifecycle management of the services provided by the domain.

Domain control services allow to individually steer the state of each managed entity (resource, consumed service).

Domain intelligence services provide domain-specific decisions and recommendations, to drive domain-level closed-loop automation.

Domain assurance services monitor the managed entities (resources and consumed services), and provides live performance and fault data to support closed-loop automation.

(Source: ETSI GS ZSM002)
Service-based view of a ZSM management domain (work in progress)

(Source: ETSI GS ZSM002)
ZSM architecture feature: Common data services

Data are the lifeblood of automation.

Common Data Services allow

- Storing of management data
- Sharing of management data with authorized consumers, also across domains
- Supporting big data analysis
- Raidly providing data to support control loops

Examples of shared data related to managed entities:

- Performance monitoring data (e.g. performance counters)
- Assurance data (e.g. performance/fault alarm events)
- Trace data (e.g. packet capture data)
- Configuration data
- Miscellaneous log data
- Network/service topology data
- Network/service inventory data

(Source: ETSI GS ZSM002)
ZSM architecture feature: Enabling automation based on closed loops

OODA – Observe, Orient, Decide, Act - Closed Control Loop
Closed loop example

Management Data Transport

(2) Publishes fault event (Network Error - SGW not responding)
(3a) Consumes fault event
(5) Invokes “Configure Resource” service
(6) Receives “Configure Resource” service request
(3b) Stores fault event data

(1) Fault event: SGW not responding

Fault events collector

Domain Assurance

Analyze Learn

Domain Intelligence

Orchestration Engine

Domain Orchestration

Config Mgmt

Domain Control

Management Domain

Integration Fabric

(4) Determines link is bad

(4a) Consumes fault event
(5a) Invokes “Configure Resource” service

Resources

(7) Changes configuration on router to reroute traffic
Specification Work: ETSI GS ZSM002

• This presentation is based on the current status of the ETSI ZSM002 specification work

• Work in progress, expected to evolve

• Next steps in the ZSM002 architecture work
  • Complete the definition of management domain services
  • Define E2E service management domain services
  • Define support for closed loops

• Drafts of the specification available here:
  https://docbox.etsi.org/ISG/ZSM/Open/Drafts/002ed111_RefArch
Conclusion

✓ The ZSM framework architecture is flexible and service based.

✓ The ZSM framework architecture separates the concerns of Network Domain Management and E2E Service Management.

✓ Integration Fabric and Common Data Services in the ZSM framework architecture provide flexibility to
  • integrate and compose management services and
  • build closed automation loops
  across domains.
Author’s contact
Uwe.Rauschenbach@nokia.com

More information on ETSI ZSM
ZSM Technology Page: http://www.etsi.org/zsm
ZSM Wiki: https://zsmwiki.etsi.org/
ZSM Open Area (Draft specs): http://docbox.etsi.org/ISG/ZSM/Open
ZSM Portal (members’ working area): http://portal.etsi.org/zsm