



The Standards People

The ETSI ZSM Framework Reference Architecture

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For: **ZSM Association Forum**

ETSI 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 and 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!**

The ETSI ZSM framework reference architecture

ZSM service aka management service: A set of offered management capabilities.

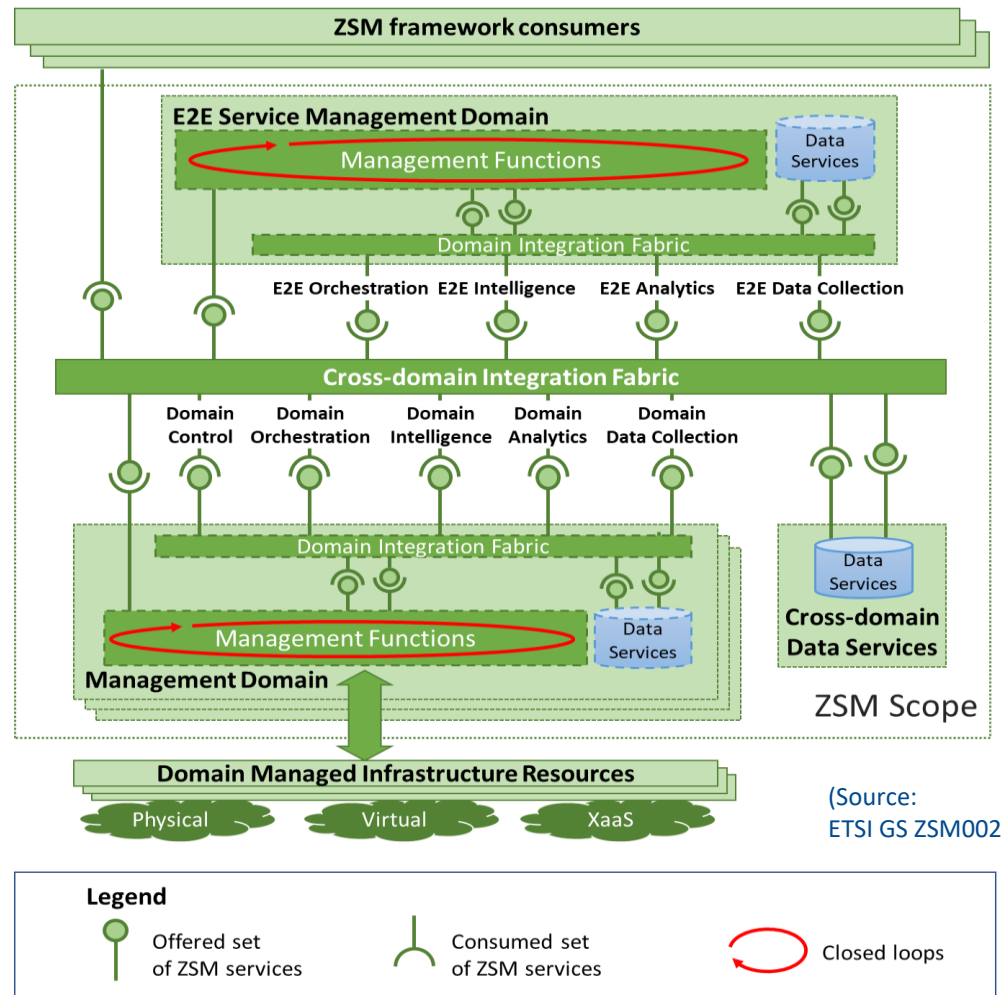
Management function: Logical entity playing the roles of service consumer and/or service producer.

Integration fabric: A management function, playing the roles of both service consumer and service producer, that enables interoperation and communication between management functions within and across management domains.

Cross-domain data services: Services that allow to persist data and share them with authorized consumers across domains.

Management domain: A scope of management delineated by a technological, business, administrative or other boundary.

E2E service management domain: A management domain specialized to manage E2E services.



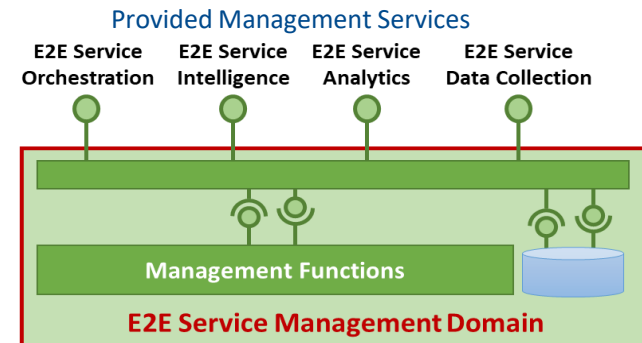
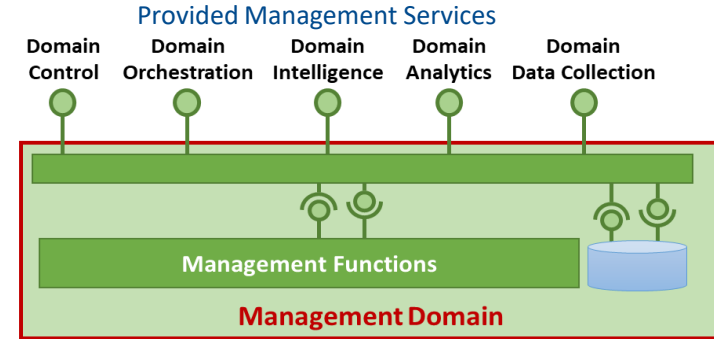
ZSM architecture feature: Separation of concerns in management

Management Domain (aka Network Management Domain)

- Scope of management delineated by a, e.g., technological or organizational boundary
- Manages resources and services based on these
- Provides 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
- Provides and consumes management services
- Coordinates between management domains



ZSM architecture feature: Service-based



Domain data collection

- Event notification services
- Performance measurements streaming service
- Performance measurements collection service
- Log collection service

Domain analytics

- Analytics services
- Domain condition detection service
- Data optimization services

Domain intelligence

- AI model management service
- Deployed AI model assessment service
- AI training data management service
- Knowledge base service
- Health issue reporting service

Domain orchestration

- Domain orchestration service
- Feasibility check service
- Managed services catalogue management service
- Testing service
- Domain inventory information service
- Domain inventory management service
- Domain topology information service

Domain control

- Resource configuration management service
- Resource lifecycle management services
- Configuration data generation service

The ZSM architecture defines management services which can be provided and consumed by management functions.

(The realization of the actual management functions is out of scope.)

E2E service data collection

- E2E performance data reporting service

E2E service analytics

- Analytics services
- E2E service quality management service
- E2E service condition detection service

E2E service intelligence

- AI model management service
- Deployed AI model assessment service
- AI training data management service
- E2E service health issue reporting service

E2E service orchestration

- E2E service orchestration service
- Feasibility check service
- Managed services catalogue management service
- E2E testing service
- E2E services inventory information service
- E2E services inventory management service
- E2E services topology information service

Integration fabric services

- Management services registration service
- Management services discovery service
- Management communication service
- Management service invocation routing service
- Management capability exposure configuration service

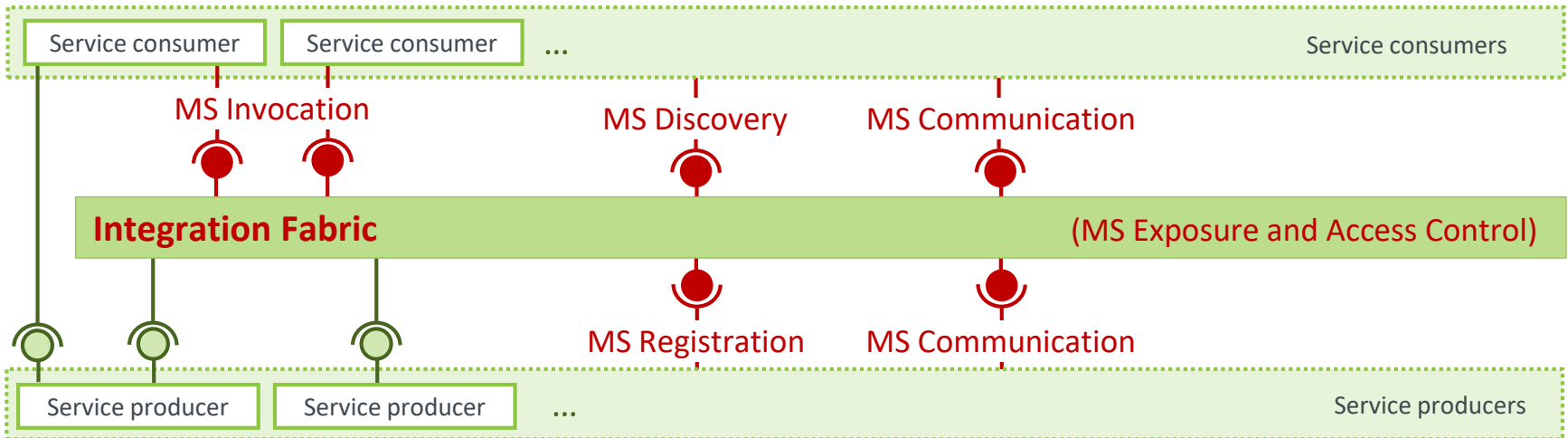
Data services

- Data store management service
- Data persistence services
- Data processing service

ZSM architecture feature: Integration fabric

The integration fabric allows management service (MS) interoperation and communication.

- MS communication → asynchronous or synchronous, e.g. event notifications and streaming data
- MS registration and discovery
- MS invocation, including support for service meshes (direct invocation also possible)
- MS exposure management and access control



ZSM architecture feature: Cross-domain data services

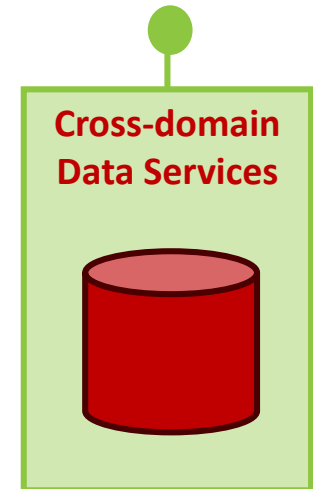
Data are the lifeblood of automation.

Cross-domain Data Services allow

- Storing of management data
- Sharing of management data with authorized consumers across domains
- Supporting big data analysis

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



ZSM architecture feature: Enabling automation based on closed loops

Observe

- *Data collection services* monitor the managed entities (resources and services), and provide live performance and fault data to support closed-loop automation.

Orient

- *Analytics services* provide specific insights based on data collected by data collection services and on other data / knowledge.

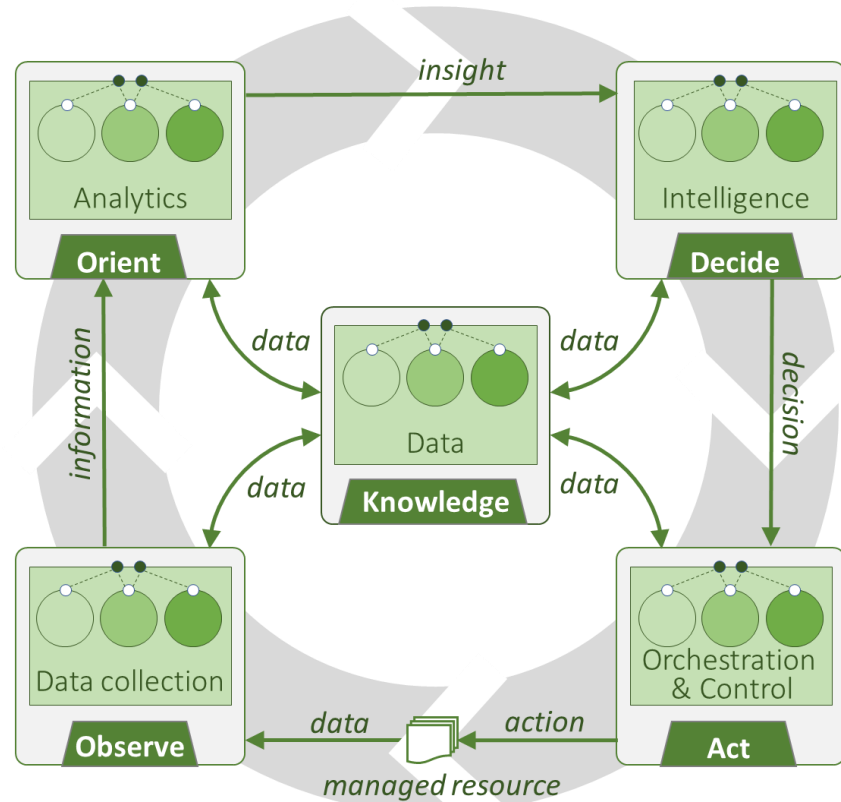
Decide

- *Intelligence services* provide specific decisions and recommendations, to drive closed-loop automation.

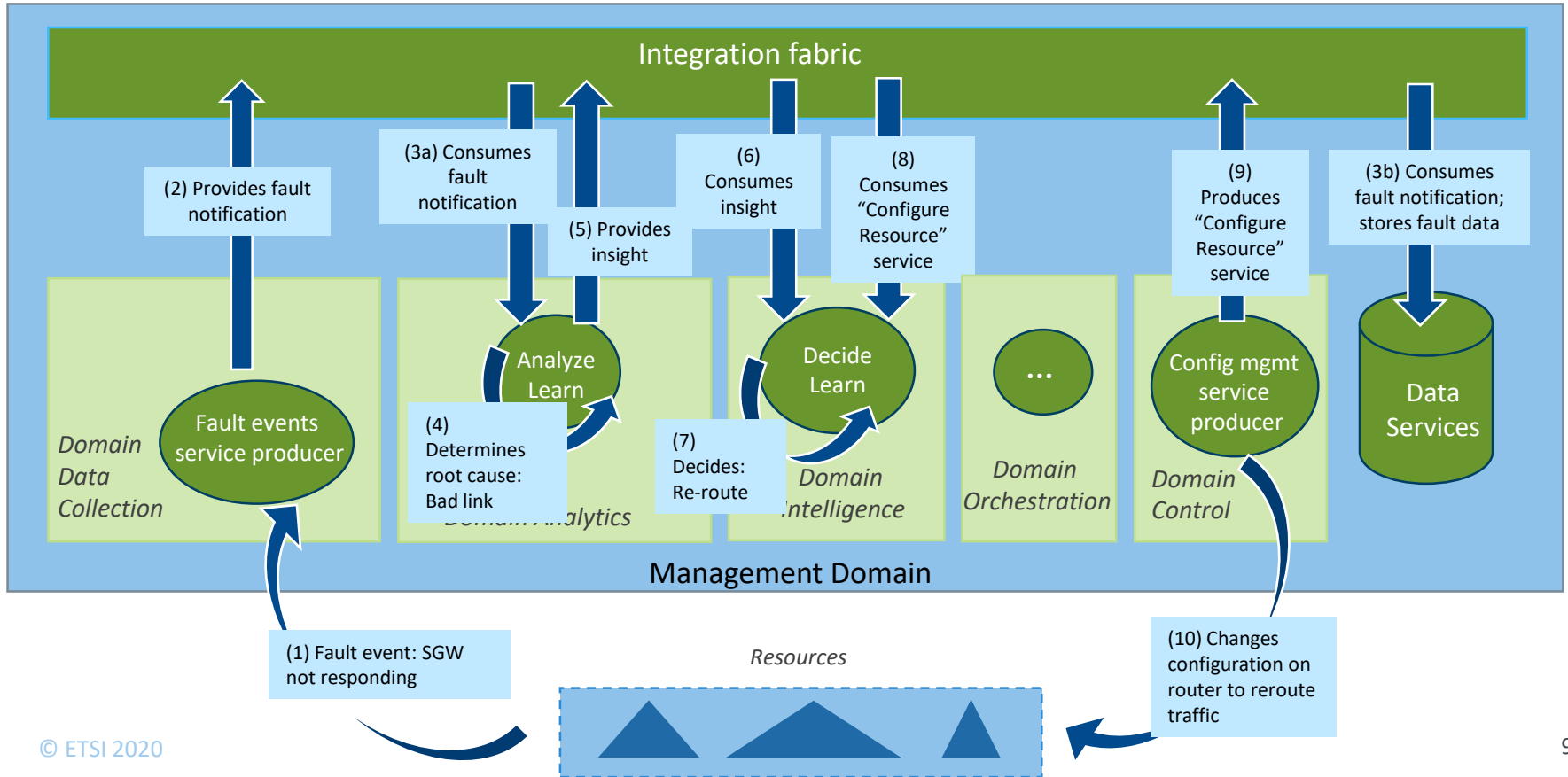
Act

- *Orchestration services* automate workflows and processes to handle instantiation and lifecycle management of the managed services.
- *Control services* individually steer the state of each managed entity (resource, service).

→ Follow-up specifications: ZSM009-1, ZSM009-2, ZSM009-3



Closed loop example: Automatic fault mitigation



Specification Work

- This presentation is based mainly on the ETSI ZSM002 specification
- The specification was published by ETSI in August 2020 and is publicly available here:
https://www.etsi.org/deliver/etsi_gs/ZSM/001_099/002/01.01.01_60/gs_zsm002v010101p.pdf

V 1.1.1 (2019-08)



ETSI GS ZSM 002

Zero-touch Network and
Service Management (ZSM);
Reference Architecture

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 Cross-domain Data Services in the ZSM framework architecture provide flexibility to
 - integrate and compose management services and
 - build closed automation loopsacross domains.



Author's contact

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More information on ETSI ZSM

ZSM Technology Page: <http://www.etsi.org/zsm>

ZSM Wiki: <https://zsmwiki.etsi.org/>

Published ZSM specs: <https://www.etsi.org/committee/1431-zsm>

ZSM Open Area (Draft specs): <http://docbox.etsi.org/ISG/ZSM/Open>

ZSM Portal (members' working area): <http://portal.etsi.org/zsm>