The Standards People

The ETSI ZSM Framework Reference Architecture

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V 1.0

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

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!**

*) ZSM: Zero-touch network and Service Management

The ETSI ZSM framework reference architecture

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

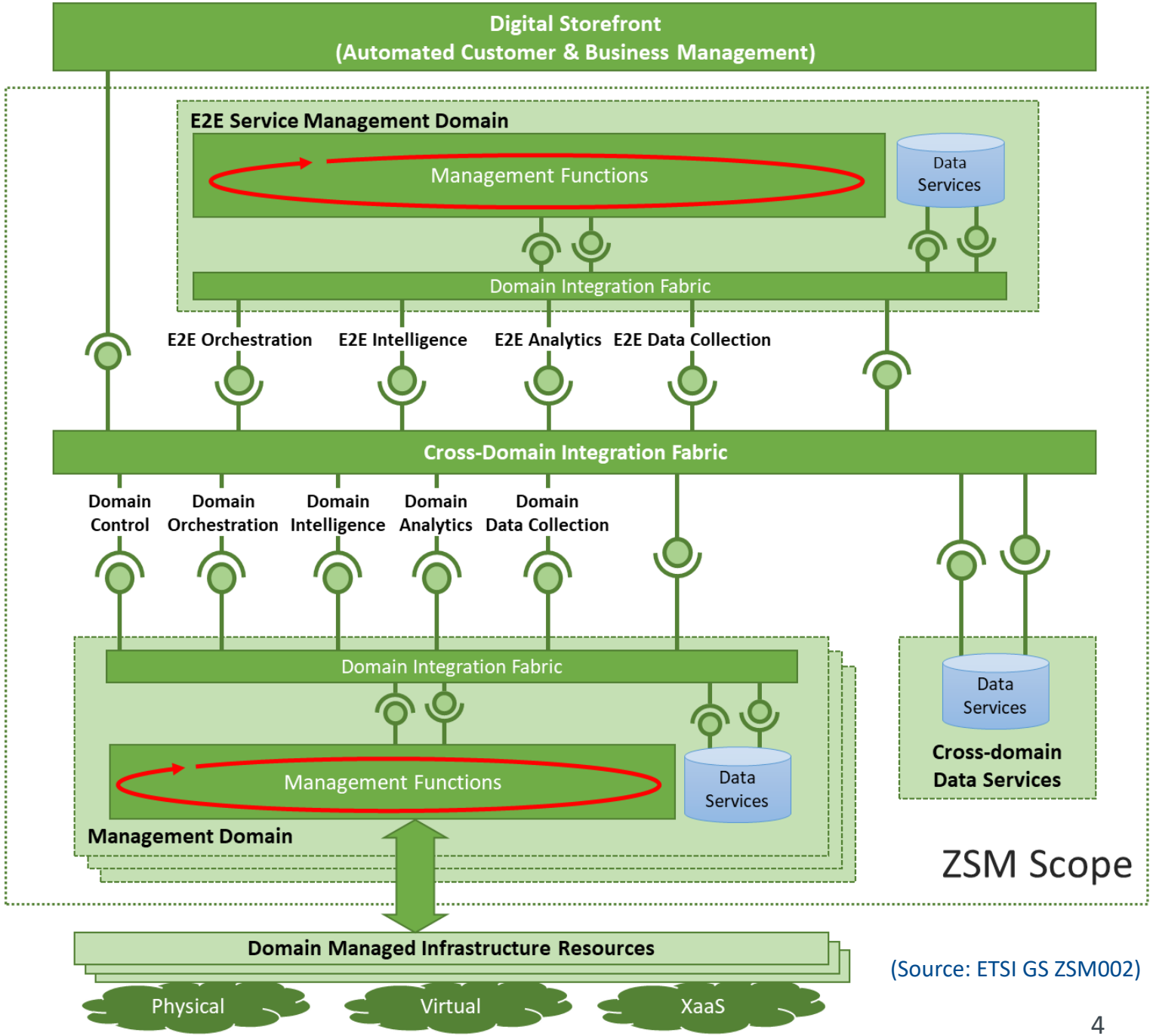
Management function: Logical entity playing the roles of service consumer and/or service producer.

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 share data 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.



(Source: ETSI GS ZSM002)

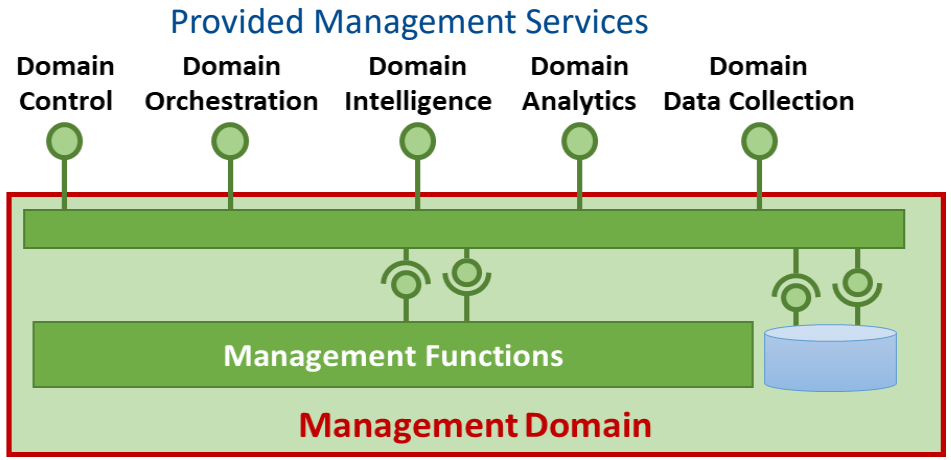
ZSM architecture feature: Separation of concerns in management

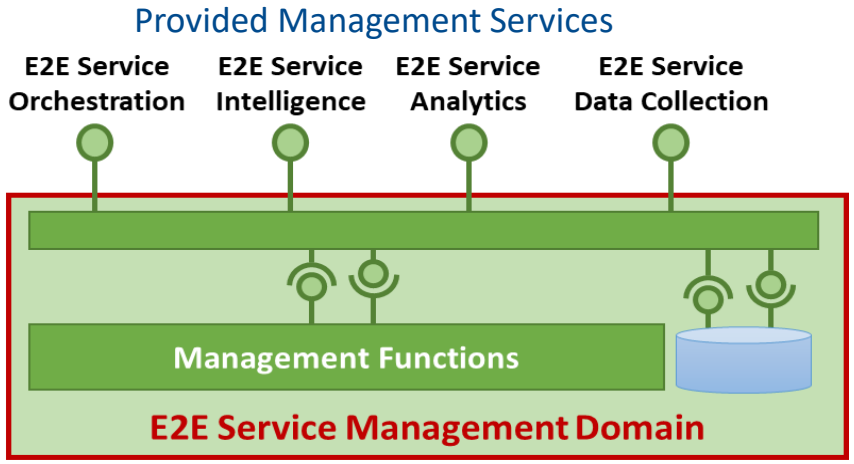
Management Domain (aka Network Management Domain)

- Scope of management delineated by e.g. technological or organizational boundaries
- 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
- Fault events service
- Security events service
- Performance measurements streaming service
- Performance measurements collection service
- Log collection service
- Performance events service

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

Domain intelligence
- AI model management service

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

Domain control
- Configuration management service
- Configuration data generation service

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

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

E2E service data collection
- E2E performance data report service

E2E service analytics
- Analytics services
- E2E service SLA management services
- E2E anomaly detection service
- E2E service condition detection service

E2E service intelligence
- AI model management service
- AI training data management service

E2E service orchestration
- E2E service orchestration service
- Feasibility check service
- Managed services catalogue management service
- E2E testing service

Integration fabric services
- Management communication service*
- Exposure service*
- Management service registration service
- Management services discovery service
- Inter-service communication rules management service

*: under discussion

Data services
- Data integration service
- Data storage services
- Data processing service

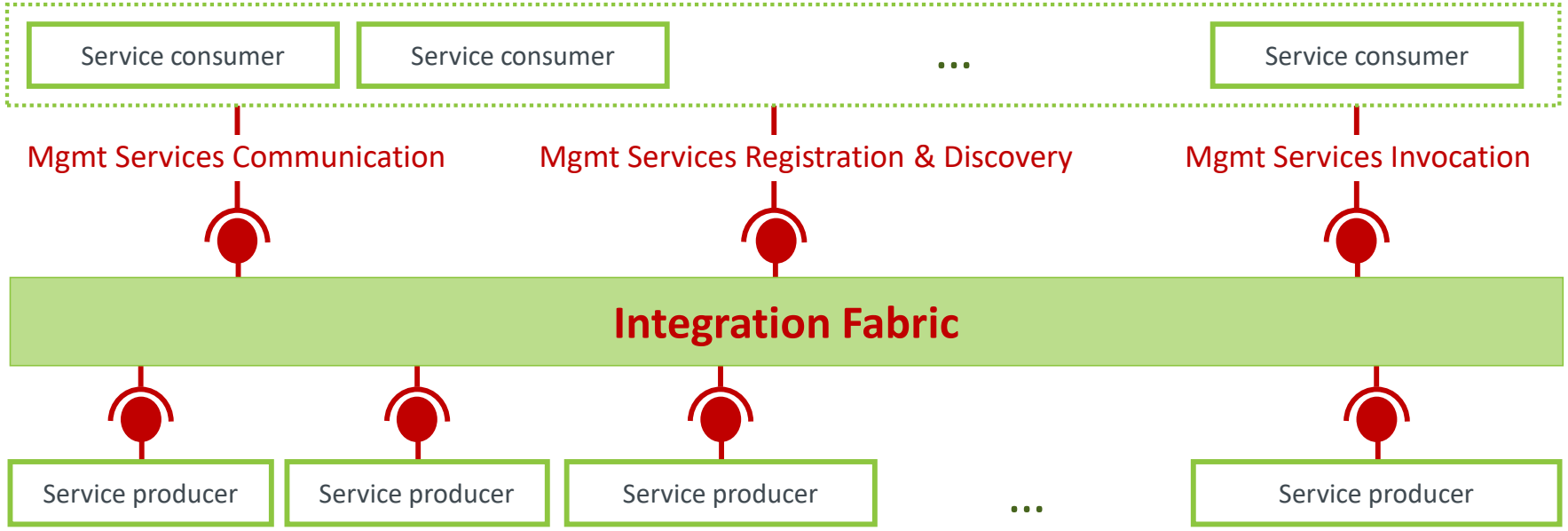
(Source: ETSI GS ZSM002)

ZSM architecture feature: Integration fabric

The integration fabric allows service interoperation & communication

- Management services communication

  → synchronous & asynchronous, e.g. event notifications and streaming data
- Management services registration and discovery
- Management service invocation, including access control



ZSM architecture feature: Cross-domain data services

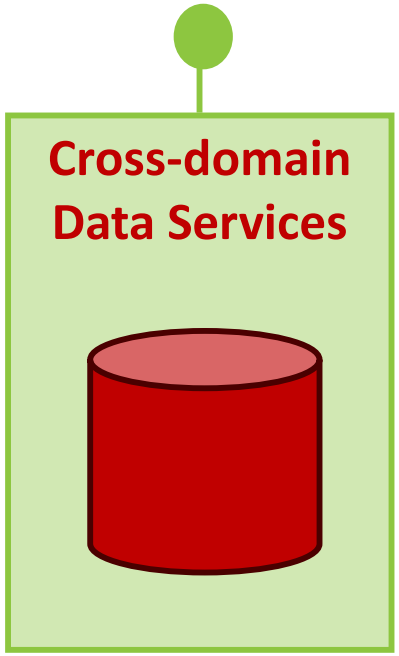
Data are the lifeblood of automation.

Cross-domain Data Services allow

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



ZSM architecture feature:
Enabling automation based on closed loops

(Source: ETSI GS ZSM002)

Intelligence services

Provide specific decisions and recommendations, to drive closed-loop automation.

Decide

Orchestration services

Automate workflows and processes to handle instantiation and lifecycle management of the managed services.

Act

Analytics services

Provide specific insights based on data collected by data collection services and on other data.

Orient

Control services

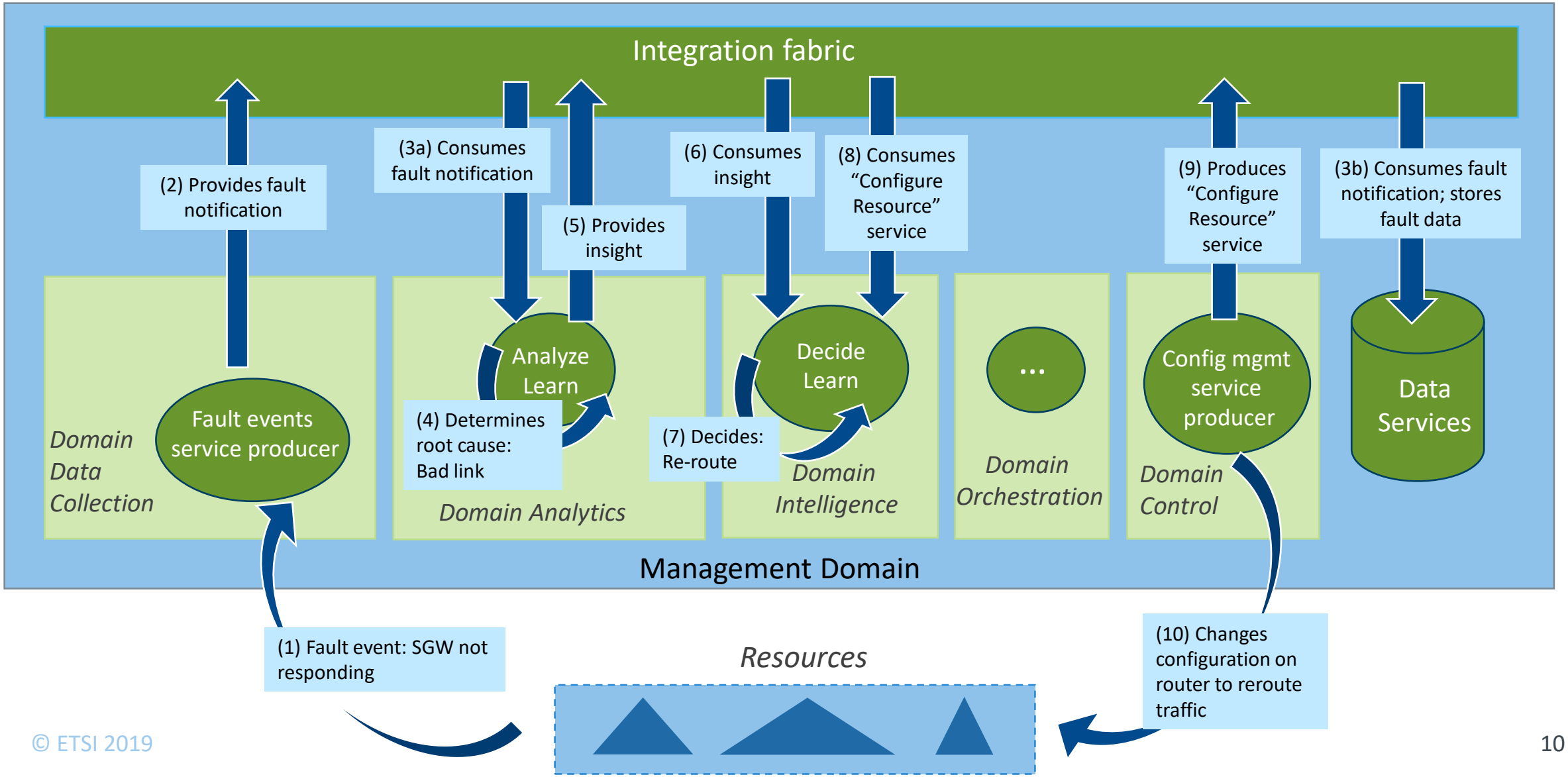
Individually steer the state of each managed entity (resource, service).

Data collection services

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

Observe

Closed loop example: Automatic fault mitigation



Specification Work: ETSI GS ZSM002

- This presentation is based on the current status of the ETSI ZSM002 specification work
- Work in progress, expected to reach „Stable Draft“ milestone soon
- The drafts of the specification are 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 Cross-domain Data Services in the ZSM framework architecture provide flexibility to
  - integrate and compose management services and
  - build closed automation loops

  across domains.

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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