

# The ETSI ZSM Framework Reference Architecture

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# Motivation

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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

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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 offerend management capabilities.

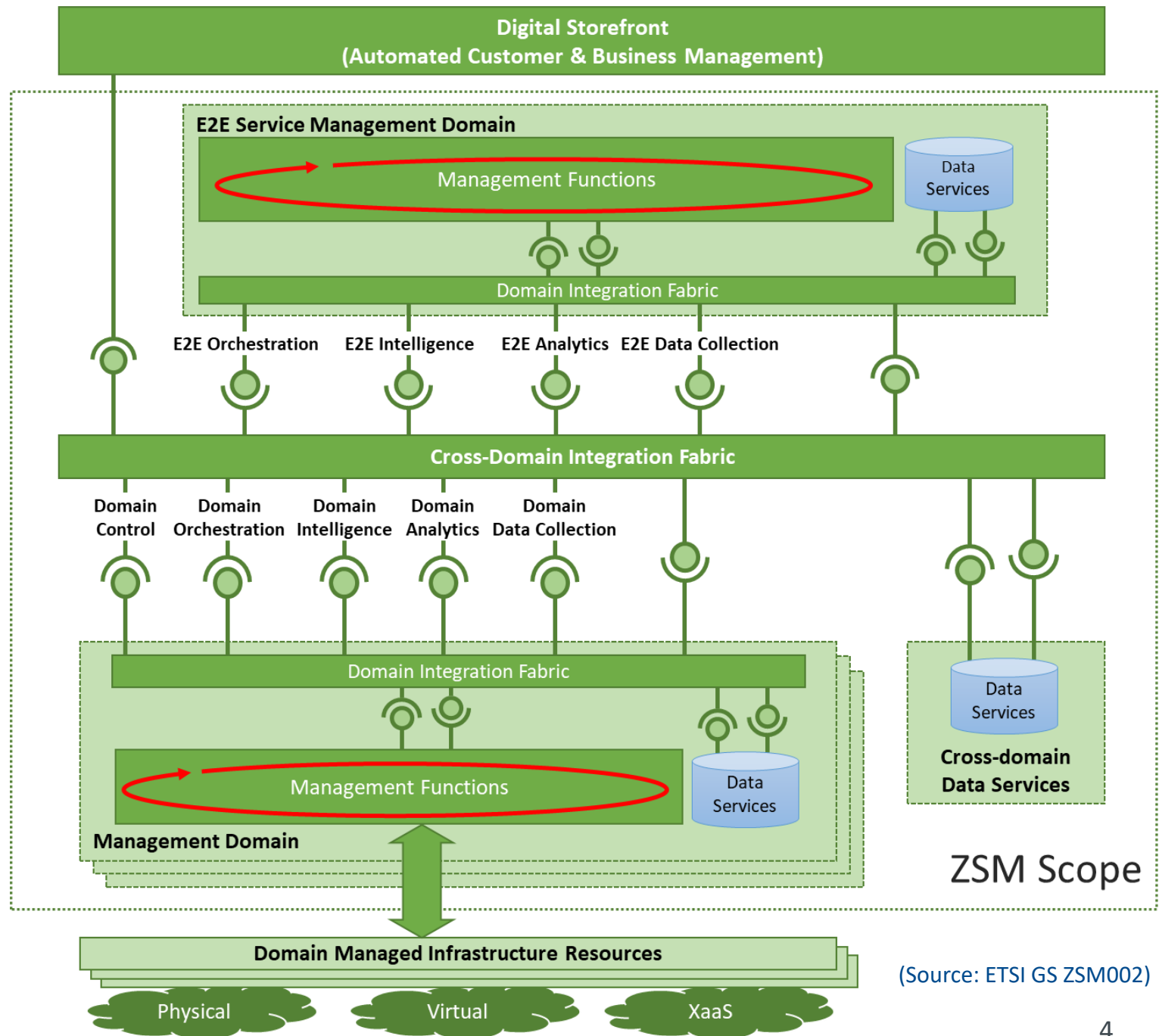
**Management function:** Logical entity playing the roles of service consumer and/or service producer.

**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.



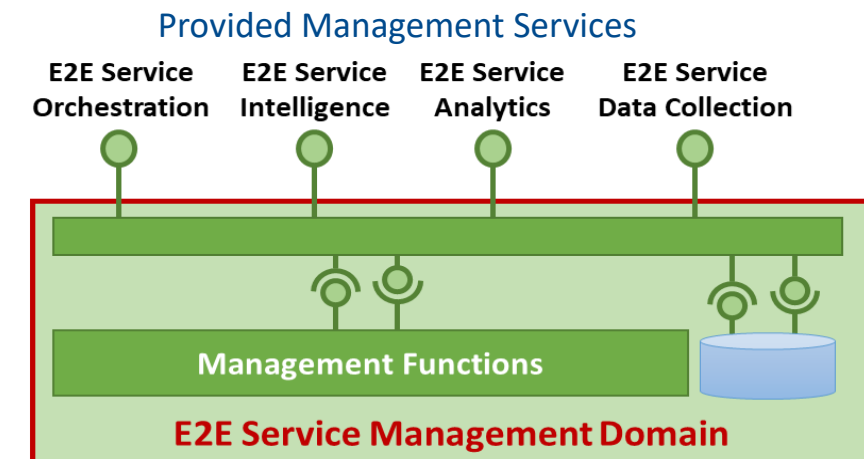
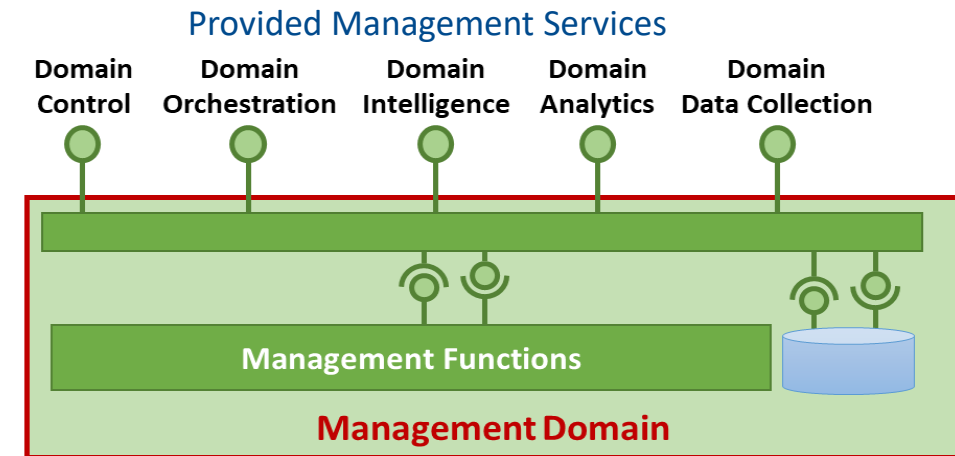
# ZSM architecture feature: Separation of concerns in management

## Management Domain (aka Network Management Domain)

- Scope of management delineated by e.g. organizational or technological boundaries
- Manages resources and services based on these
- 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

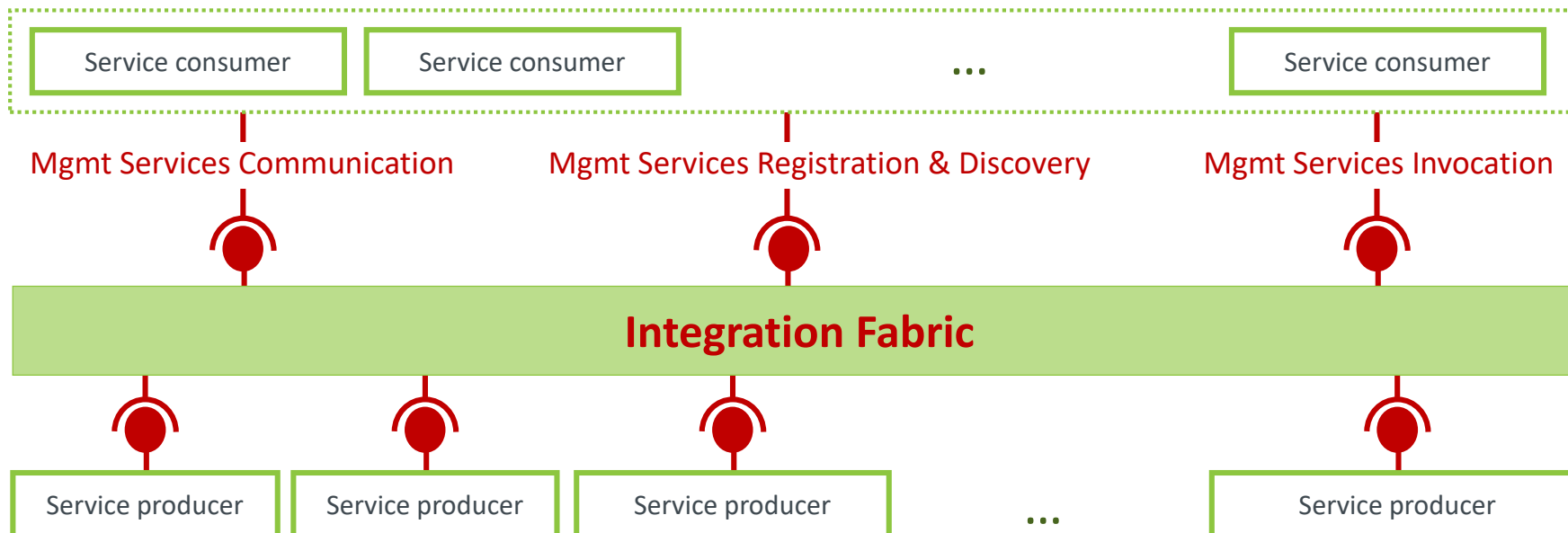
## Data services

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

# 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

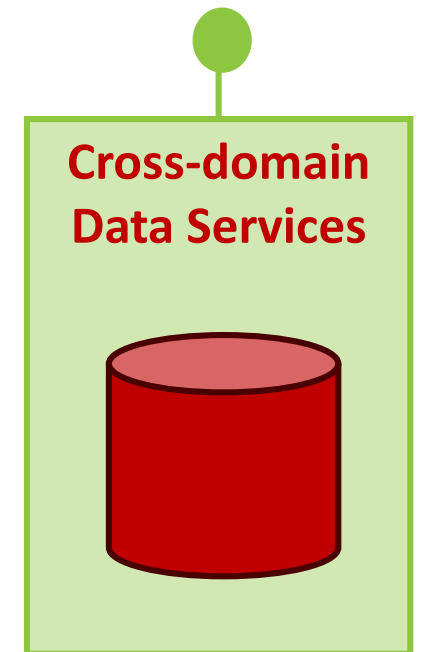
Data are the lifeblood of automation.

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:**

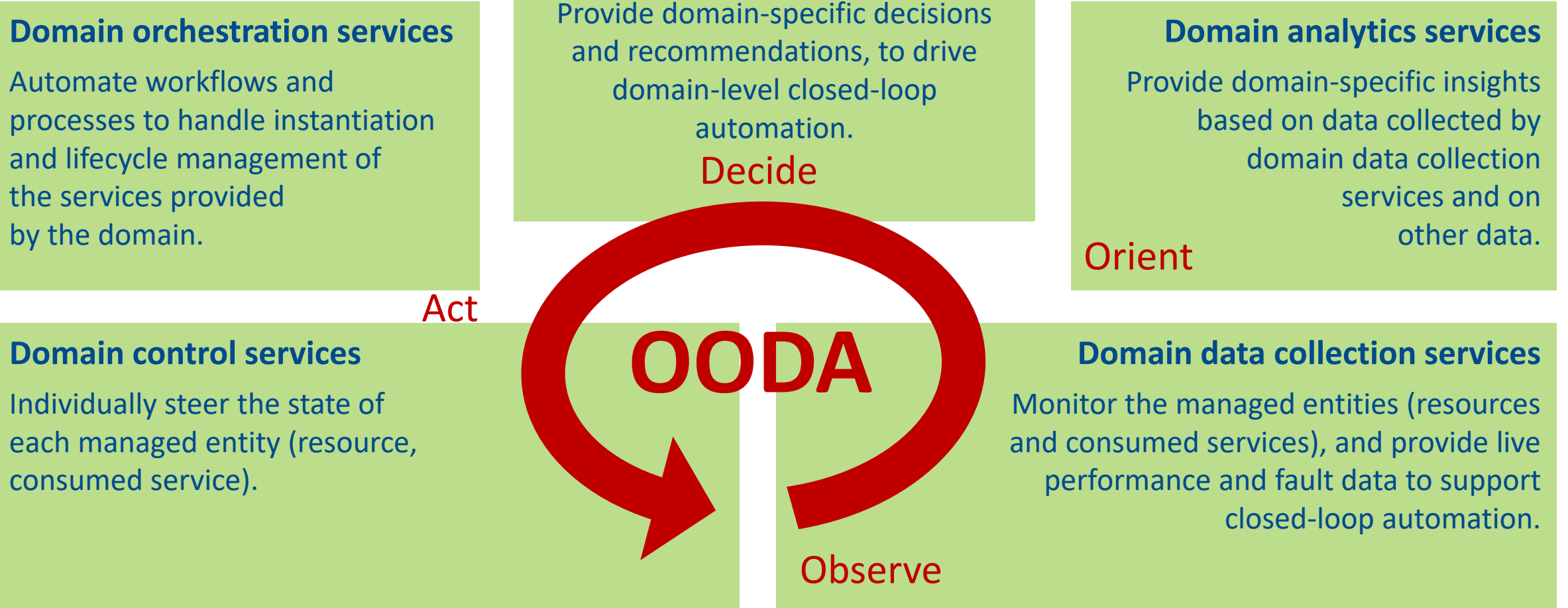
- performance monitoring data (e.g. performance counters)
- assurance data (e.g. performance/fault alarm events)
- trace data (e.g. packet capture data)
- configuration data
- miscellaneous log data
- network/service topology data
- network/service inventory data



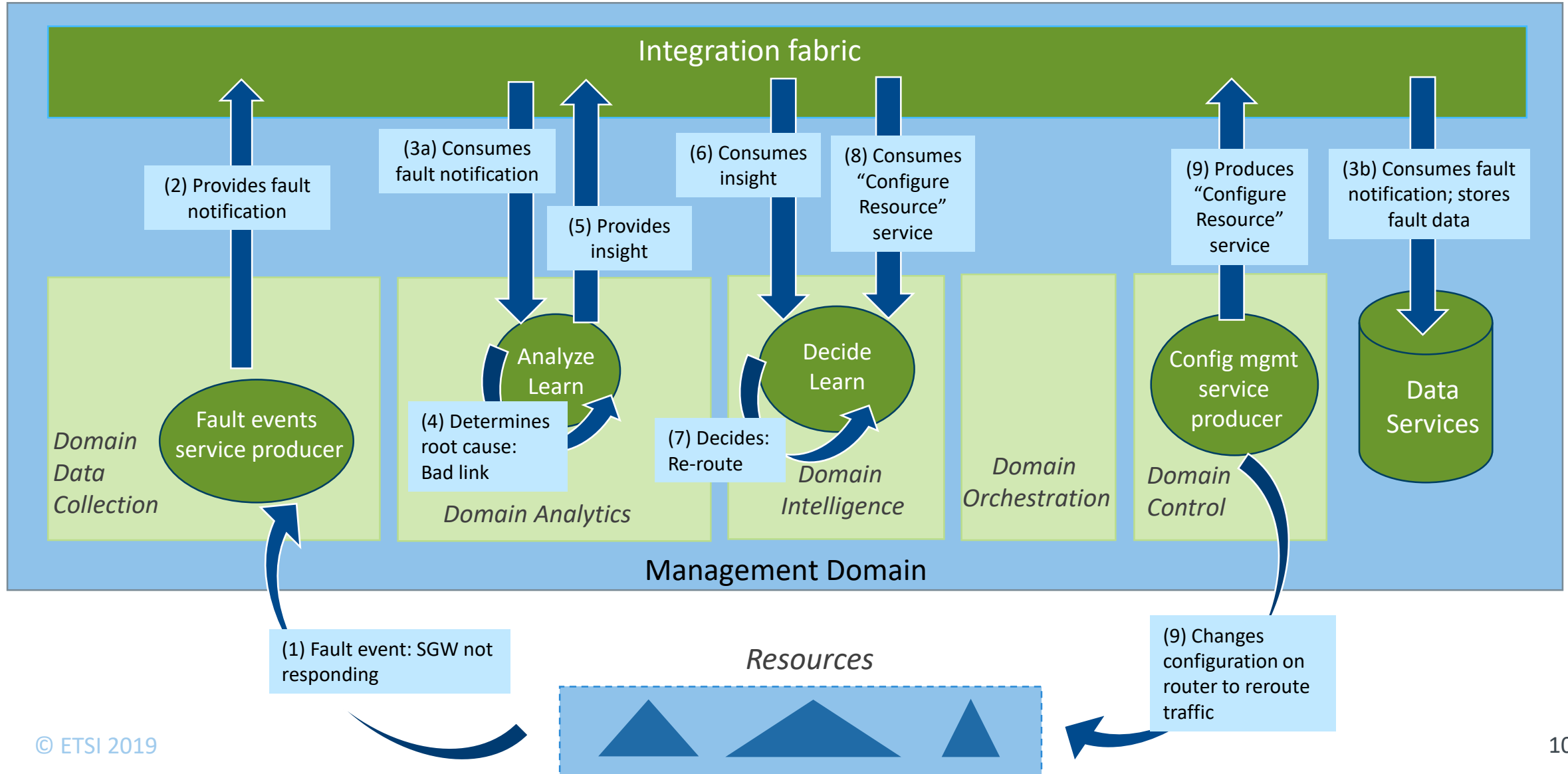


# ZSM architecture feature: Enabling automation based on closed loops

(Source: ETSI GS ZSM002)



# 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](https://docbox.etsi.org/ISG/ZSM/Open/Drafts/002ed111_RefArch)

V 0.10.0 (2019-03)



## **ETSI GS ZSM 002**

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

# Conclusion

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- ✓ 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.



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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>