Overview of the federated testbeds framework

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Federated testbeds framework

Based on Recommendation ITU-T Q.4068 "Open APIs for interoperable testbed federations“:

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This Recommendation contains a technical framework consisting of guidelines, which provides a common reference for developers in order to facilitate the implementation and promotion of interoperability of testbeds.

Objectives of this Recommendation:

1. Definition of potential improvements for the testbed interoperability and federation.
2. Description of a reference model for interoperable testbed federations.
3. Specification of open APIs for the interconnection and interoperability among testbeds.
4. Definition of reference metrics easing the integration and the interoperability of testbeds.

International Telecommunication Union

ITU-T Q.4068

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TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

SERIES Q: SWITCHING AND SIGNALLING, AND ASSOCIATED MEASUREMENTS AND TESTS

Testing specifications – Testing specifications for IMT-2020 and IoT

Open application program interfaces (APIs) for interoperable testbed federations

Recommendation ITU-T Q.4068

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Recommendation ITU-T Q.4068 "Open APIs for interoperable testbed federations"

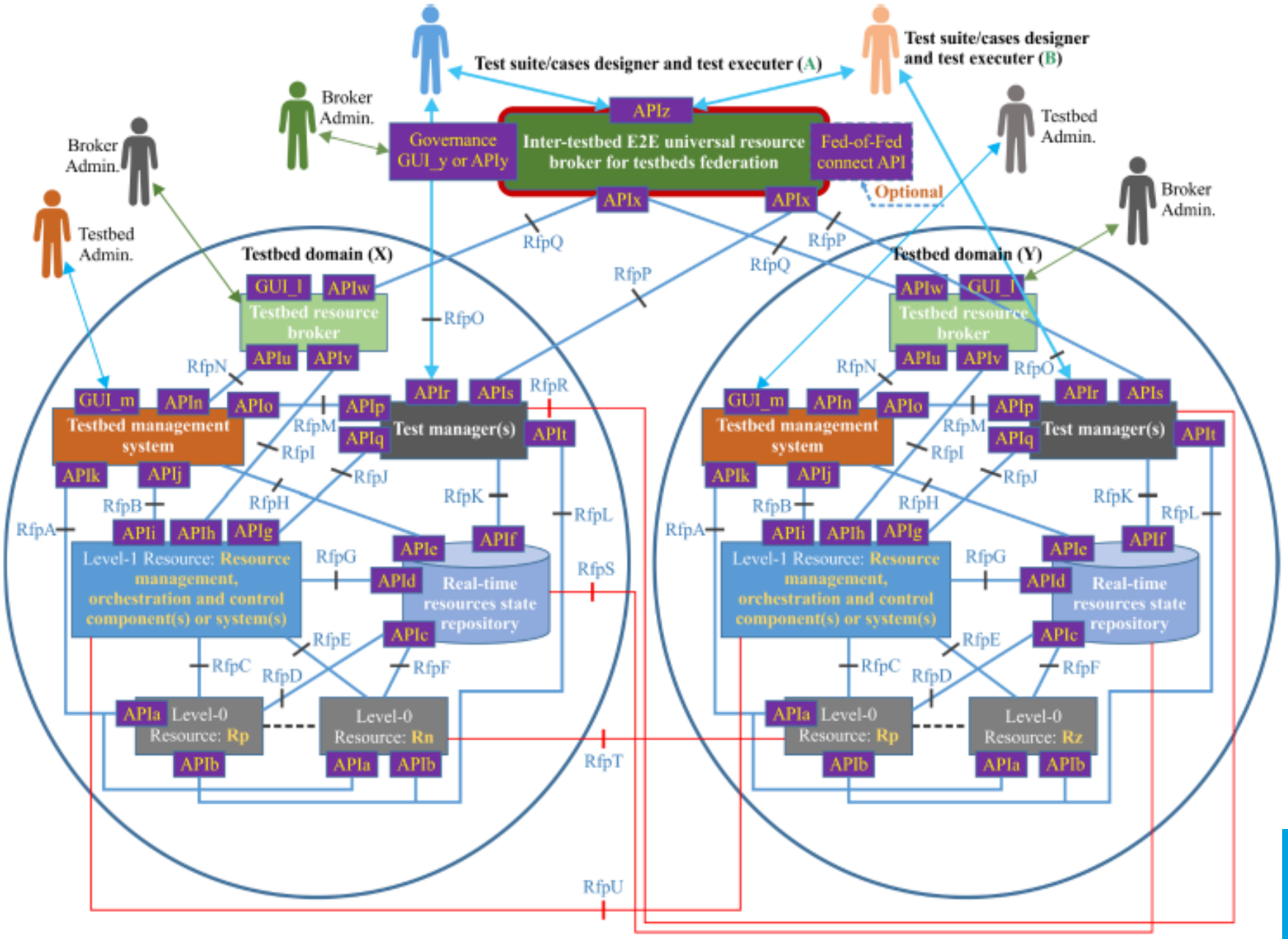
The Recommendations contains:

- A generic reference model for testbeds federation and key players, based on GANA (Generic Autonomic Networking Architecture) from ETSI.
- A general architecture for the testbed interoperability and federation.
- Proposed elements of a reference model of testbed federation.
- Testbeds federation APIs requirements.
- Some APIs instantiating the generic model, based on Fed4FIRE+ and GENI.
- Proposed reference metrics.

Appendixes of the Recommendation (not part of the Recommendation itself):

- GENI testbed federation.
- Fed4FIRE+ testbed federation.
- Different use cases for testbed federations.

Generic federated testbed model



Elements of the generic federated testbed model

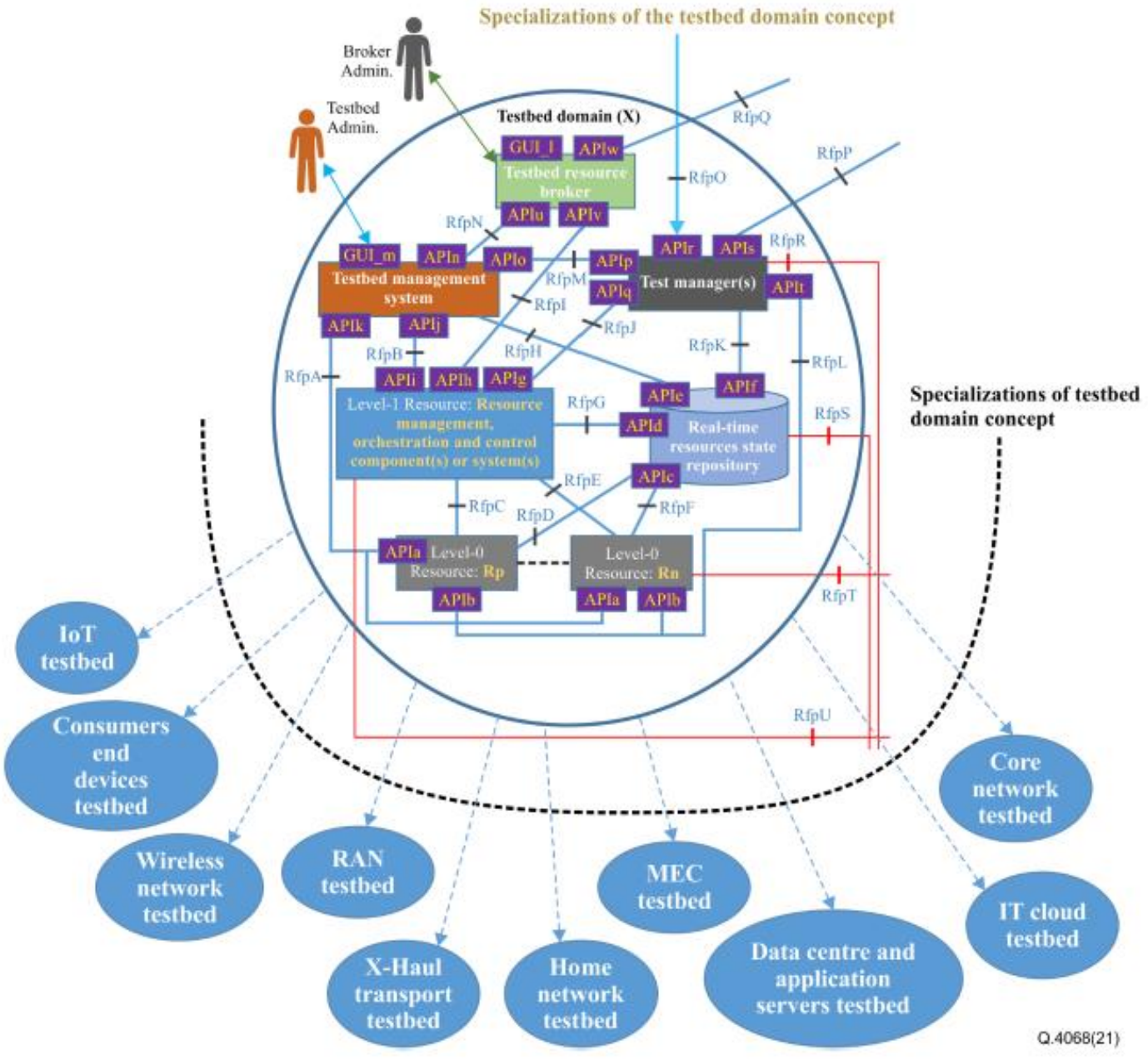
- Testbed domain:
  - Testbed resource broker
  - Testbed management system
  - Test manager(s)
  - Level-1 resource: resource management, orchestration and control components or systems
  - Level-0 resource
  - Real-time resources state repository
- Inter-testbed E2E universal resource broker for testbeds federation

Generic federated testbed model

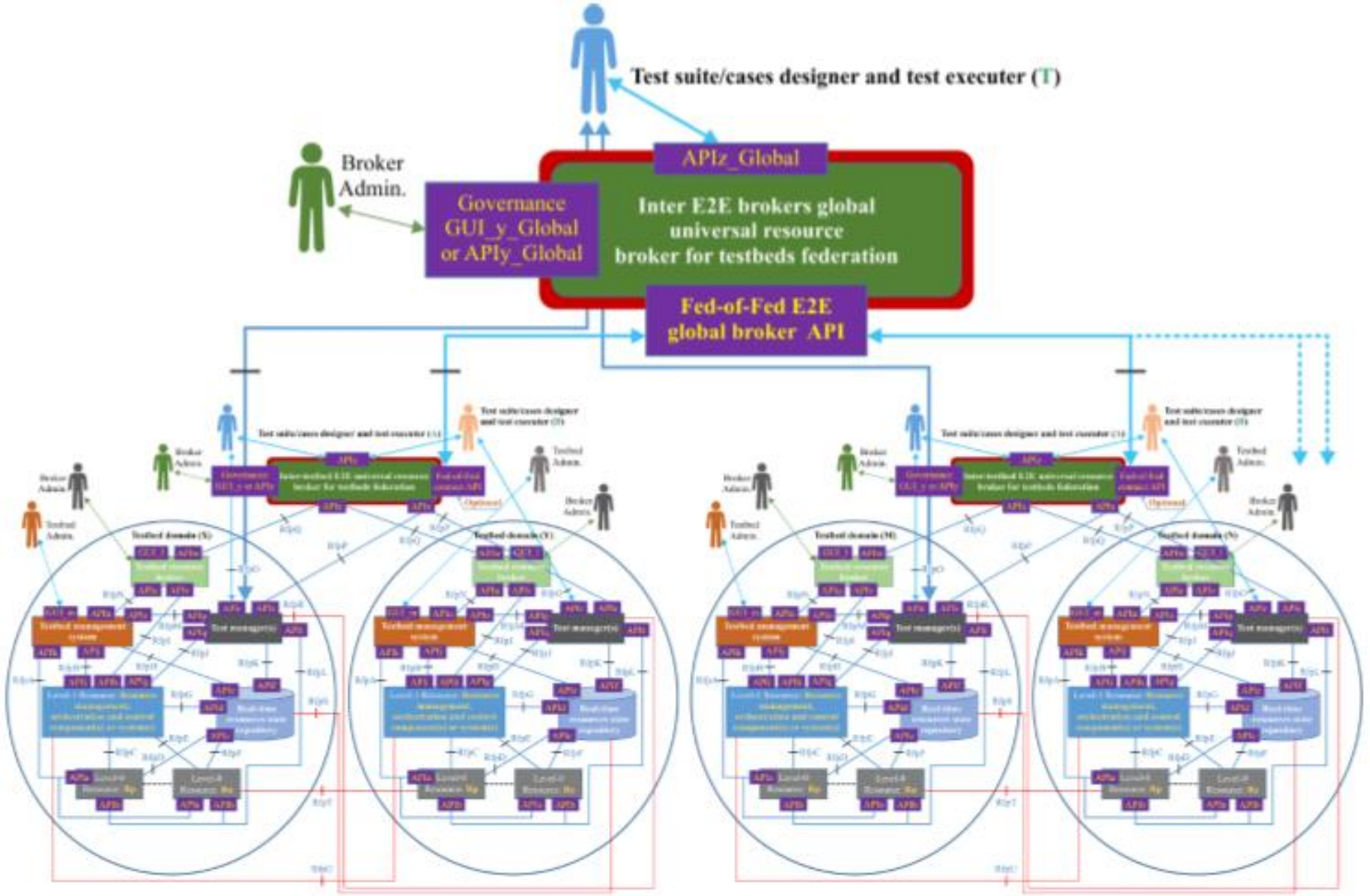
- Roles or actors:
  - Testbed admin
  - Broker admin
  - Test suite/cases designer and test executer

- 26 APIs with high-level description

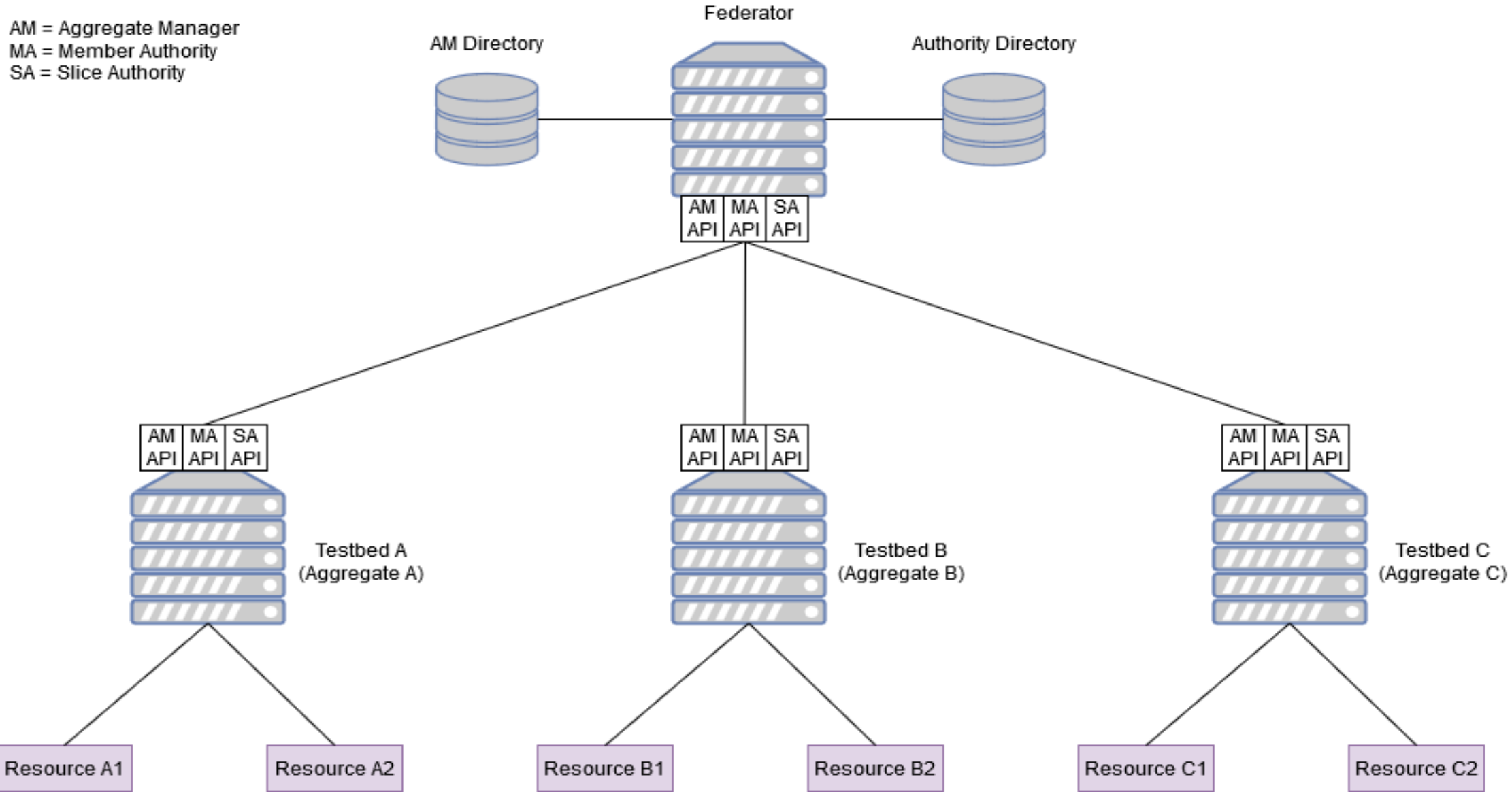
Specialization of the testbed domain concept



Federations of federations



Instantiation of the generic model: Testbed federation architecture in Fed4FIRE+



Instantiation of the generic model: Fed4FIRE+ APIs

- Aggregate Manager (AM) API: Permits all the operations on the testbed resources like reservation.
- Slice Authority (SA) API: Management of a set of resources (slice) linked to a user.
- Member Authority (MA) API: Management of the users and their credentials.

Possible application of the testbeds framework

- SLICES-RI: https://slices-ri.eu/
  - Flexible platform designed to support large-scale, experimental research focused on networking protocols, radio technologies, services, data collection, parallel and distributed computing and in particular cloud and edge-based computing architectures and services.
  - 15 European countries
  - 25 partners

Thank you!

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