



TM Forum Open APIs Conformance Certification

Company Name:

GDi d.o.o.

Product Name and Release Version:

GDi Ensemble GeoInfrastructure Manager (GIM)

TM Forum Open API Name and Release Version:

TMF639 – Resource Inventory Management v4.0.0

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1. What Product or Solution does your API support?

The GDi Ensemble GeoInfrastructure Manager (GIM) supports the TMF639 Resource Inventory Management API REST Specification, and it is the subject of this certification process. GIM is a telecom network inventory and asset management solution built on ESRI ArcGIS Enterprise, leveraging the Telecom Data Network (TDN) model and the Utility Network (UN) framework. It supports the complete lifecycle of telecom and infrastructure assets — from planning and design, through construction, into live operations.

Within the GDi Ensemble Server, the Open API component exposes GIM network inventory to external OSS/BSS systems through TMF-compliant interfaces. The TMF639 Resource Inventory Management API is the central integration point through which third-party systems discover, query, and manage the physical and logical network resources held in the GIM inventory. It acts as a standards-based hub for data exchange between the GIM platform and surrounding systems in the end-to-end service provisioning process, including:

- Order Management / Service Ordering systems (TMF641)
- Resource Catalog Management systems (TMF634)
- Network Resource Management and Workforce Management systems
- Service and Resource Inventory systems
- Customer relationship, billing, and enterprise resource planning systems

The API relies on GIM's generic, highly configurable data model, which can represent any telecom network topology without changes to the application code. Resources exposed through the API are projected from the underlying ArcGIS Enterprise Feature Service, so that inventory served over TMF639 reflects the single, authoritative network state maintained across all GIM clients — GIM Pro (desktop), GIM Online (web), and GIM Mobile.

GIM Pro — Feature Set

The GIM Pro desktop application is the flagship client with the full feature set. The features below maintain and operate on the same network inventory that is exposed externally through the TMF639 Resource Inventory Management API. Feature availability on GIM Online and GIM Mobile is defined separately in the platform scope.

- **GIM Version Manager** — governance layer over ESRI branch versioning, adding a version lifecycle workflow, role-based User/Administrator controls, project-phase transitions, conflict management, and reconcile/post with full audit visibility.
- **GIM Asset Manager** — tree-based view of all network elements organised by layer, asset group, asset type and record, with cross-database search and right-click actions (zoom, flash, select, show connections, locate on tree).
- **GIM Asset Catalog** — central repository of asset templates built on the deployed data model; complex multi-component objects are defined once and instantiated consistently across desktop, web and mobile.
- **GIM Topology Manager** — unified interface for running and resolving topology validation, surfacing dirty areas and rule violations via a persistent toolbar badge with live counts.

- **GIM Associations Manager** — centrepiece editing tool that renders selected assets as a schematic and lets engineers create and edit all TDN association types (containment, structural attachment, connectivity).
- **GIM Asset Editor** — unified environment organising all manual network editing tools, combining out-of-the-box ArcGIS editing with GIM-specific tools and live dirty-area and validation feedback.
- **GIM Infrastructure Manager** — drill-down visualisation of physical infrastructure, from trench and manhole interior to building exterior and internal assets. It includes:
 - GIM Infrastructure Cross Section — proportional cross-section view of underground trenches, duct banks, ducts and microducts at a selected point.
 - GIM Butterfly Manhole View — a manhole rendered as an unfolded butterfly diagram of walls, entering trenches and ducts.
 - GIM Building Layout — dynamic vertical schematic of a building and its contained telecom assets, driven by containment associations.
- **GIM Splice Manager** — dedicated GUI for managing fiber cross-connections within a splice closure, visualising cables, tubes, fibers and ports.
- **GIM Device Manager** — interface for inside-plant active devices (OLTs, switches, routers, amplifiers) and their internal chassis, slot, card and port layouts.
- **GIM Trace Manager** — panel for executing ESRI UN/TDN and custom GIM trace types from saved trace configurations.
- **GIM Diagram Manager** — generates and interacts with network diagrams from map selections using administrator-defined templates.
- **GIM Circuit Manager** — GIM-native full-lifecycle management of telecom circuits, extending ESRI find/create/modify circuit capabilities with a GIM dashboard.
- **GIM Cost Manager** — pricing configuration and cost-document generation, comprising the Cost Administrator (price lists and variants) and the Cost Generator (BoQ/BoM documents from network selections).
- **GIM Capacity Manager** — unified view and analysis of available and used network capacity to identify free resources and coverage gaps.
- **GIM Incident Manager** — records, tracks and visualises network incidents, from physical faults and cable cuts to planned outages and maintenance windows.
- **GIM Dashboards** — access to pre-configured and custom ESRI web dashboards for network status, KPIs and operational metrics.
- **GIM Reports** — interactive, on-demand reporting across cost documents, inventory listings and capacity summaries.
- **GIM Insights** — charts and visual analytics driven by live network data for trend analysis and capacity planning.
- **GIM AI Manager** — user-facing access to GIM's AI capabilities through the Synth AI engine hosted on the GDi Ensemble Server.

2. Overview of Certified API

The subject of the certification process is the TMF639 Resource Inventory Management API v4.0.0, implemented within the GDi Ensemble GIM Open API component. The implementation covers the required API methods with the underlying Resource data schema defined by the TM Forum Resource Inventory Management API specification, including the `resourceCharacteristic` and `resourceSpecification` structures used to describe network assets.

Resources are exposed from the GIM Telecom Domain, which is built on the ESRI Utility Network configured as a Telecom Data Network. The Resource entity maps onto GIM asset layer types, whose asset groups and asset types are configurable per deployment. Typical resources served through the API include:

- Device — equipment point features such as OLTs, cabinets, optical amplifiers and splice closures
- Line — linear features representing physical cable routes (fiber, copper, coax, aerial)
- Junction — splice points, connection points and inline joints
- Assembly — spatial containers grouping internal devices and junctions, such as racks and patch bays
- JunctionObject — non-spatial objects such as ports, connectors, chassis, slots, trays and splitters

Each resource carries a lifecycle status attribute (for example Planned, Designed, Under Construction, Active, Reserved, Outage, Decommissioned) that aligns with TMF lifecycle management concepts, with the specific status vocabulary defined per deployment.

Included TMF639 Resource Inventory API methods:

- List and filtering of resources (GET /resource)
- Retrieve a single resource (GET /resource/{id})
- Attribute selection / field projection (?fields=...)
- Create resource (POST /resource)
- Patch resource (PATCH /resource/{id})
- Delete resource (DELETE /resource/{id})

Using the official TM Forum Conformance Test Kit (CTK) for TMF639 v4.0.0, the deployed API endpoints were executed and a result report was generated for API conformance confirmation. The Swagger/OpenAPI view of the implemented Resource Inventory API is shown below.

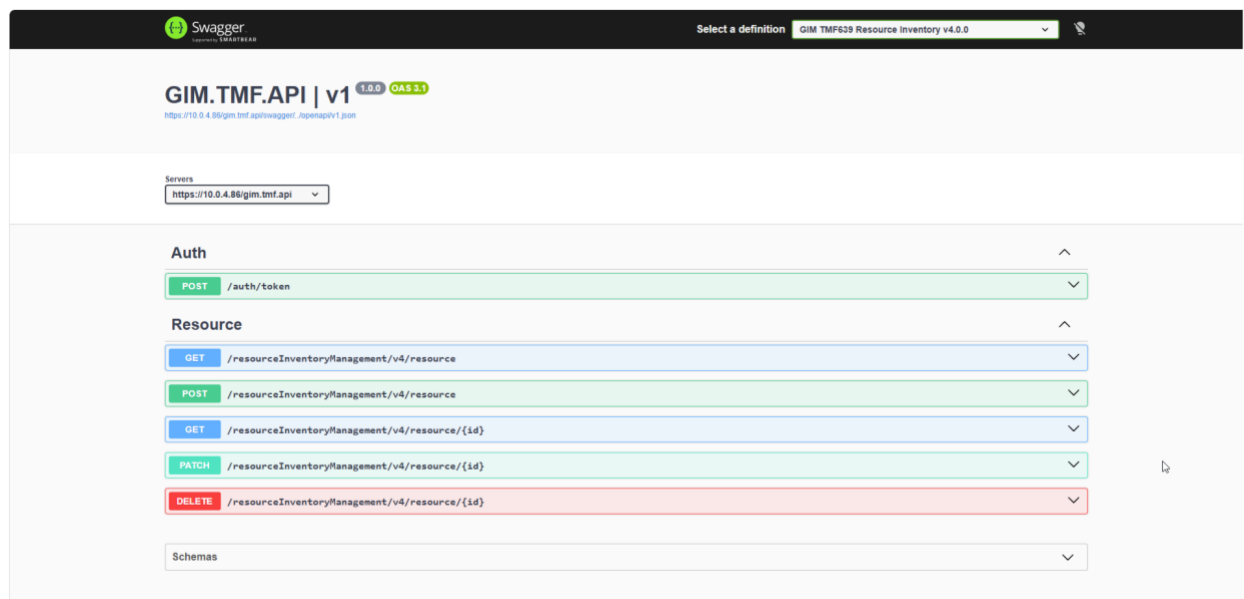


Figure 1. GIM TMF639 Resource Inventory Management API — Swagger view

3. Architectural View

The GIM solution is structured across two backend layers and three clients. The foundation is ArcGIS Enterprise with the ESRI Utility Network / TDN information model. On top of that sits the GDi Ensemble Server — the GIM backend platform providing higher-level services, including the Open API component that hosts the TMF639 Resource Inventory Management API. The three GIM clients — GIM Pro (desktop), GIM Online (web), and GIM Mobile — all consume the backend services via REST API. This layered design emphasises a single authoritative data store, server-side enforcement of business rules, and standards-based external integration.

Key Components

1. ArcGIS Enterprise Foundation

ArcGIS Enterprise is the data and network services foundation. At its base is an enterprise geodatabase hosted on a relational database platform (Microsoft SQL Server, PostgreSQL, or Oracle) that holds all spatial and non-spatial feature classes, tables, relationship classes, domains, subtypes and network topology. On top of the geodatabase sits the ESRI Utility Network Model configured according to the Telecom Data Network schema — the generic information model that defines the layer types, association types, network-rule framework, topology engine and versioning mechanism common to all GIM deployments. Customer-specific data models are built within this fixed framework, allowing a single deployment to model any valid TDN-compliant network topology.

The data models are exposed to all GIM clients and to the Open API through five ArcGIS Enterprise services published via REST: the Feature Service (primary read/write access to all feature classes and tables), the Utility Network Service (associations, connectivity, topology), the Network Diagram

Service, the Version Management Service (branch versioning), and the Validation Service (topology and attribute-rule validation).

2. GDi Ensemble Server — Open API Component

The GDi Ensemble Server is the GIM backend platform layer that provides higher-level services consumed by all client applications. Its Open API component exposes GIM data and operations to external OSS/BSS systems through TMF-compliant APIs. The TMF639 Resource Inventory Management API — the subject of this certification — publishes the GIM network inventory to external systems, alongside the TMF634 Resource Catalog Management API which exposes the GIM asset catalog. The Open API applies standard TM Forum design patterns to ensure interoperability, and enforces business rules and status-based protection at the API level.

When a TMF639 request is received, the Open API resolves it against the underlying ArcGIS Feature Service, mapping GIM asset layer records to the TMF Resource model — including projecting asset attributes and network characteristics into the resourceCharacteristic structure and referencing the originating asset type through resourceSpecification. Because all data operations are abstracted into a shared service layer with server-side rule enforcement, resources served over TMF639 remain consistent with the state presented to GIM Pro, GIM Online and GIM Mobile.

3. Inventory Services and Supporting Modules

The Inventory Services component provides a REST API layer for GIM inventory operations that go beyond what the ArcGIS Feature Service offers directly, abstracting complex multi-step operations into single API calls. Supporting server modules — including the Rights Manager, Identity Manager, Audit Manager, and Mobile Manager — provide access control, authentication (via ArcGIS Enterprise portal OAuth2/token), audit logging, and offline replication. Authentication for API consumers is handled through the ArcGIS Enterprise portal, with editor tracking enabled at the service level so that all changes record user identity and timestamp.

Cross-Platform and Standards Alignment

All three clients and the Open API share the same Feature Service REST backend; no client-specific data access paths exist. Business logic, validation and network rules are enforced server-side and apply uniformly. GIM is designed in alignment with TM Forum standards: data model entities map to TMF SID concepts where applicable, service-facing APIs follow TMF Open API design patterns, and asset lifecycle states align with TMF lifecycle management. The formal TMF compliance scope is maintained as a separate compliance matrix.

Architectural View Conclusion

The GIM architecture combines an industry-standard ESRI ArcGIS Enterprise / Utility Network foundation with a service-oriented GDi Ensemble Server layer and a standards-based Open API. This positions GIM to expose a single, authoritative telecom inventory to external OSS/BSS systems through the TMF639 Resource Inventory Management API, ensuring interoperability and compatibility within the wider TM Forum Open API ecosystem.

4. Test Results

Click here to view the test results: [GDI-TMF639-v4.0.0-HTMLResults.html](#)