Semantix
INFORMATION TECHNOLOGIES

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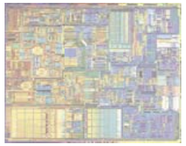
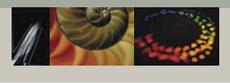
Mediation and Roaming



Mediation and Roaming



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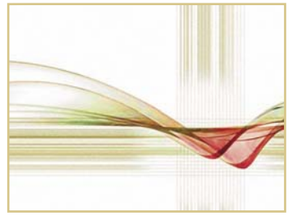


Semantix has extensive exposure in the design, execution, delivery and rollout of telecom mediation and roaming solutions. Our team of experts can lead the data modelling, business analysis and implementation phases of core mediation and roaming projects ensuring that cost, schedule and performance objectives are met.

Semantix has developed mediation devices, components for the processing of roaming subscribers data (according to the latest GSM Transferred Account Procedure and Rejects and Returns Process) and an exceptionally flexible, high performance, script-based re-pricing and re-rating engine for ASN.1 based TAP files.

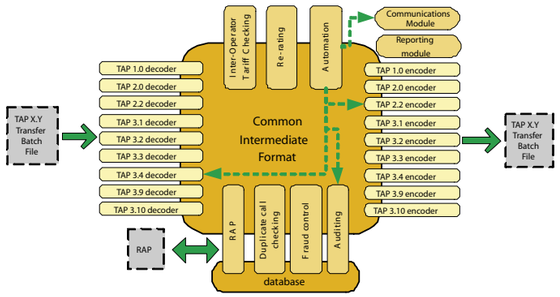
Protocol Mediation

In today's multi-format and multi-protocol telecommunications environment, the proliferation of TAP versions is a problem facing every GSM operator. The TAP Protocol Converter is a modular and open component that is capable of interfacing with a variety of industry standards including all GSM specified TAP formats, converting CDR files between these formats, and optionally, converting CDR data to a normalized output format, and then distributing it to third-party applications such as billing or fraud management systems.

Features:

- Configurable TAP ASN.1 BER decoding, validations and encoding. All versions of TAP defined by the GSM Association can be received and processed (TAP1, TAP2.X, TAP3.X)
- Validates CDRs (fatal/severe errors, warnings) in all GSM-defined versions
- Mediation from/to all GSM TAP versions (e.g. TAP1.0 to TAP3.10) by converting them to a Common Intermediate Format.
- Full customization of the conversion process on a per roaming agreement basis (e.g. different custom settings applicable for each roaming partner)
- Optional modules include: Subscriber Fraud Control, Inter-Operator Tariff checking and re-rating, duplicate call checking
- Provides unique ability to toggle on / off any of the GSM defined validations or alter their gravity or alter their set of allowed values on a per-roaming-agreement basis at runtime and without suspending operation of the system
- Optional component that allows the Common Intermediate Format representation of incoming CDR files to be loaded to a number of databases to support data warehousing applications
- Custom (proprietary, operator-own) TAP versions can be supported
- The core functionality is implemented in ANSI C++ and is thus portable to a variety of platforms. It also allows for excellent performance characteristics as nearly all processing takes place in C++ with database server side processing minimized to what is absolutely necessary.

The TAP Mediation components offered by Semantix can also be used as building blocks to quickly assemble enterprise TAP mediation systems for GSM operators or clearing houses.



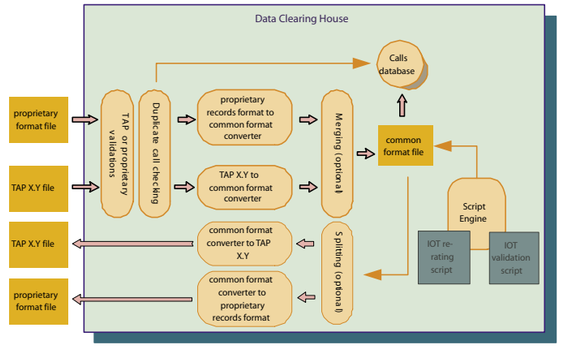
Mediation and Roaming

Roaming Data Clearing House

Semantix has developed a high-performance, high-availability Data Clearing House system that enables GSM network operators to exchange billing and roaming data in different formats. It carries out a set of critical operations such as Fraud Control, TAP File Validation, Financial Clearing and Data Communication. The system accepts all TAP versions specified by the GSM association, performs more than 300 different validations per record, and automatically issues alarms and reports in either summary or detail formats, faxing and emailing them to the interested parties.

The Data Clearing House system is built around a powerful three-tier scalable architecture and consists of a number of C++ processes under the higher level control of Java daemons that process, validate, store in an Oracle database and make transformations among Transferred Account Procedure (TAP) file formats. The following features are supported:

- All versions of TAP defined by the GSM Association are supported (TAP1, TAP2.X, TAP3.X). Transformations are applicable from / to any of these versions.
- Custom (proprietary, operator-own) TAP versions can be supported (two Vodafone-specific TAP versions have been integrated into the presently functioning system).
- Separate formats for GPRS records can be supported. For example, a separate, proprietary format file with only GPRS records can be converted into a TAP file (any version) or vice-versa.
- An interpreted scripting language has been developed to allow for the expression of Inter-Operator Tariff validation rules.
- A more advanced scripting language based on the above one is used to perform re-pricing and re-rating of calls.
- Full RAP support. The system both generates and receives RAP files updating its database to flag rejected calls, etc.
- Information is kept for each call and file processed in the database (most important parameters of the call, services used, etc).



- TAP validations can be customized in a variety of ways, at runtime, on a per-roaming-agreement basis. The same kind of per-roaming-agreement customizations can be applied to IOT validation and re-rating.
- Communications module that automatically faxes or emails reports and alarms to operators or designated administrators.
- FTP and FTAM transfer of produced TAP files.

The system also generates and receives RAP files in accordance to the GSM-specified Rejects and Returns Process.

In a typical production configuration (e.g. an HPUX system with 2x750MHz PA8700 CPUs and 2GBs of RAM) the C++ process will decode a 50,000 calls TAP (BER) file, convert it to the Common Intermediate Format, produce a RAP file, and encode the Common Intermediate Format into any other TAP version into 2 minutes. Database loading files are naturally dependent on a number of configuration and installation choices and also on the extend of the information that is kept in the abridged file form but would typically run in the order of 10 minutes for a 50,000 calls TAP file.