Evolution of EUMETSAT's Multi-Mission Service Monitoring Tools

Henrique Oliveira, Solenix Deutschland GmbH, Spreestr. 3, 64295 Darmstadt (Germany), henrique.oliveira@solenix.ch
Alexander Lais, Solenix Deutschland GmbH, Spreestr. 3, 64295 Darmstadt (Germany), alexander.lais@solenix.ch
Yann Voumard, Solenix Deutschland GmbH, Spreestr. 3, 64295 Darmstadt (Germany), yann.voumard@solenix.ch
Rodrigo Romero, EUMETSAT, Eumetsatallee 1, 64295 Darmstadt (Germany), rodrigo.romero@eumetsat.int

EUMETSAT delivers weather, climate and environment-related satellite data products to its partners, 24 hours a day, 365 days a year. EUMETSAT's highly reliable infrastructure is closely monitored by a set of Multi-Mission Service Monitoring Tools owned by EUMETSAT and used operationally across the organization: GEMS, SMART and SPRS.

Solenix has been developing and maintaining the Multi-Mission Service Monitoring Tools under contract with EUMETSAT since 2011. At ESAW 2013, we presented the status of these software tools at the time. Since then, we have improved them in several major ways.

GEMS

Generic Event Monitoring System

Gathers textual events from systems and services for analysis, and alarms operators of critical events in near-real-time.

SMART

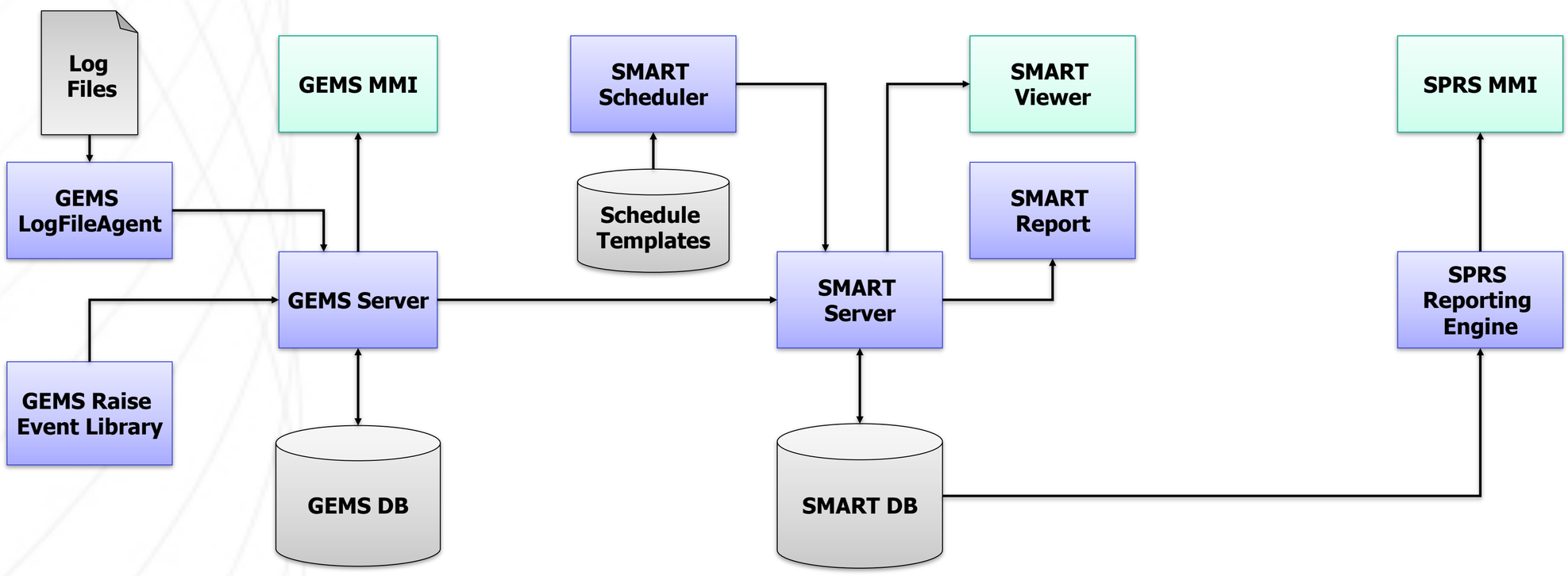
Scheduling, Monitoring, Analysis and Reporting Tool

Defines scheduled event expectations and maps actual GEMS events for analysis of the completeness and timeliness of the services in near-real-time.

SPRS

Service Performance Reporting System

Provides continuous and long-term reporting of SMART event expectations and timeliness.



Major Evolutions

Database Backends

GEMS and SMART have been reengineered with a client-server architecture and an Oracle database backend. These changes have had major impact:

- Improvement to performance of critical SMART components
- Better querying and data access capabilities
- SMART and SPRS now share the same database backend

Event and Message Based Data Transport

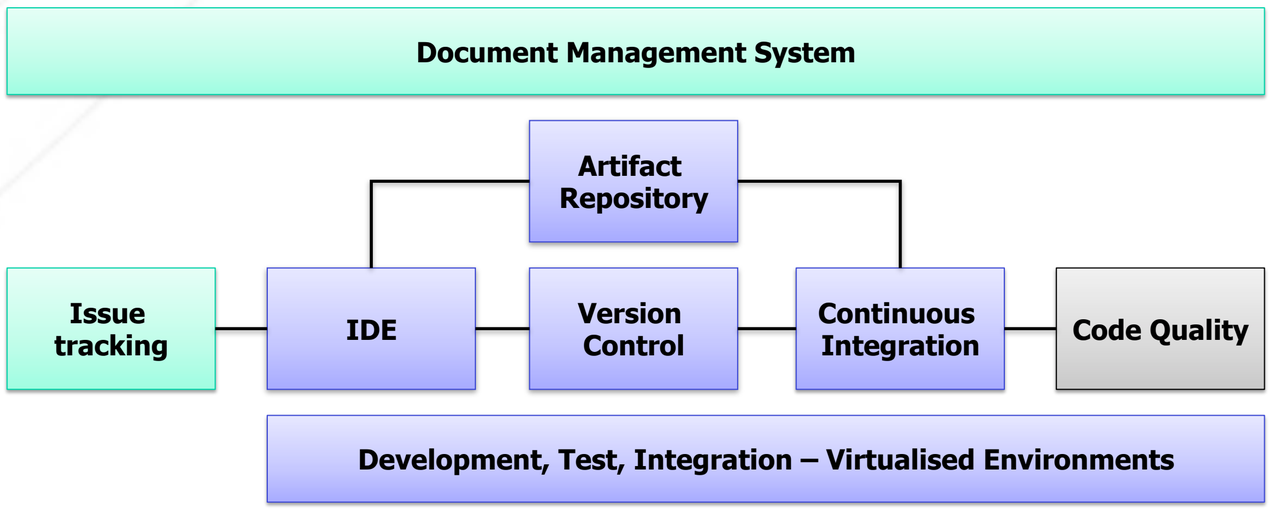
A JMS and ActiveMQ based message queue was implemented, in addition to the current GEMS FTP transport layer. This new architecture has brought several benefits:

- Greatly reduced overall latency
- Validation of events in real time by GEMS

MMI Improvements

The GEMS and SPRS user interfaces have been reimplemented using modern technologies such as JSF and PrimeFaces. New features are now available:

- Push notifications
- Powerful query builder
- Better alarm filtering and acknowledgment via grouping of duplicate events
- Mobile-optimised version



Solenix Software Engineering Framework

All developments have been performed using Solenix's Software Engineering Framework, which relies on Continuous Integration and software testing at its core.

This framework gives us confidence that the existing software's expected behaviour is preserved during major evolutions.

Conclusion

The overall Multi-Mission Service Monitoring Tool chain is no longer based on polling and is now event and message driven. This improvement has resulted in lower latency and faster data distribution across the whole chain.

These evolutions have had not only a positive impact on the system's capabilities and performance, but have also improved software maintainability by introducing modular architectures and more modern technologies.

Future Work

Future developments rely on the solid foundation introduced during the evolutions implemented so far. Several evolutions are currently in planning:

- Extend GEMS with better event data statistics, enabled by the previous adaptation to a relational database.
- Extend the SMART Scheduler, taking advantage of the modular architecture and flexible API introduced in the SMART DB activity.
- Further down the road, reengineer the SMART MMI with better reporting capabilities and more modern web-based technologies.