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TANGO Integration of a SIMATIC WinCC Open Architecture SCADA System at ANKA

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The WinCC OA [1] supervisory control and data acquisition (SCADA) system (previous PVSS II) provides at the ANKA synchrotron facility a powerful and very scalable tool to manage the enormous variety of technical equipment relevant for house keeping, beamline, and machine operation. Crucial to the applicability of a SCADA system for the ANKA synchrotron are the provided options to integrate it into other control concepts even if they are working e.g. on different time scales, managing concepts, and control standards.
Especially these latter aspects result into different approaches for controlling concepts for technical services, storage ring, and beamlines.
The beamline control at ANKA was originally fully based on SPEC and is currently moved to TANGO [2] and SPEC [3] which has been fully integrated by expanding by TANGO server capabilities. This approach implies the essential need to provide a stable and fast link, which does not increase the dead time of a measurement, to the slower WinCC OA SCADA system. The open architecture of WinCC OA offers a smooth integration in both directions and therefore gives options to combine potential advantages, e.g. native hardware drivers or convenient graphical skills.
The implemented solution will be presented and discussed at selected examples.

Expanding SCADA and TANGO

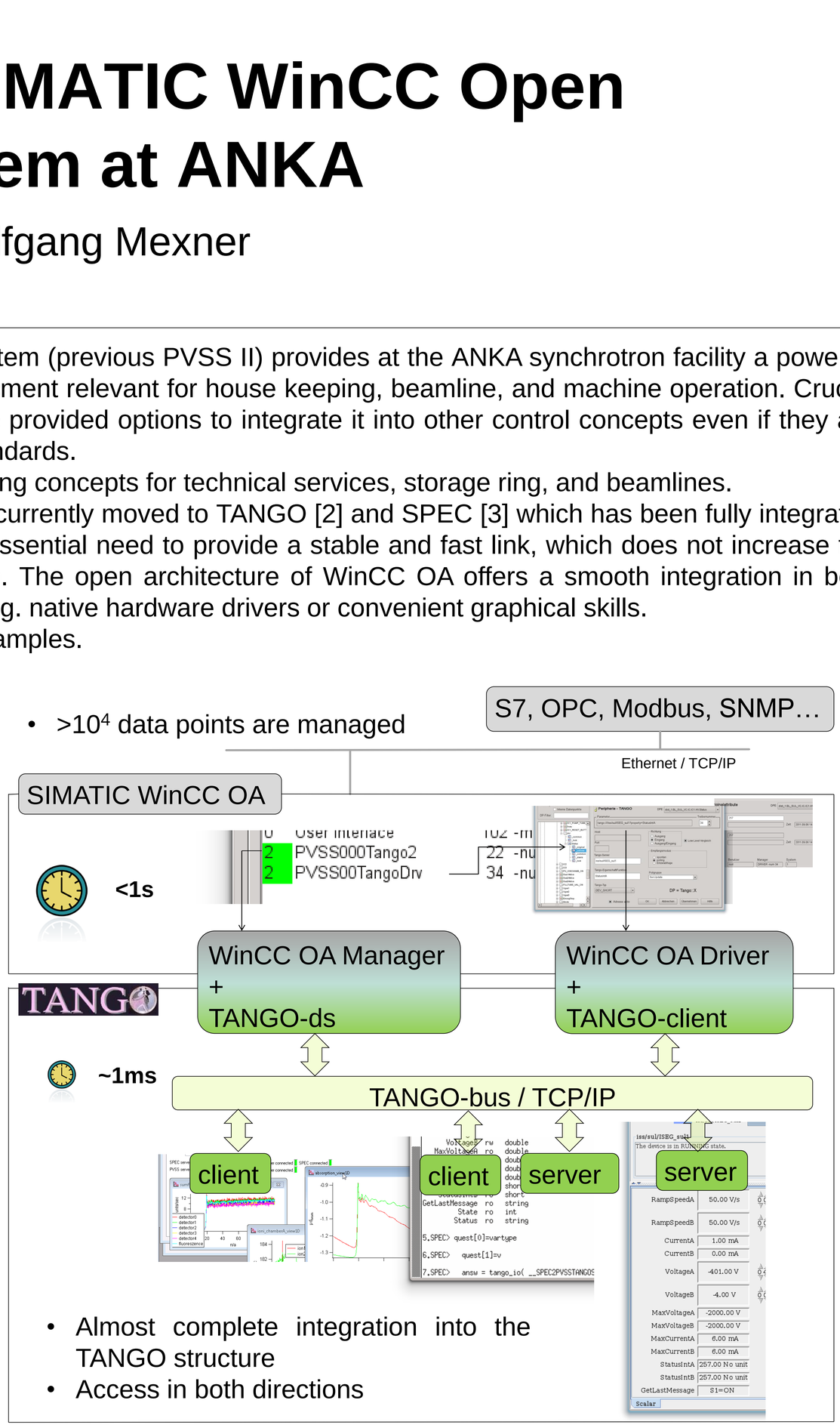
The SCADA tool WinCC OA presents a number of interesting features (marked blue in fig. 1) which are not directly present in the TANGO world in the full range. A bidirectional TANGO access to these SCADA benefits increases its usability and expands the SCADA by a number of special TANGO device drivers of systems which are normally don't offer industrial protocol connections.

SCADA WinCC OA/PVSS II	Beamline control TANGO / spec™
➢ *Hardware integration and maintenence*	
• done by engineers	• done by software developers
• industrial standard protocol driver	• many specific driver solutions
➢ *cycle time*	
Hz	**kHz**
• Driver	• Client
• Manager	• Server
• Single data point storage	• Attributes
• n/a	• Commands
• GUI	• Various visualisation approaches
• developed archiving	• Not used @ ANKA
• dedicated alarming	• Not used @ ANKA

Fig. 1: Comparison chart of basic features of WinCC OA and Tango based beamline control. Key benefits of the SCADA and TANGO used at ANKA are marked blue.

Lifting constraints

As to be seen in fig. 1 the main difficulty are different timescales in signal processing. The power of WinCC OA is to manage a huge number of data points with a rate up to a few Hz. To avoid a slow down of the much faster TANGO based measurement system dedicated access buffers where developed.



- >10^4 data points are managed
- Almost complete integration into the TANGO structure
- Access in both directions

Fig. 2: Schematic overview of the WinCC OA / TANGO interaction for beamline operation. The intrinsic time scale difference is resolved by the developed WinCC OA manager and driver.

The *WinCC OA manager* caches requested data points and guarantees thereby a fast multiple TANGO access without an increased workload of the SCADA. The *WinCC OA driver* permits an access to TANGO server and their attributes and attribute like functions and expands the SCADA to the TANGO world.
The driver implementation might be expanded into a drag and drop systematics and the SCADA might be used as a visualisation platform.

Conclusions

The combination of the SCADA system WinCC OA and TANGO expands the application conditions of both systems significantly. Due to caching TANGO clients may access connected data points without speed loss. Any SCADA data can be used in the timescale of the typical TANGO measurement processes. Additionally many industrial devices became available to TANGO without an extra driver development. The SCADA became access to a number of already programed TANGO device servers and it's attributes and simple commands. The solution is in productive state.

References

[1] http://www.etm.at
[2] http://www.tango-controls.org
[3] http://www.certif.com