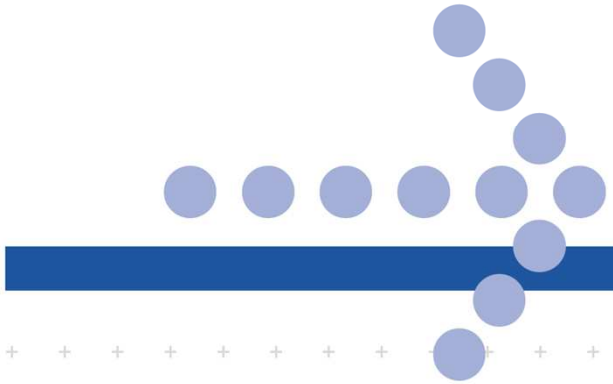


Zabbix in safety critical environments

Zabbix conference / Riga

Günther Sommer
Senior IT Architect / „Zabbix Evangelist“
Business Unit Integration Projects

FREQUENTIS

Overview

- The why and how of using ZABBIX in safety critical environment

- Marketing ☺ – Who are we
- Part I – Why Zabbix / safety critical usage
- Part II – Zabbix usage
- Part III – Zabbix toolbox we used

Marketing ☺

About FREQUENTIS & ZABBIX

- FREQUENTIS is a premium partner of ZABBIX
- Using it as a monitoring part for some of our systems
- Certified for an ED109 – AL3 environment

More than 60 years of innovation & expertise in mission critical applications

We develop and market high reliable communication and information systems for mission critical applications in the fields of Air Traffic Management and Public Safety & Transport.

ATM
Air Traffic Management

ATM Civil **Defence**

PST
Public Safety & Transport

Public Safety **Public Transport** **Maritime**

Worldwide Control Centres develop towards the same standards.

Company Overview

- Established in 1947
- 154 Mio. EUR Turnover 2010
- Corporate headquarters in Vienna
  - Subsidiaries and regional offices in over 50 countries
- about 980 Employees
- Outstanding Engineering Capacity
  - more than 600 highly-qualified engineers (HW/SW/PM) at FREQUENTIS headquarter and subsidiaries
- Export Quota > 90%
- R&D Quota > 12%

First Air Traffic Control System in Austria, Vienna / Schwechat, 1955

Breakthrough in the US: FAA Command Centre / Herndon, Virginia, 2003

Company Headquarters on Wienerberg, relocation in 2006

Global Market Leader in ATC Voice Communication Systems

Worldwide References

[Excerpt 05/2011]

Customers using Zabbix

- Major air traffic control center in Europe
- Major UK police force
- Several airports worldwide
- And getting more

- Used in some of the most complex projects

Safety critical / Why Zabbix

What means safety critical?

- Organisations
  - Air traffic managment
  - Public safety control centers – Police, Ambulance, Fire brigade

- Technical
  - Redundancy and resiliance
  - Severity levels (multiple for same problem) and priorities
  - Time to alarm
  - Configureable screens (Text and Graphs!) for critical situations
  - Minimization of false alarms

Ensuring that the system is safe

- A lot of design! A lot of paperwork! A lot of testing!

- Requirements – Writing and tracking / testing
- Configuration managment / Deployment – this is an essential part of it - not a bit of change without tracking
- Testing
- Test procedures (up to several hundreds of testcases for every release)
- System tests – complete failovers, powerplug, ...
- And more testing – two years of it and still doing ...

Why Zabbix?

- Evaluated several competitors:
  - Nagios
  - GWOS (Nagios++)
  - Zenoss
  - Hyperic
  - OpenNMS
  - Commercial ones like WhatsUp, SNMPc
- Focus on different aspects
  - Some on Java / Middleware
  - SNMP support

Advantages of Zabbix / technical

- Templates – makes mass-administration easy
- Stability
- Fully GUI configureable!
- Trigger „language“
  - Filtering out of CPU spikes
  - Severity escalations with dependencies possible
- Agent command line
  - Try to query NTP sync via SNMP ☺
- Nagios „plugin compatible“
  - You can use outputs from Nagios checks (ie „check_hpasm“)

Advantages of Zabbix / technical II

- Queue – gives you an idea, if it doesn‘t work as expected
- Seperation of App and Config – RPM & Config only in DB
- Proxy & distributed monitoring concept for nationwide systems including a full standalone remote node

Advantages of Zabbix / business

- Matching to our SI business
- Commercial support options
- Trainings
- Engineers „love“ open source – „Patch hack“ support
- Release policy

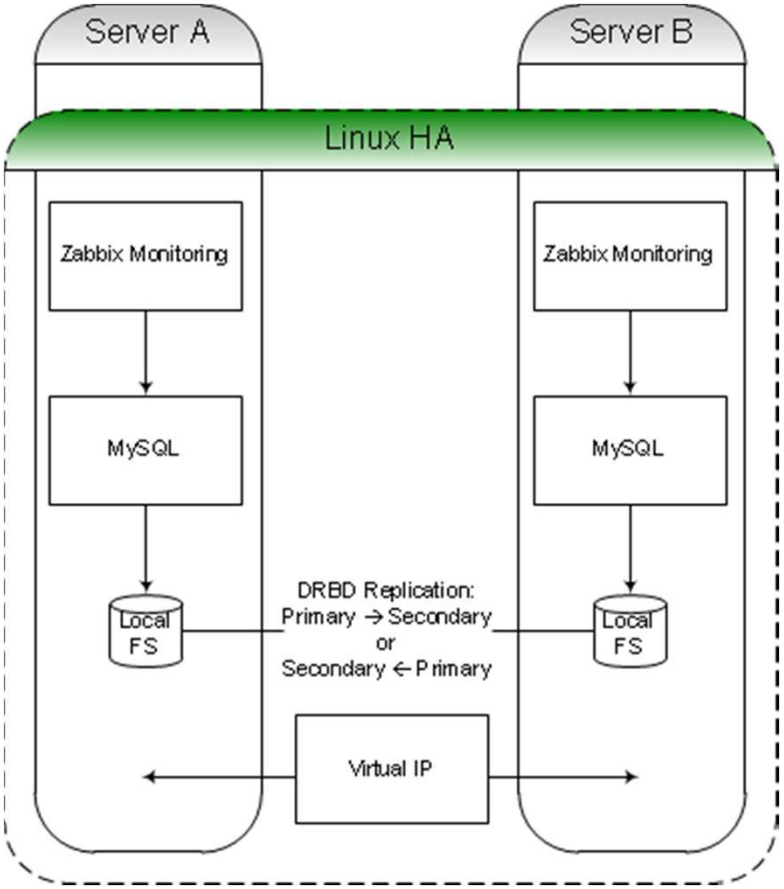
Disadvantages of Zabbix

- Templates ☺ – high learning curve
- Configuration GUI (but improved a lot since 1.8.1...)
- No full config export possible via XML (only on DB)
- No templateable multi-node status – „Service view“

Part II – Zabbix usage

HA setup of Zabbix

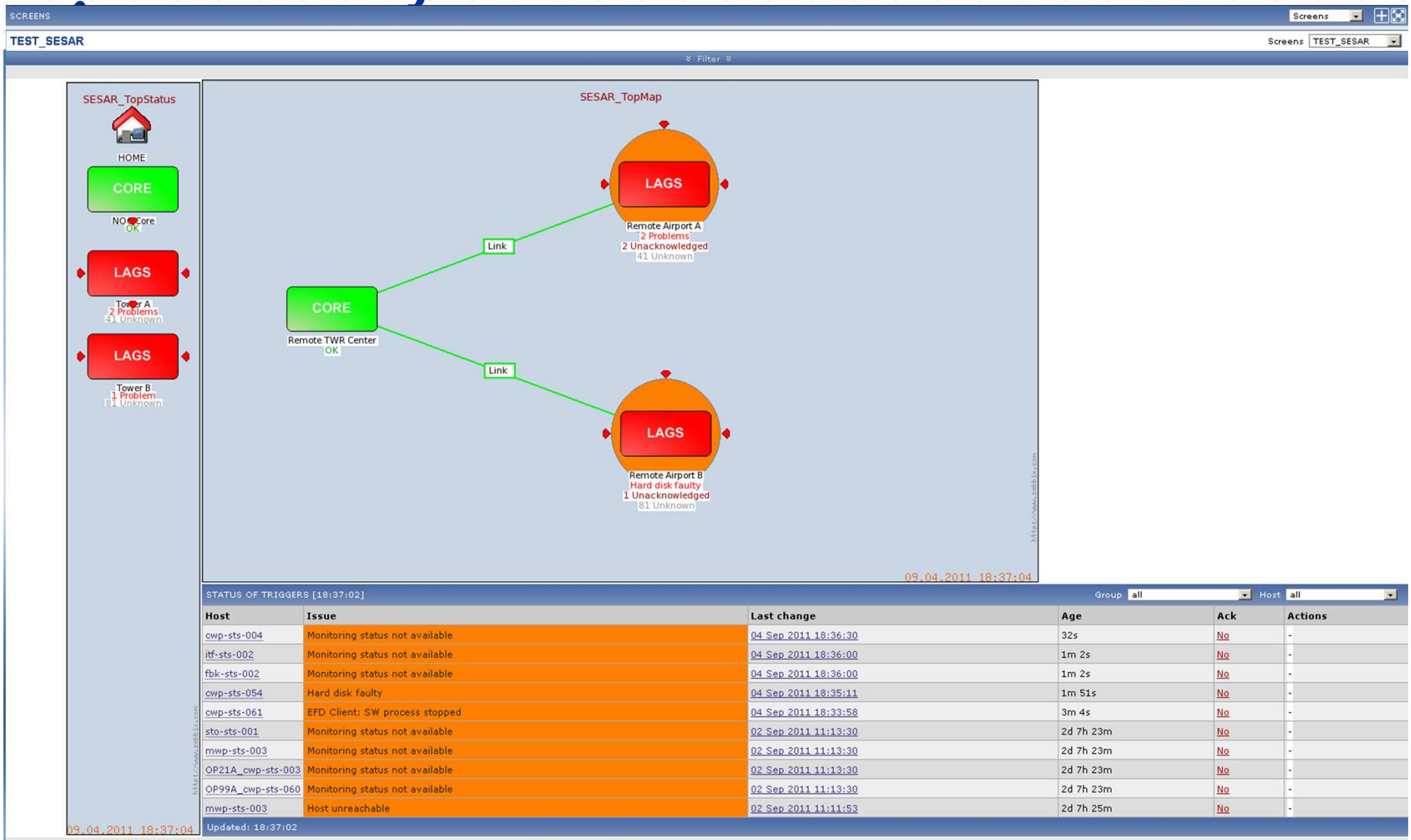
→ Shared nothing architecture



Cluster stack

- Monitoring - Zabbix 👍
- Database - MYSQL 👍👎
  - Sometime quite long startup time (Cluster timeout)
- Replication - DRBD 👍
- Cluster - LINUX-HA based on Pacemaker 👎
  - Lots of issues until failover & failback works
  - Very bad documentation at 2009 for Pacemaker and espical XML, Corosync/OpenAIS was not ready for production use
- Fencing - HP ILO 👍👎
  - productive network has dual redundancy, ILO just one

Screen layouts



Features developed out of our work

- Map & Screen Import/Export
- Internal Zabbix monitoring – had some issues with pollers getting frozen and missing poller resources
- Configurable severity naming and coloring
- Hostgroup filter on status of triggers in screen
- Improved SNMP trap support (in future)
- Event export (in future)
- Script confirmation (in future)
- and more coming ...
- Lots of minor stuff, bug fixes, ...

If you need something...

- Then ask ZABBIX
- Pay for it, it‘s a good price for value
- We got a lot for 1.8 and for 2.0, and 2.x+
- And if you are completly new, there is consulting available

Part III – Zabbix toolbox

Zabbix „Parrot“

- Requirments:
  - Sound alarm indiciation for Zabbix
  - Browser is not really 100% trustworthy
  - Shall be independent of Zabbix server HW & SW

- Solution:
  - External PC or embedded device
  - „Parrot“ gets triggerd by Zabbix
  - Loops the sound until EOL or stop event
  - Stop can be done by server or local contact

Zabbix Backup

Problem

- Normal backup can take very long at DB sizes > 100GB
- No maintenance window existing
- Can only be fast done on storage level – SAN / LVM?
- Can block DB access in example for MYSQL
- Historical data is „always outdated“

Solution

- Fully backup configuration tables only
- Create only DB structure for historic tables
- Backup needs some seconds and is about 1M size

Zabbix API uses

- Command line tool for mass actions
  - Use existing groups and items for command line display
  - Can do the same things as on GUI
- Umbrella monitoring
  - Possible to extend it to interface to another system via API

Q & A

→ Any questions ?

Thank you


COMMUNICATION
AND INFORMATION
SOLUTIONS FOR
A SAFER WORLD