



VŠB – Technical University of Ostrava  
Faculty of Mining and Geology

# Information Technology for Practice 2015

Security of  
information systems  
for production control

Roman Danel, Marcin Reklin,  
Michal Řepka, David Johanides  
and Lukáš Otte



# Content

Selected risk in IS for production control:

- Technical Security of 7x24
- Penetration Testing (WSG Bydgoszcz)
- Personnel Security



# IS for Continual Production Control

## Continual Production 7x24

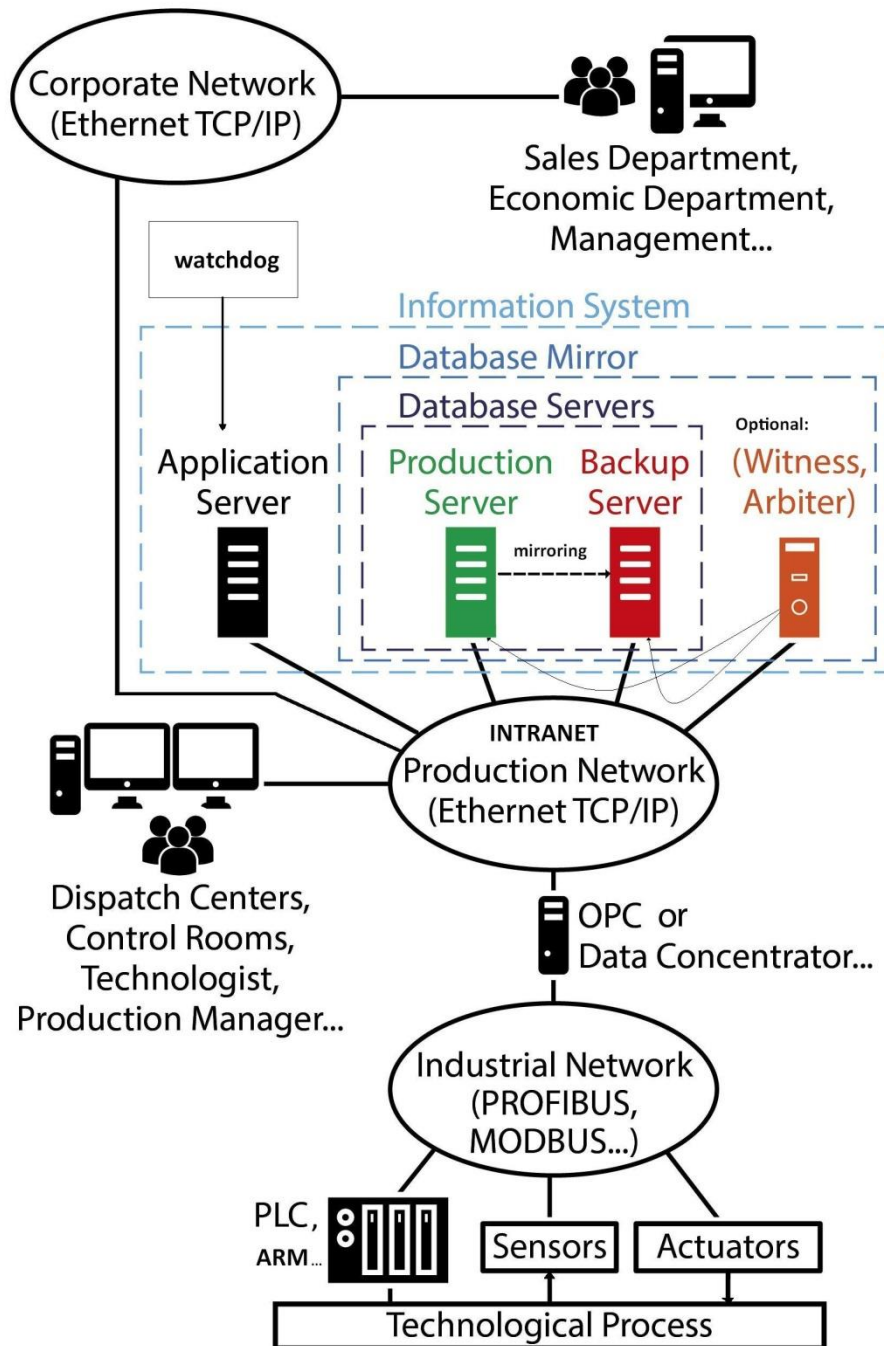
- Data sampling from sensors
- Data in form of time series
- Calculation of trends or prediction of technological parameters



# Fault-tolerant solution for 7x24

- Production and Backup System
- The weakest point → database
- Solution:
  - Replication
  - Database Mirroring
  - Clustering, Always-On

# Conceptual Schema of IS for Production Control





# SGS project – Test of Databases Technology for fault-tolerant solution

- 2014-2015
- Databases for testing
  - Oracle
  - Microsoft SQL Server
  - InterSystems Caché
  - MySQL
- Tests
  - Failover timeout (Data sampling loss)
  - Crush tests



# SGS project – Criteria for Comparison

- Difficulty of deploying a database mirror
- Controllability of systems using scripts
- Speed of the transition to a mirror after failure (downtime duration)
- Implementation costs
- Reliability following crash tests

# SGS project – Results

- **Oracle** – only for Enterprise solution
- **MySQL** – only replication, no support for automatic failover
- **SQL Server and Caché** – the same functionality
- High robustness during crush tests – all db
- **MS SQL Server** - necessity to generate TCP/IP endpoint and set up theirs access using authorisation certificates
- **Caché** – ISC Agent – virtual IP; higher implementation costs





# Penetration Testing

- According OWASP (Open Web Application Security Project) standard
- Commercial tools GFI LanGuard and Nessus
- Open Source Linux Kali



# Penetration Testing

- Found one critical error which led to the unveiling of the username and password of a Cisco network router
- Weakness of many systems is Wireless networks (Franeková et al, 2007)

# Problems with Personnel Security

- Access rights were not recovered from employees with changed position or employees with terminated contracts
- Serious risk can be posed by the still active authentication of a subcontractor's worker after a project has ended
- Administrator and access rights to data backup - *Who can decide about backup deletion?*

# Biometrics Identification Problems

- Advent s.r.o. (Ardagh Group)
- Glass and metal products
- Attendance system





# Biometrics Identification Problems

Reliability evaluation is influenced by:

- Fingerprinting – quality of samples stored into the database
- Device firmware
- Setting the sensitivity threshold (=how likely it is created a string identical to the one that is already stored in the database)



# Biometrics Identification Problems - ichthyosis





# Biometrics Identification Problems - workers



# Biometrics Identification Problems - dirt







# Biometrics Identification Problems

## Summary:

- Sensitivity for cleanness sensor
- Accuracy in fingerprint database
- About 5% of the population is unable to provide fingerprints to make them usable for identification (Note: in Advent s.r.o. 8 people from 144)



# Conclusion

- The design of systems for controlling production sometimes underestimates the area of security, which can potentially lead to substantial damages.
- Good IS design should also include solutions for system reliability, high availability and security.

# Information Technology for Practice 2015



Thank you for your attention...