



IBM Rechenzentrum Boeblingen

Hardware Entwicklung



Data center

+USV im UG

Mirror

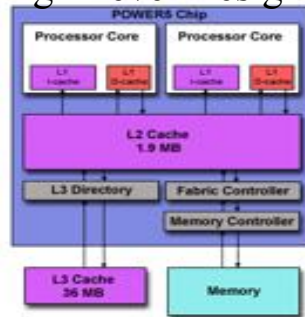
Kühlung

Backup



Schritte in der Hardware Entwicklung

Architecture and High Level Design



benötigte Rechenleistung:

~ 0%

Logic Design and Verification

```
-- (this is a VHDL comment)
-- import std_logic from the IEEE library
library IEEE;
use IEEE.std_logic_1164.all;

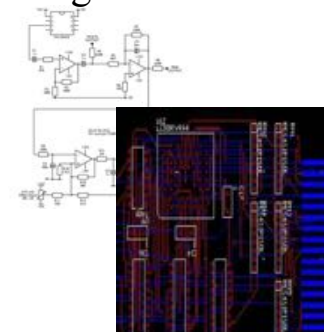
-- this is the entity
entity ANDGATE is
port (
  I1 : in std_logic;
  I2 : in std_logic;
  O  : out std_logic;
end entity ANDGATE;

-- this is the architecture
architecture RTL of ANDGATE is
begin
  O <= I1 and I2;
end architecture RTL;
```

benötigte Rechenleistung

~ 80%

Circuit / Phys Design



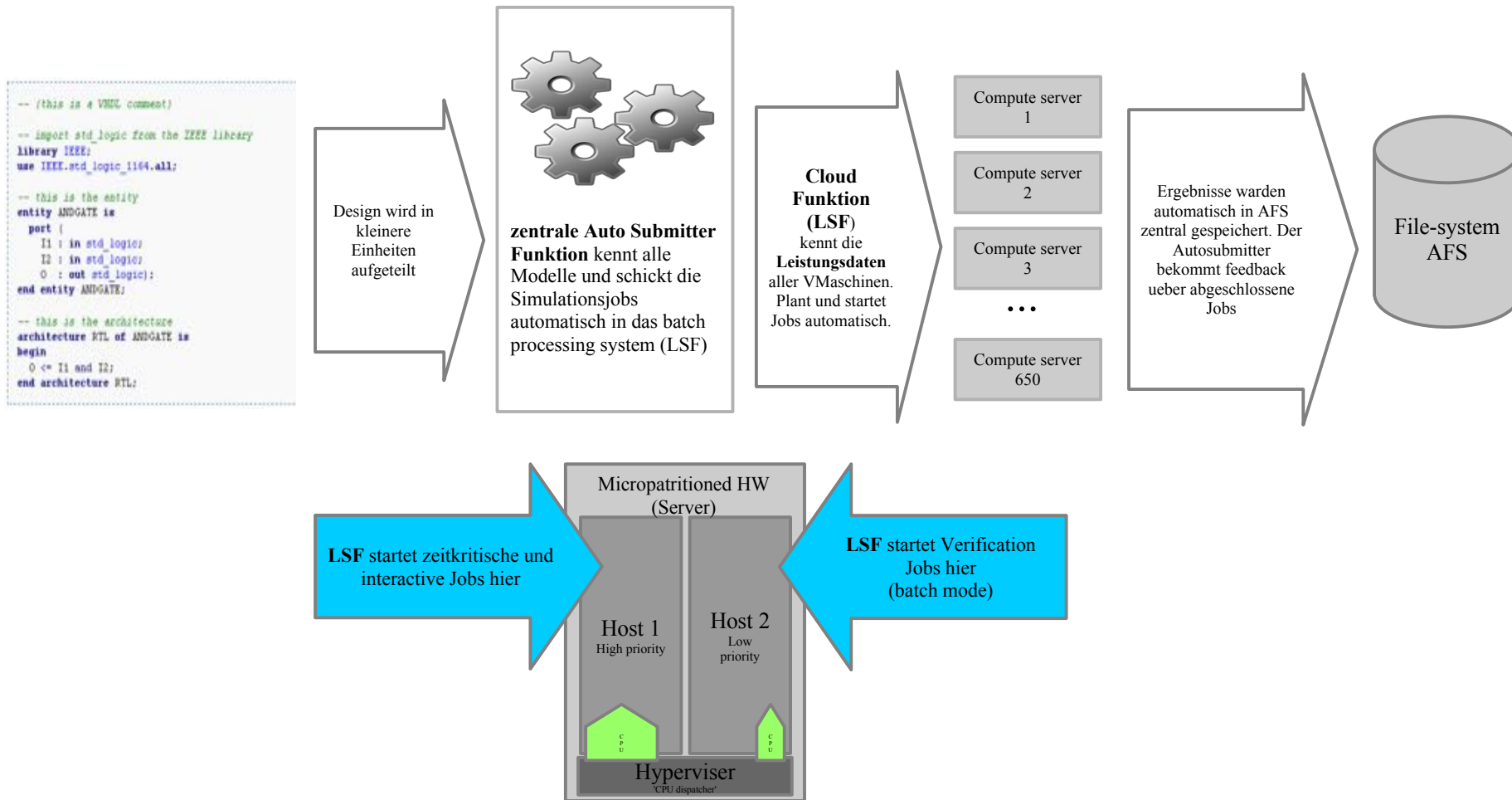
benötigte Rechenleistung

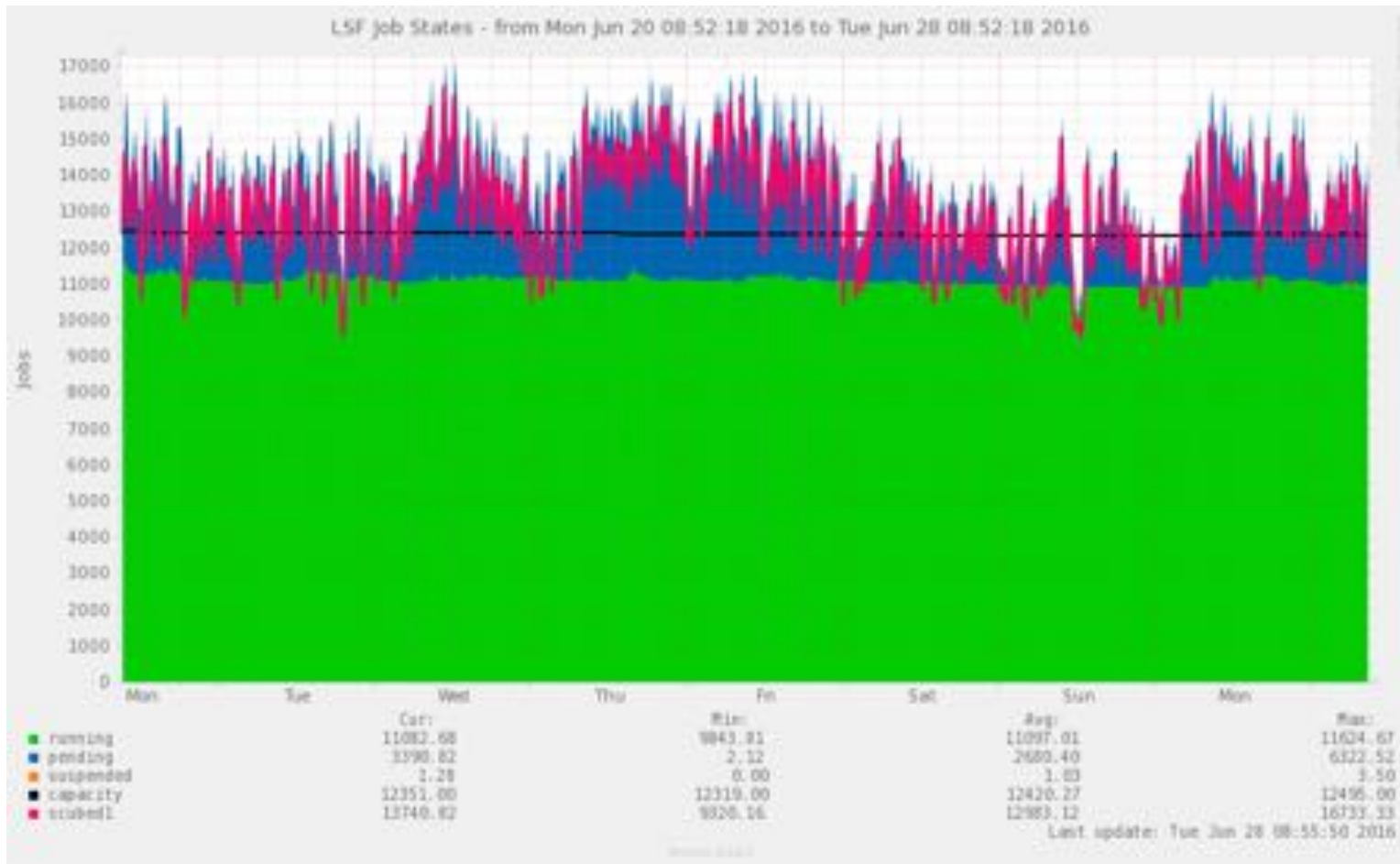
~ 20%

Herausforderungen im 24/7 IT Betrieb

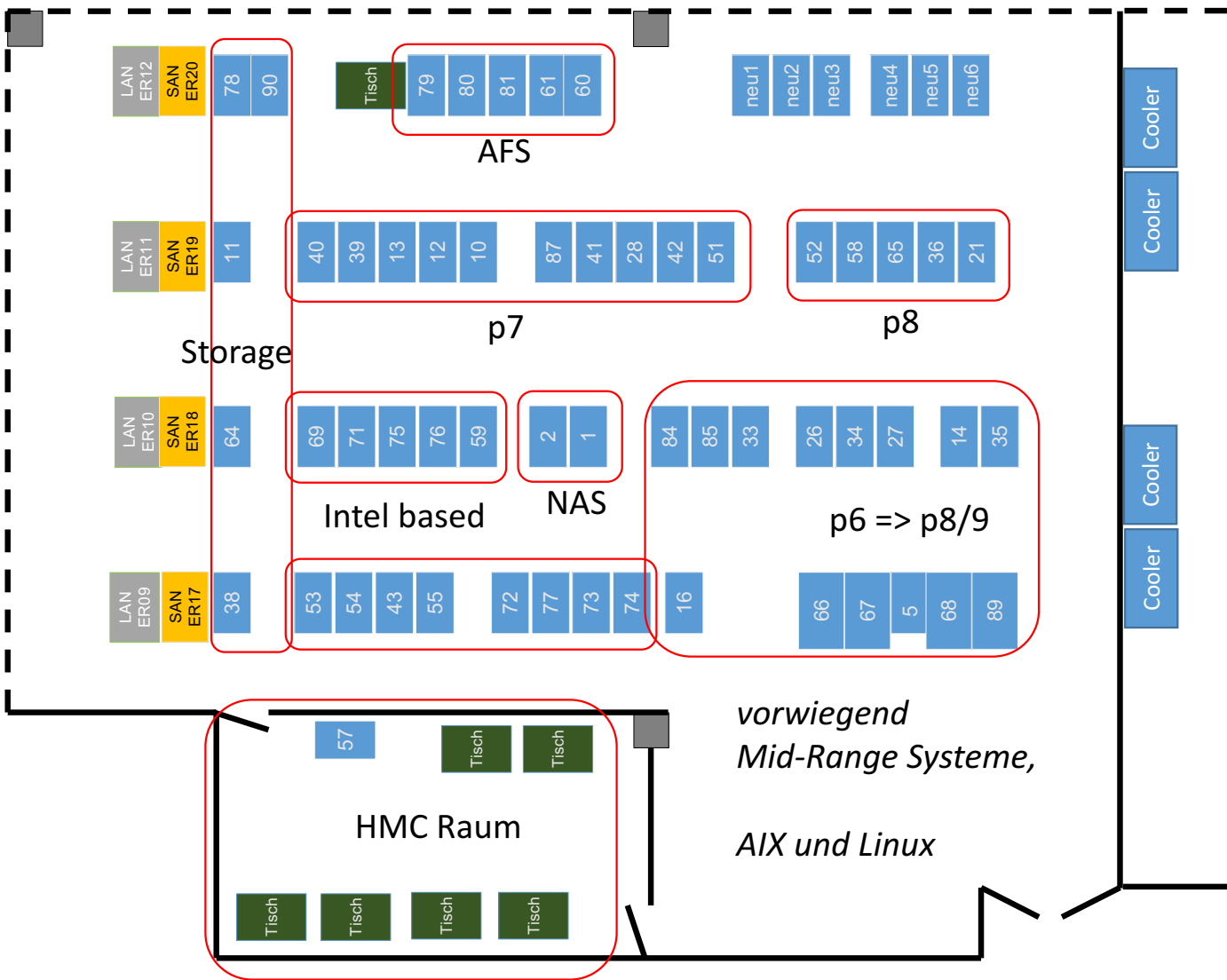
- Verfügbarkeit von Rechenleistung (Benutzer) im Kontext zur optimalen Auslastung der Systeme / Effizienz (IT) und IT Team Größe
- Stromverbrauch (=> MMT)
 - Kühlung
 - Racks
- hohe Anzahl von parallelen Jobs (11k) (LSF), 800 Server, SAN und Infrastr.
- Ausfallsicherheit, gerade bei lange laufenden Jobs (Virtualisierung, SAN)
- Kühlung (=> RDHE, Luftfluss, Wasser)
- Reaktionsfähigkeit bei Problemen (=> SAN, Virtualisierung, remote access, Notfallprozeduren, USV)

autom. Start und Kontrolle von Millionen Jobs





alle virtuelle CPUs
 ←
 ‚Slots in LSF‘
 und Job Volumen



Zusammenspiel LSF, Autosubmitter, HDWB, AFS

1. Autosubmitter

2. Anfrage an HDWB

3. HDWB Daten aufbereiten

4. Autosubmitter LSF submit

5. LSF Master

6. LSF Master (DB update)

7. LSF Compute host

8. evtl. Lizenz holen

9. AFS Anfrage Tool/Model

10. Job bearbeiten (Sekunden bis Tage)

11. Lokale Daten nach /tmp

12. Ergebnisdaten nach AFS

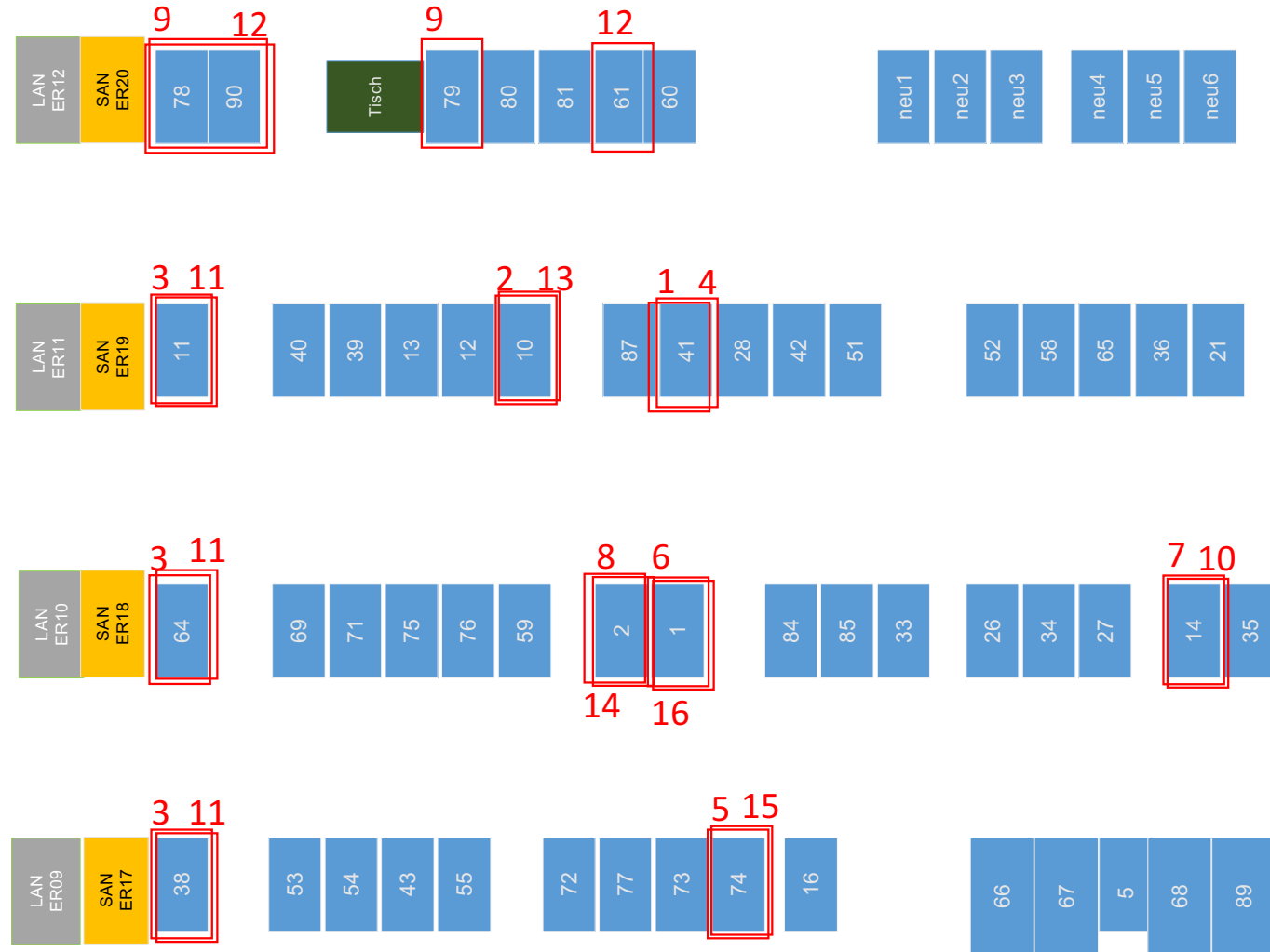
13. Ergebnis in HDWB

14. evtl. Lizenz rückgabe

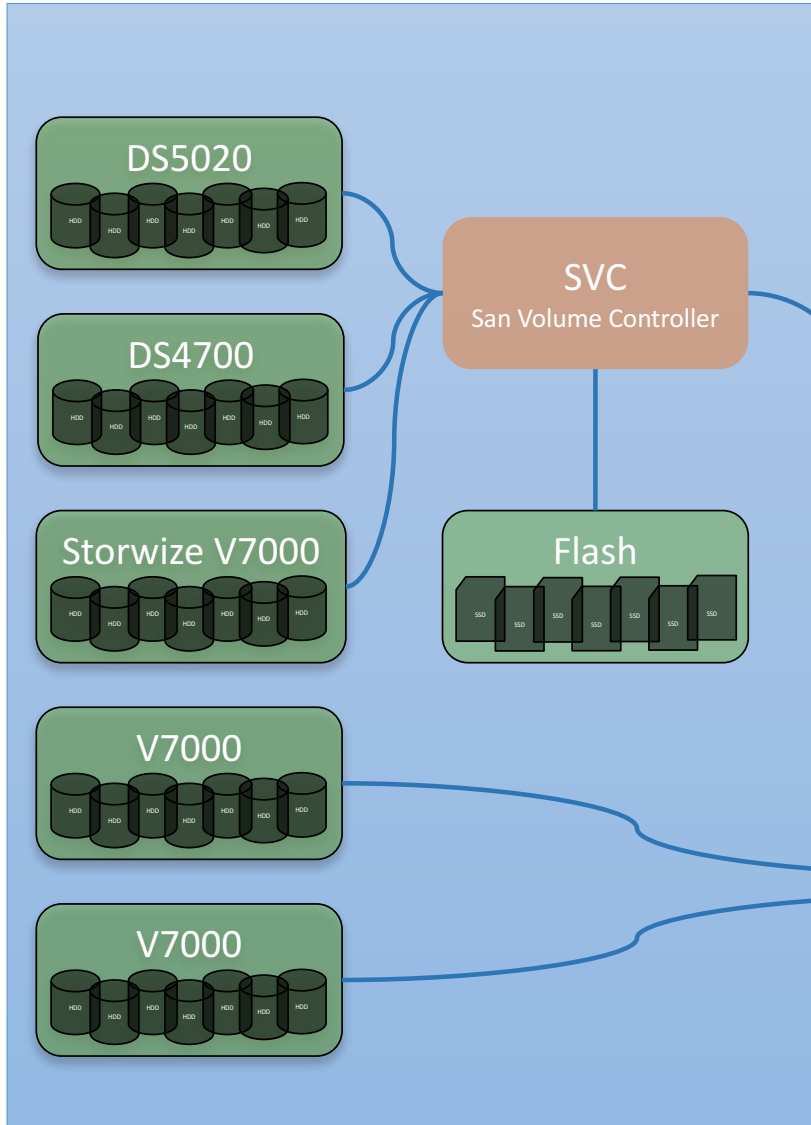
15. LSF Job Ende

17. LSF Master (DB update)

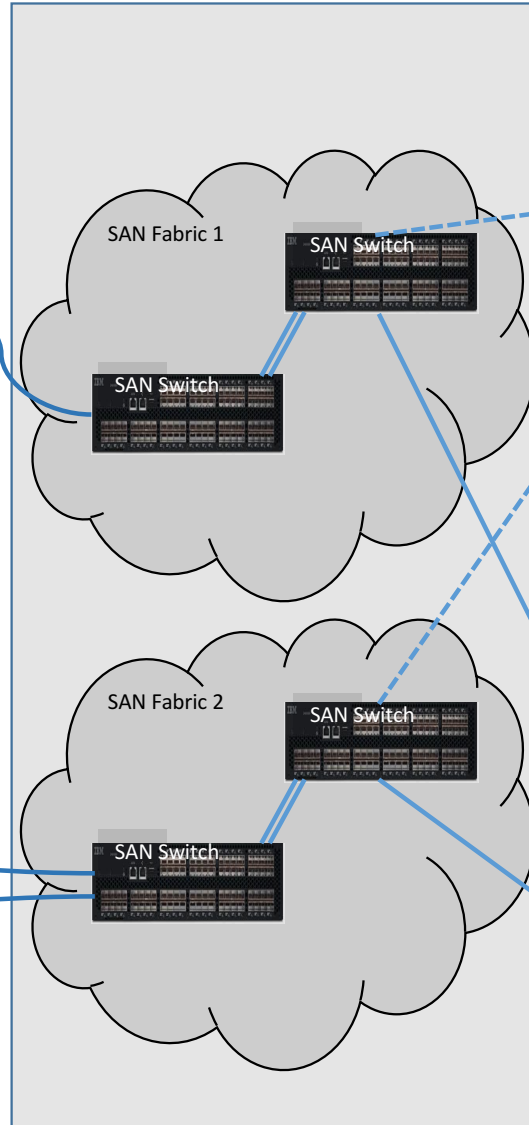
..... 4 bis 17 in loop bis Limit des Projektes erreicht; Danach ab 1. nach Wartezeit



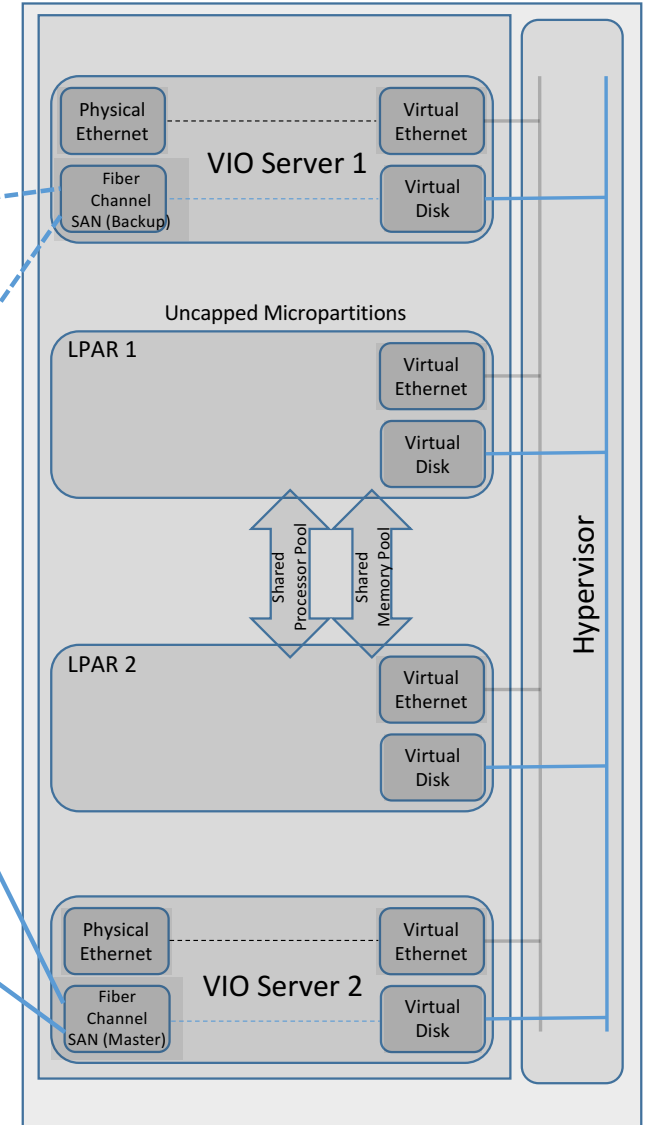
Storage systems physical view

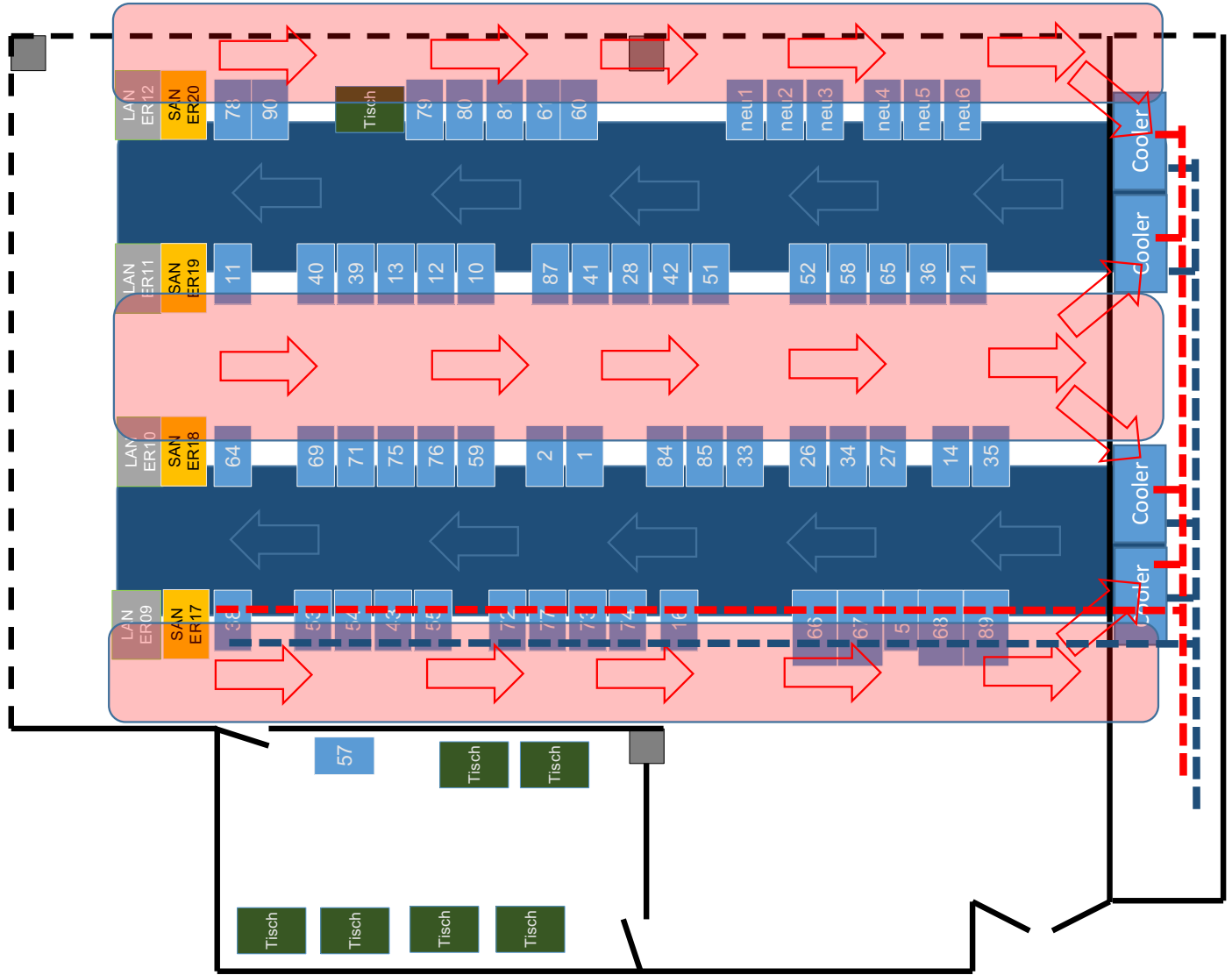


SAN

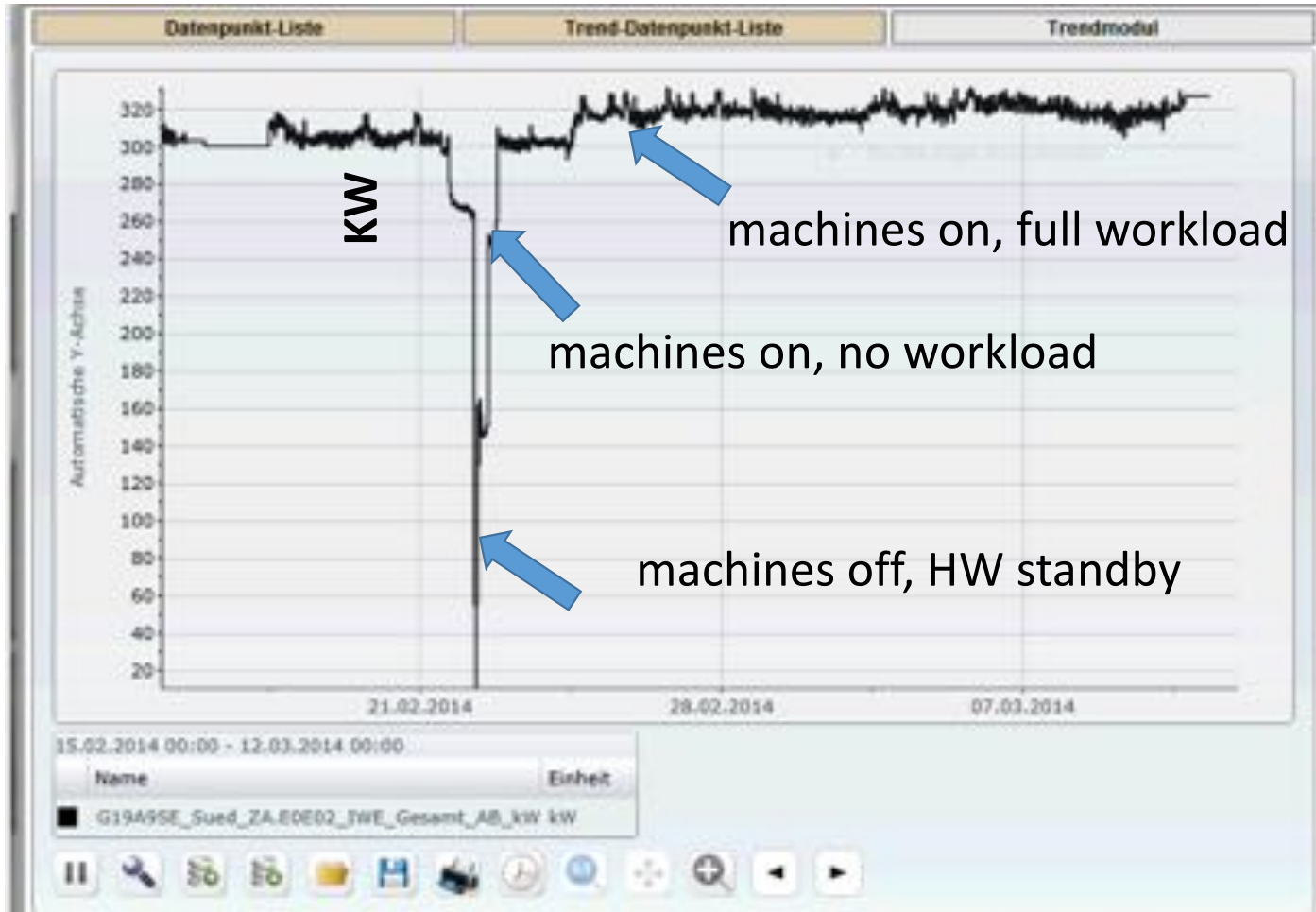


IBM Power Hardware

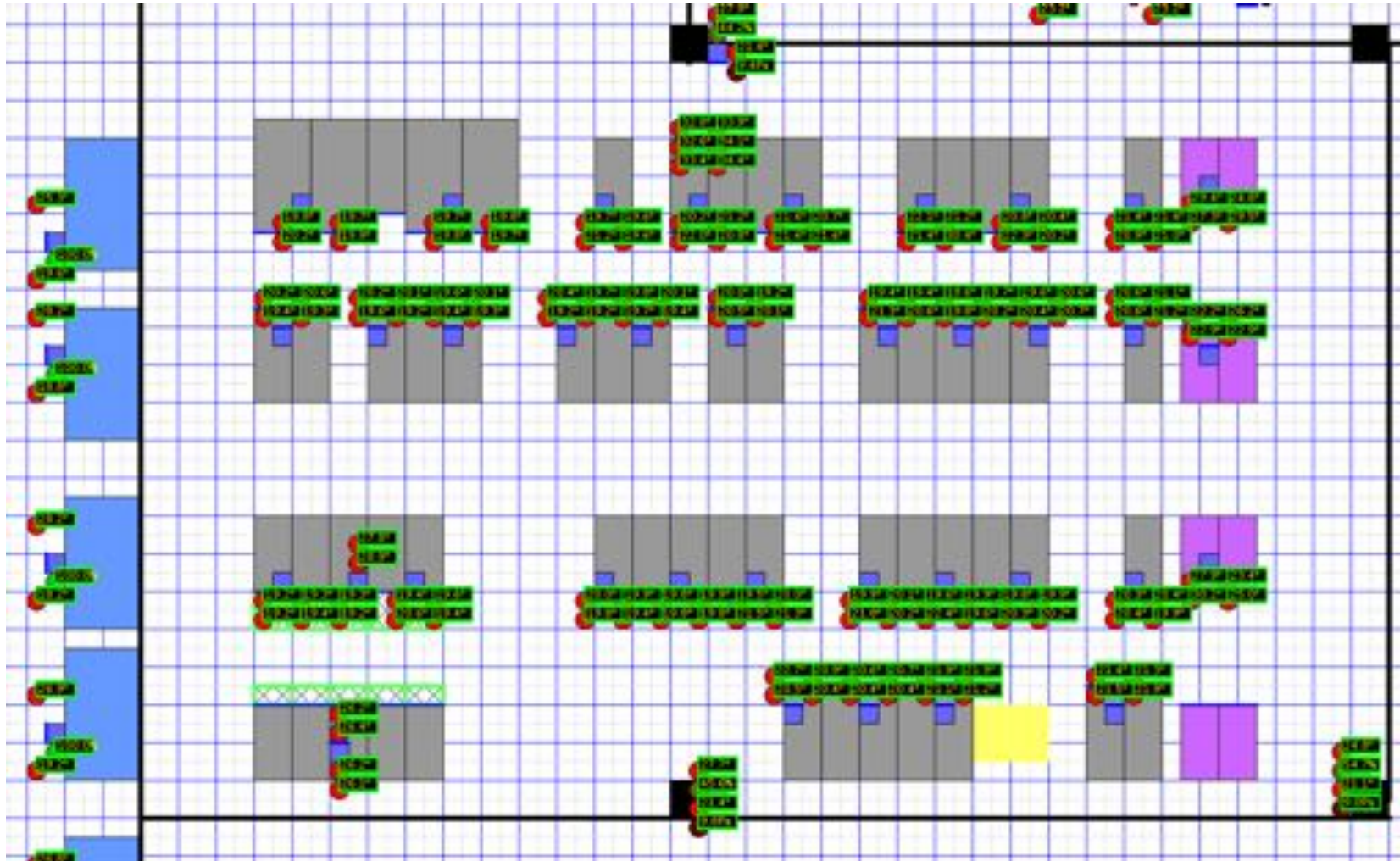




Stromverbrauch des Rechenzentrums



Klima Messung mit MMT 2.0



supervisor console

The screenshot displays the Icinga 2 web interface. At the top, there are status bars for 'UNREACHABLE' (0/0), 'PENDING' (1/82 TOTAL), and 'DOWN' (0/0) for hosts, and 'UNREACHABLE' (0/0), 'PENDING' (24/876 TOTAL), and 'DOWN' (0/0) for services. The Icinga logo and version information are also visible.

Current Network States
Last Updated: Tue Mar 11 07:34 CET 2014 - Update in 27 seconds (next) - Icinga Check UI 2.10.3 (Backend 2.10.3) - Logged in as admin@icinga.com

- View Alert History For All Hosts
- View Notifications For All Hosts
- View Service States Detail For All Hosts
- View Host States Detail For All Hosts

Commands for checked host(x)
Select command [Dropdown] [Submit]

Host States Details For All Hosts
Page 1 of 1 | Results All

Host	Status	Last Check	Duration	Attempts	Status Information
SEARCH	CRITICAL	11-03-2014 08:34:40	60 15h 25m 46s	0/20	CRITICAL - Host unreachable (IP: 192.16.1.107)


Displaying Result 1 - 1 of 1 Matching Hosts

Commands for checked services
Select command [Dropdown] [Submit]

Service States Details For All Hosts
Page 1 of 1 | Results All

Host	Service	Status	Last Check	Duration	Attempts	Status Information
hk1276	DISK_Usage	CRITICAL	11-03-2014 08:34:47	06 5h 55m 27s	0/1	DISK CRITICAL - free space: 144k (1MB (2% used - 98%))
hk1027	Load_Notify	PENDING	11-03-2014 08:34:47	6h 5h 56m 46s	0/5	PROCS WARNING: 0 processes with arg: 'Load_Notify'
hk1684	Load_Notify	PENDING	11-03-2014 08:34:47	18h 17h 56m 56s	0/5	PROCS WARNING: 0 processes with arg: 'Load_Notify'

Displaying Result 1 - 3 of 3 Matching Services



IBM Rechenzentrum Boeblingen