


The background features a dark blue gradient with a large black circle on the left. On the right, a hand in a blue suit sleeve points at a white line graph on a grid. The text 'IT-PS.' is overlaid on the hand and graph. 'IT' is white, 'PS.' is black, and the period is a blue dot. A blue circle is behind the 'P', and a black circle is behind the 'S'.

**IT-PS.**

IT Power Services

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# Realistic Performance Comparison between Power9 and Power10

IT-Power Services GmbH

# Agenda

- About the speaker
- How was the comparison produced (Tool: TRIN[IT]Y)
- Different upgrade scenarios
  1. SAP running on IBM i
  2. SAP running on AIX (with Oracle)
  3. In-house written Applications running on IBM i

# About the speaker



Klaus Haderer

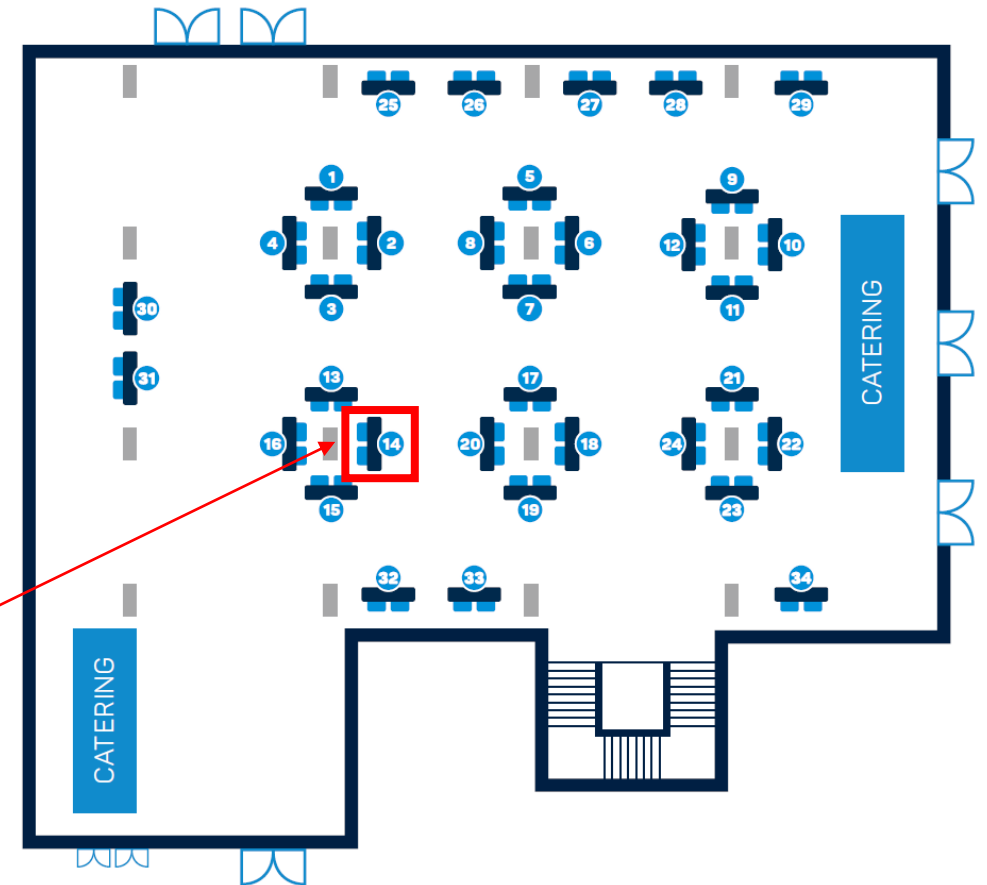
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In the case of additional questions: IT-PS



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- A large solid blue circle on the left side of the slide, a smaller blue ring to its upper right, and a small blue dot to its right.
- **How was the comparison produced**

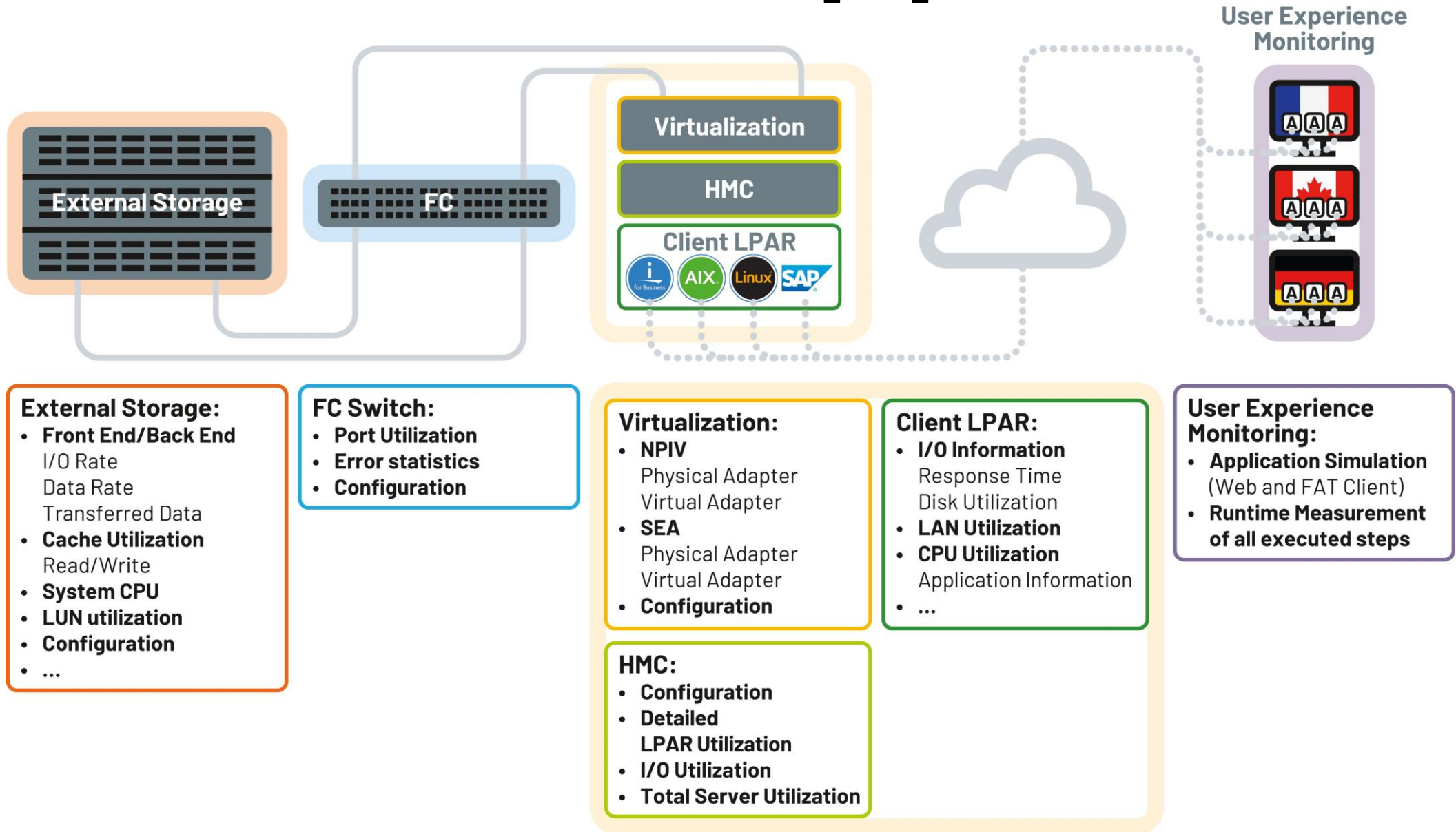
# What is important in respect to performance

- What is the standard answer of IBM regarding performance??? → **IT DEPENDS!!!!**
- Performance is .... “relative”!
- Different aspects of “performance”:
  - Job Runtime
  - CPU Consumption
  - Interactive Response Time (e.g. 5250, Application Server, ODBC, ...)
  - Scalability of the server
- In the past the Power Server was always changed in one go together with the (internal) storage → Today many IBM Power Installations are using External Storage

# What impacts performance from infrastructure point of view ...

- Processor
  - e.g. Power8, Power9, Power10, Clock Speed, ...
- Memory
- Disk
  - Internal versus external Disk
  - Synchronous Replication to a “far” destination
- LPAR settings
  - Shared versus dedicated, ...
- Other aspects ...

# The Tool to measure – TRIN[IT]Y



- External Storage:**
- **Front End/Back End**  
I/O Rate  
Data Rate  
Transferred Data
  - **Cache Utilization**  
Read/Write
  - **System CPU**
  - **LUN utilization**
  - **Configuration**
  - ...

- FC Switch:**
- **Port Utilization**
  - **Error statistics**
  - **Configuration**

- Virtualization:**
- **NPIV**  
Physical Adapter  
Virtual Adapter
  - **SEA**  
Physical Adapter  
Virtual Adapter
  - **Configuration**

- Client LPAR:**
- **I/O Information**  
Response Time  
Disk Utilization
  - **LAN Utilization**
  - **CPU Utilization**  
Application Information
  - ...

- HMC:**
- **Configuration**
  - **Detailed LPAR Utilization**
  - **I/O Utilization**
  - **Total Server Utilization**

- User Experience Monitoring:**
- **Application Simulation**  
(Web and FAT Client)
  - **Runtime Measurement of all executed steps**





- Upgrade Scenarios

# Upgrade Scenarios

- **Comparison 1:**

- SAP running on IBM i
- From Power E980 (3,9 GHz) to Power E1080 (4,15 GHz)
- Storage EMC, has not been changed

- **Comparison 2:**

- SAP running on AIX with Oracle DB
- From Power E980 (3,9 GHz) to Power E1080 (4,15 GHz)
- Storage IBM, has not been changed

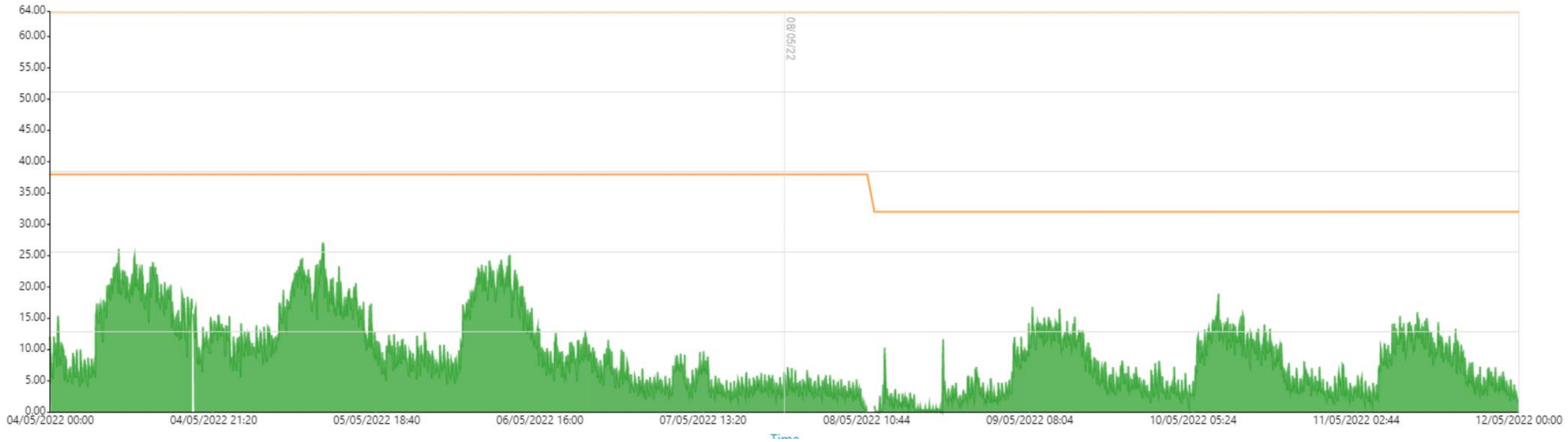
- **Comparison 3:**

- Inhouse written application running on IBM i
- From Power S922 (3,9 GHz) to Power S1022 (4,00 GHz)
- Storage IBM, has not been changed

- 
- **Comparison 1**
    - **SAP running on IBM i (E980→E1080)**

# 3 days before and 3 days after the upgrade

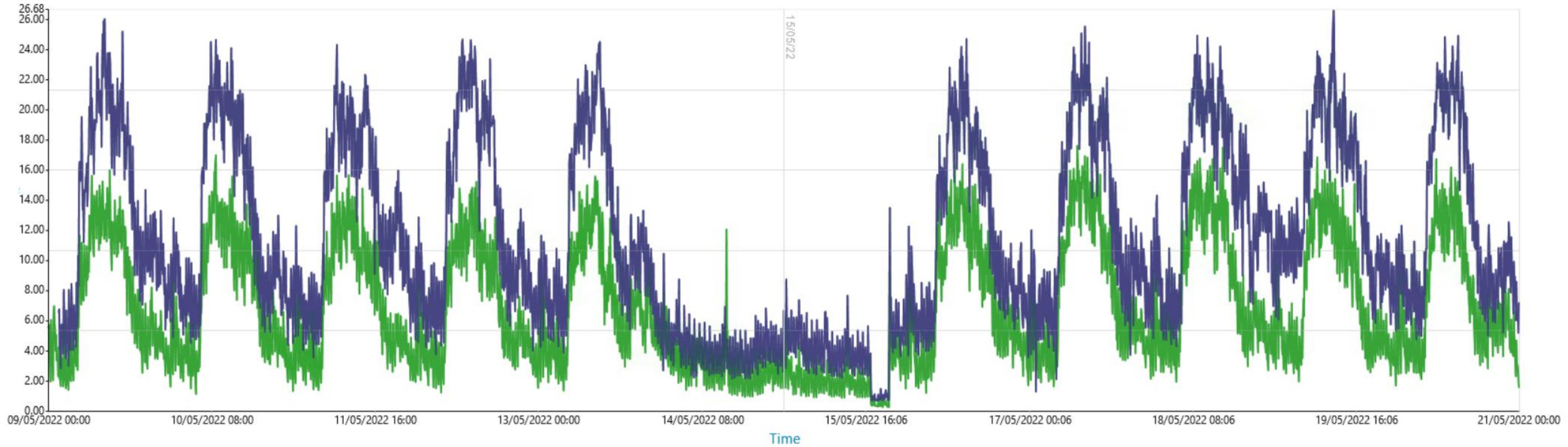
Time of the upgrade can be recognized easily ...



Name	Average	Max	Last
Maximum Processing Units	6400	6400	6400
Utilized Processing Units	8.86	264	1.51
Entitled Processor Units	3800	3800	3200
DLPAR Desired Virtual Processors	0	0	0
DLPAR Maximum Virtual Processors	0	0	0

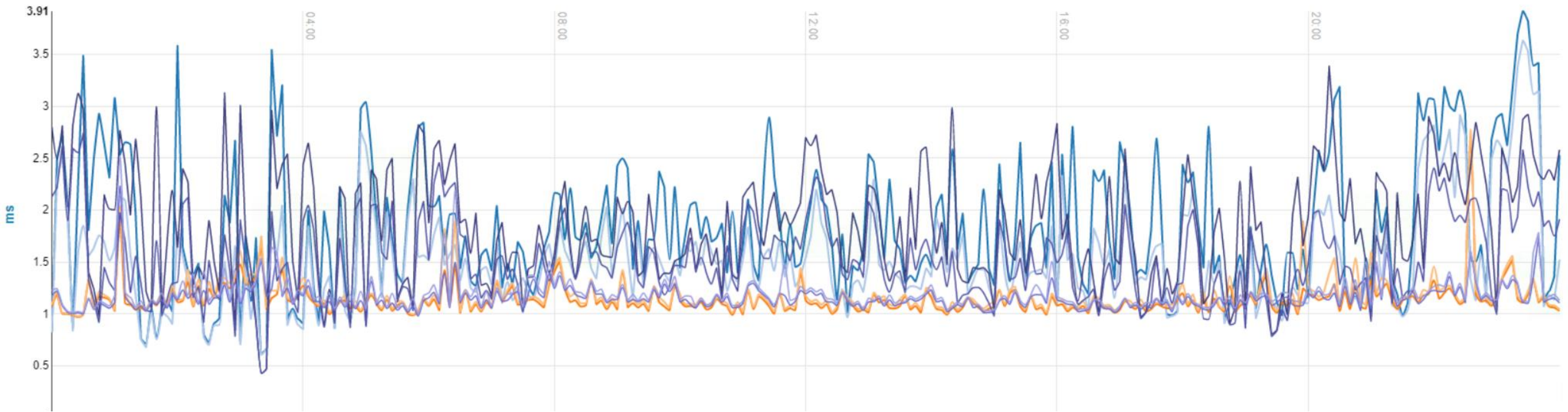
# Comparison of two weeks before and after the upgrade

The **CPU consumption was reduced by approx. 40 %!**



Name	Average	Max	Last
Utilized Processing Units	6.74	17.63	1.60
Previous date range			
Utilized Processing Units	11.52	26.68	7.18

# I/O Response Time before and after the upgrade

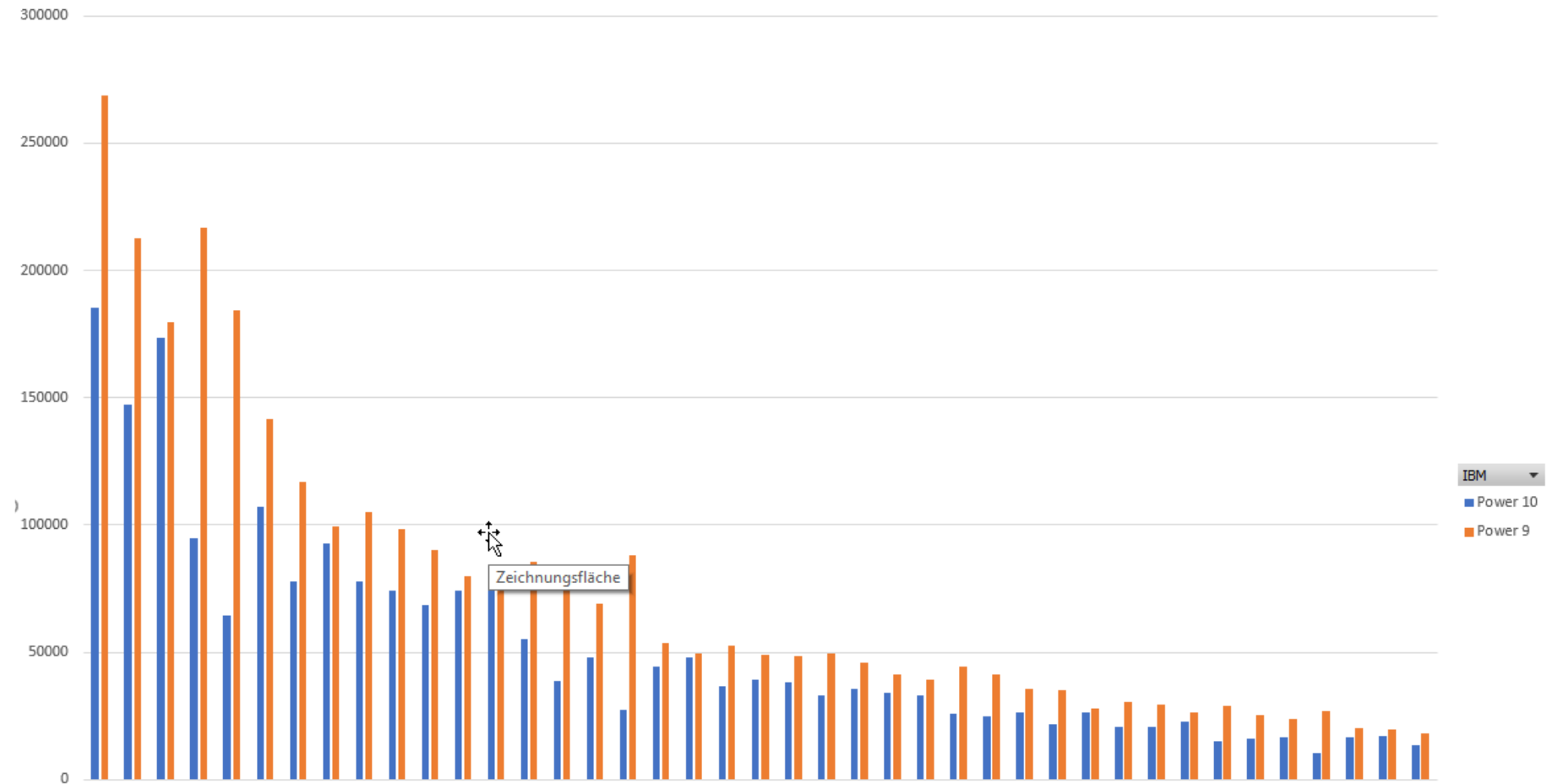


Name	Average	Max	Last
Average Read Service Time	1.53 ms	3.63 ms	1.52 ms
Average Write Response Time	1.13 ms	2.71 ms	1.03 ms
Average Read Response Time	1.85 ms	3.91 ms	2.53 ms
Average Write Service Time	1.18 ms	2.77 ms	1.04 ms
Previous date range			
Average Read Service Time	1.52 ms	2.74 ms	1.91 ms
Average Write Response Time	1.15 ms	2.23 ms	1.10 ms
Average Read Response Time	1.86 ms	3.39 ms	2.58 ms
Average Write Service Time	1.20 ms	2.51 ms	1.13 ms

# SAP – CPU time comparison of the Top 40 „jobs“

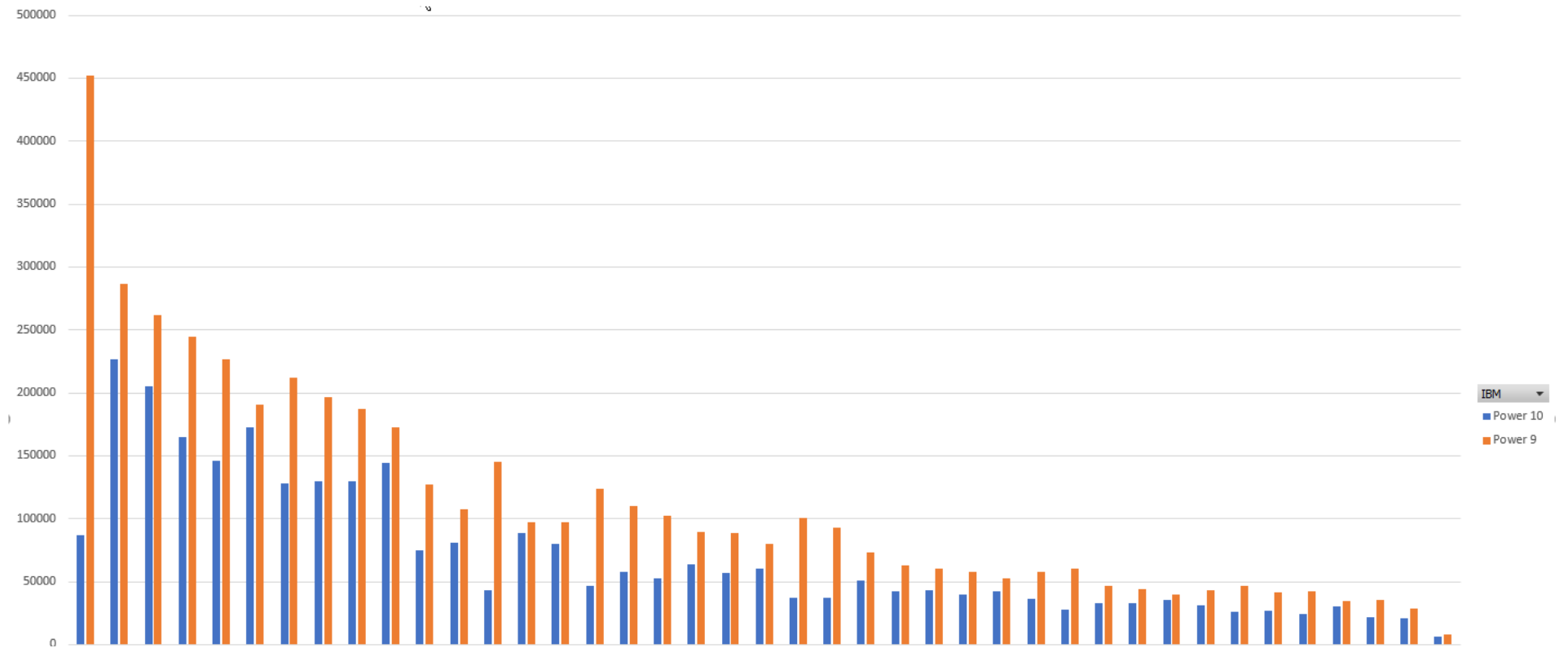


- Less consumed CPU-Time → the different jobs are running partly significantly shorter!



# SAP - DB Time

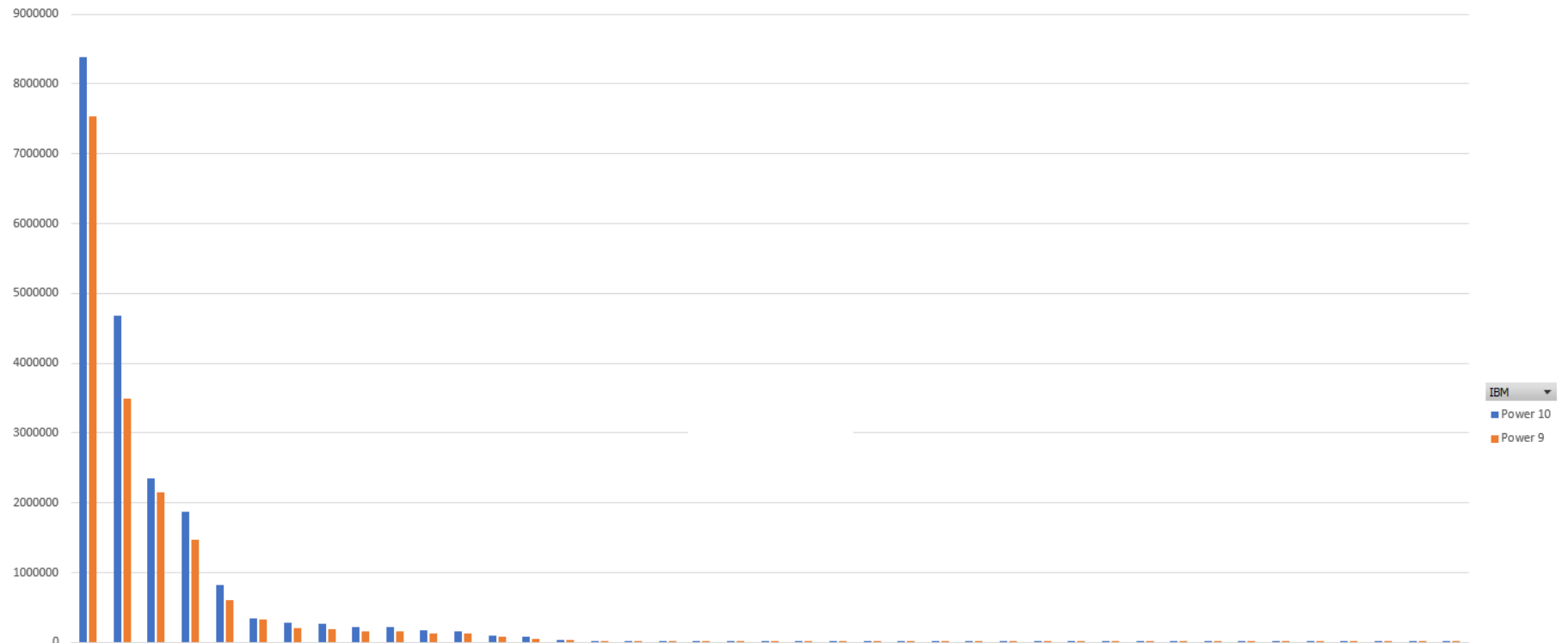
- Less DB-Timer per Job





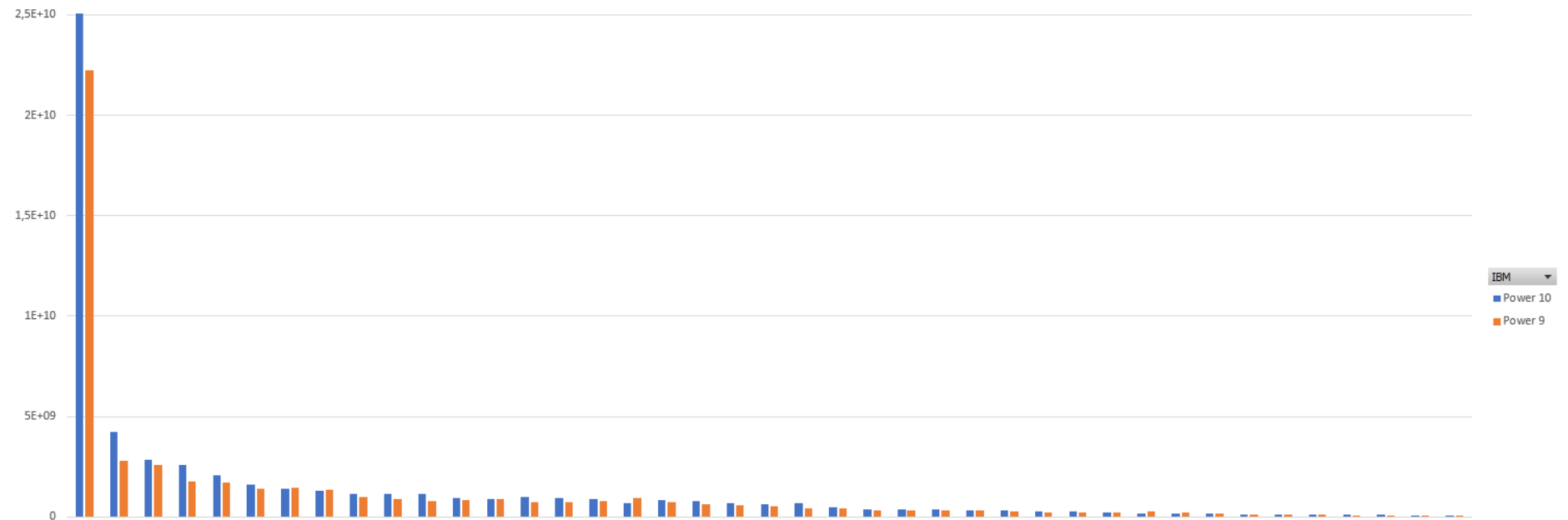
# SAP - Number dialogue steps

- Comparison of workload, Power10 workload a little bit higher compared to Power 9 → **Workload is within the same „range“**



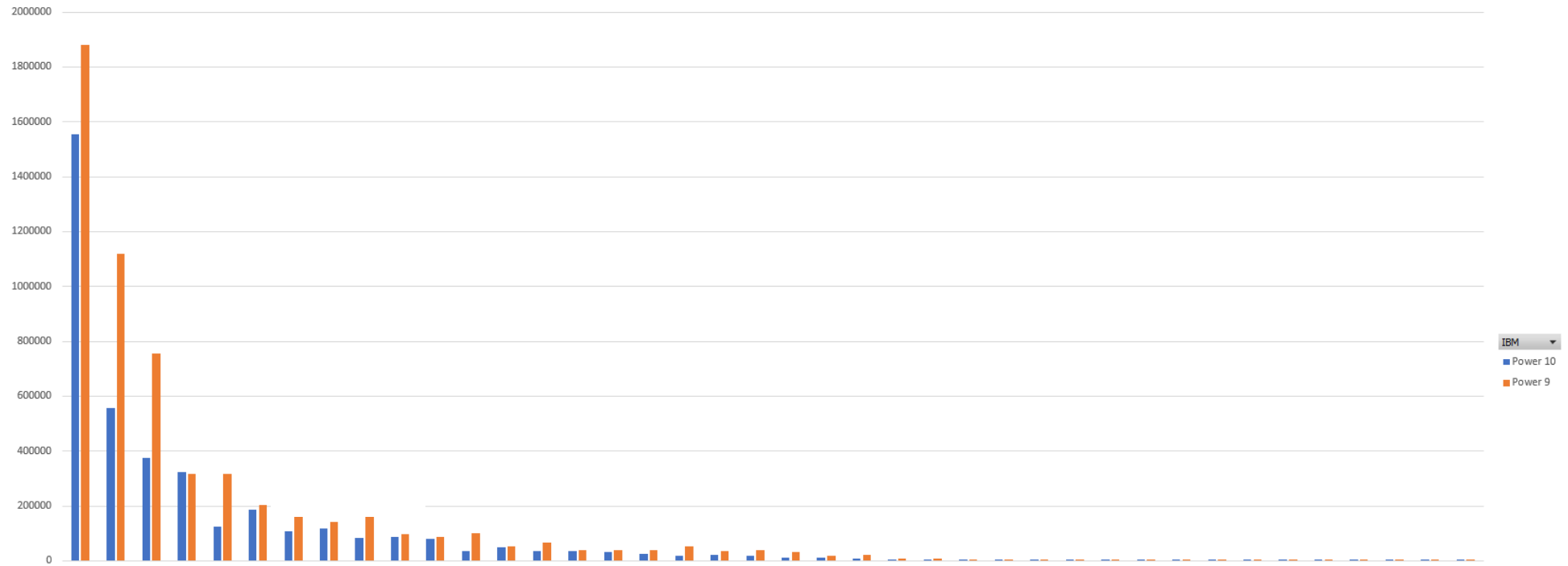
# SAP – sum of requested data

- Approx. the same data load → **Workload is within the same „range“**



# SAP – average dialogou response time

- Less using Power10!

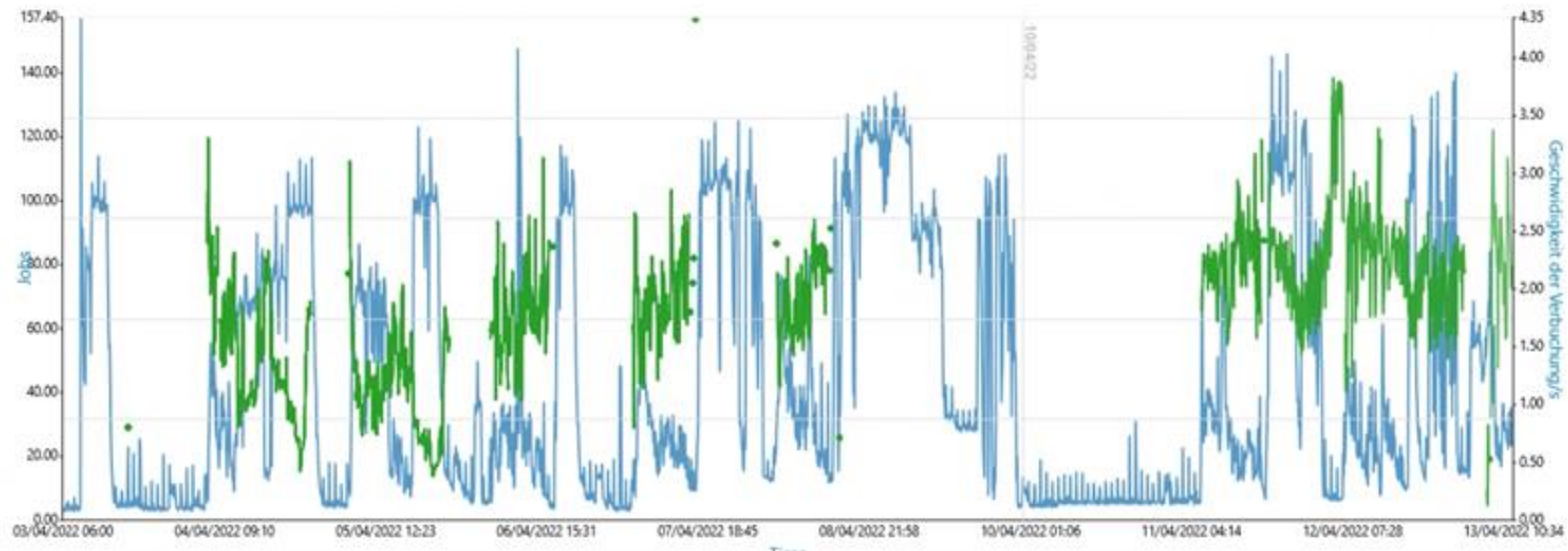


## Comparison 2

- SAP running on AIX (E980→E1080)

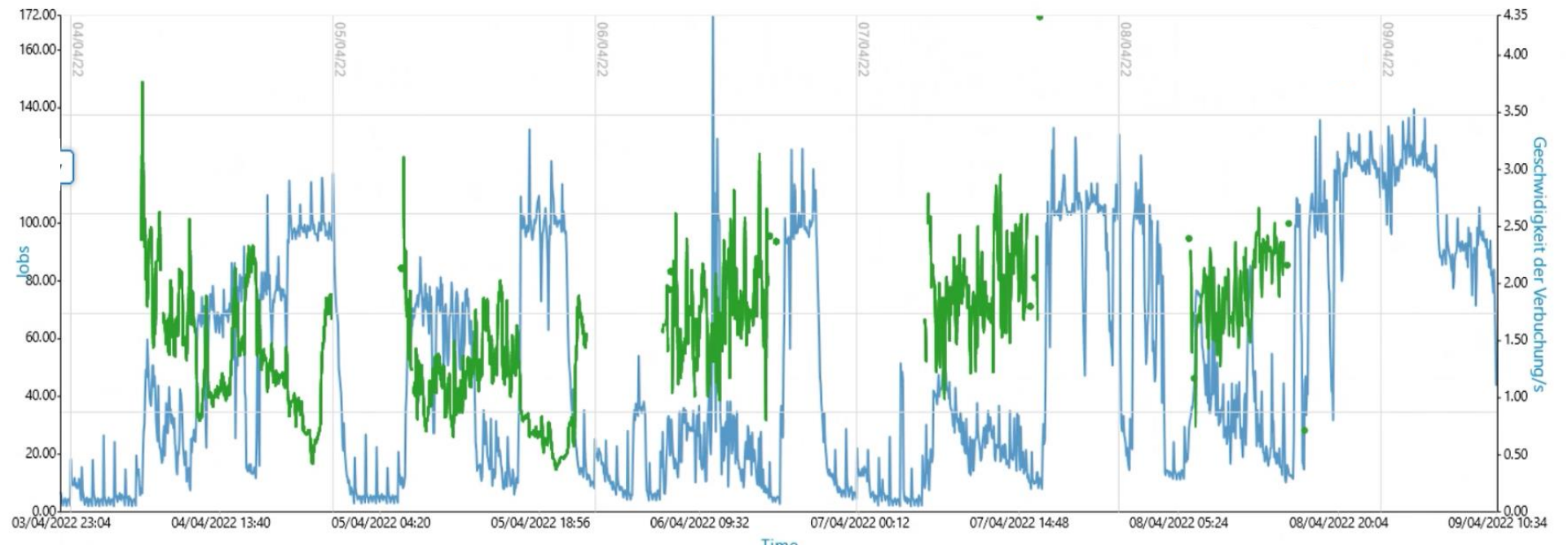
# Processing before and after the upgrade

- The chart shows **the number of parallel running jobs – blue** – and the average **number of „bookings“-green** – that could be processed per second



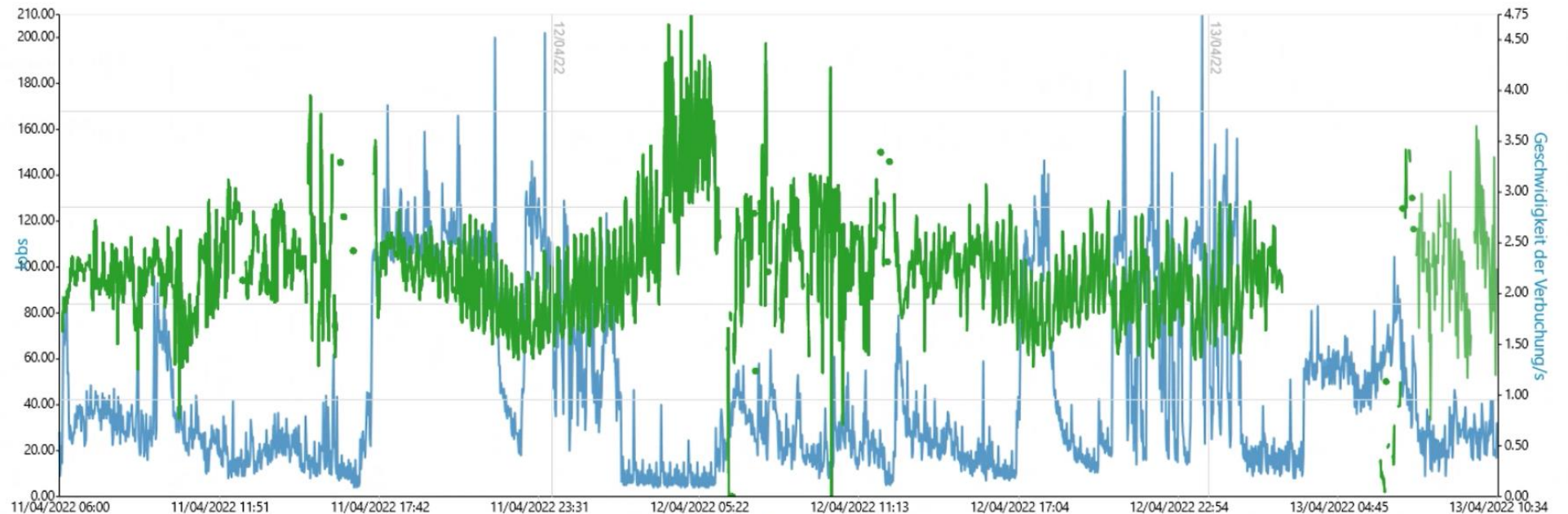
# Before the upgrade

- Using **Power9** an average performance of **1,55 bookings per second** have been achieved



# After the upgrade

- Since Power10 an average performance of **2,23 bookings per seconds** have been achieved. Based on that an **increase of 44 %** have been achieved.



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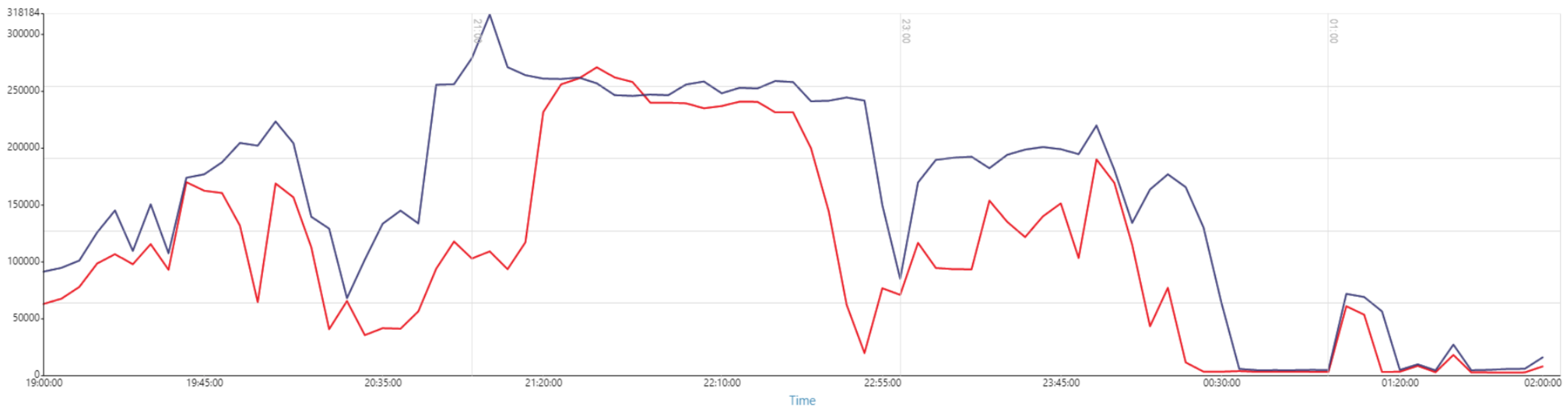
## Comparison 3

- In-house written Applications running on IBM i



# Processing before and after the upgrade

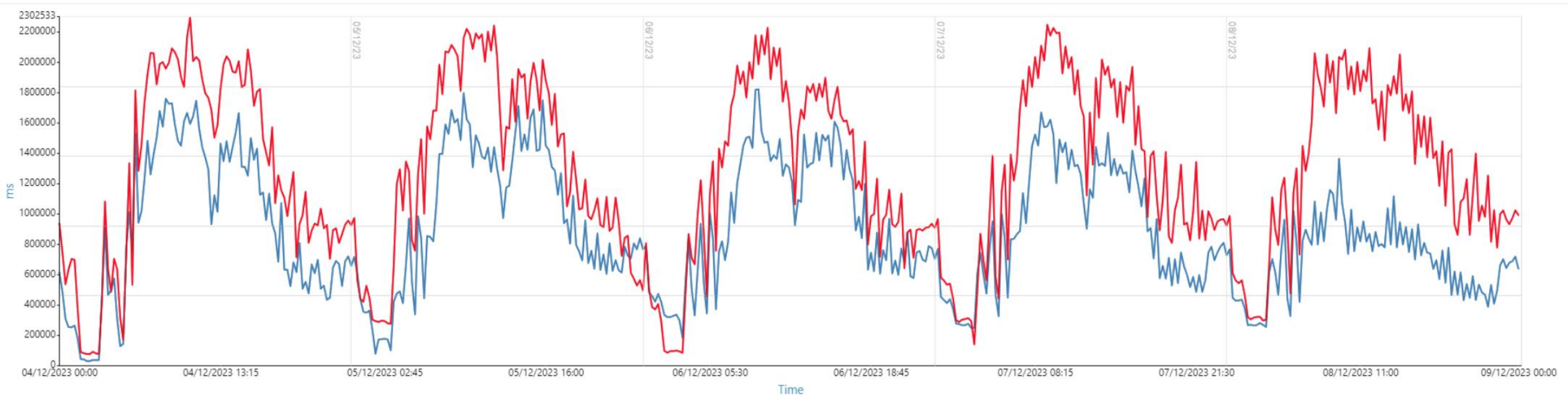
- The chart shows a comparison of a batch workload (daily close of business including reports and calculations). The blue line is Power9, the red line is **Power10**. **Approx. 32 % less CPU** is used on a Power 10 server, and the **workload is processed quicker**.



Name	Average	Max	Last
■ System CPU time milliseconds	106234.2	271072.0	8173.0
■ System CPU time milliseconds	156212.7	318184.0	16107.0

# Processing before and after the upgrade

- The chart shows a comparison the CPU workload of a production system with thousands of jobs. The red line is Power9, the blue line is **Power10. Approx. 31 % less CPU** is used on a Power 10 server.

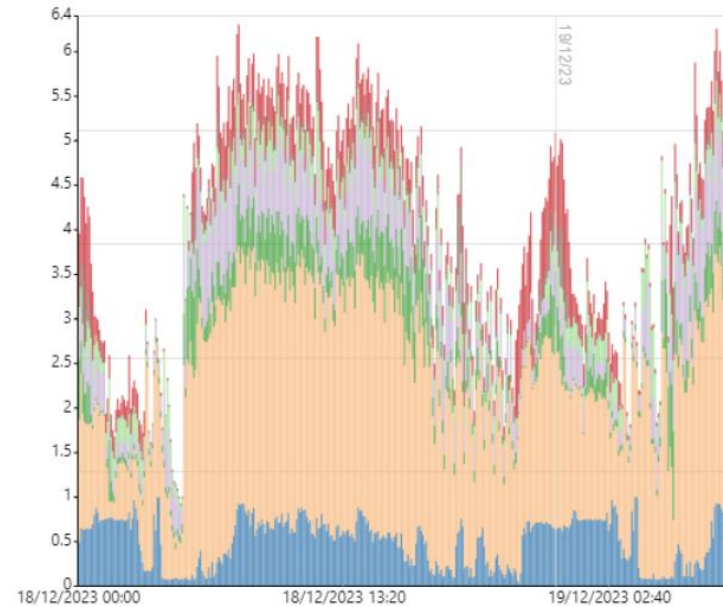
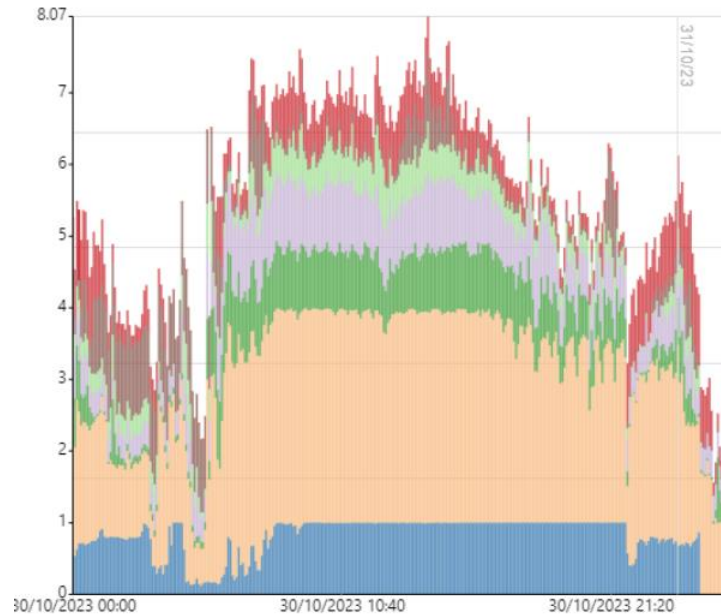


Name	Average	Max	Last
System CPU time milliseconds	894587.6 ms	1822782.0 ms	640117.0 ms
System CPU time milliseconds	1284888.1 ms	2302533.0 ms	993791.0 ms


# Processing before and after the upgrade

- The following charts are showing the CPU workload in Cores that are used by **7 LPARs** which are related to one application. As can be seen, with Power9 some LPARs are using 100 % of there entitlement. With Power10, it looks like all LPARs are not using all there entitled resources. Nevertheless, even that some LPARs are now “getting the resources they need” in total approx. 20 % less Cores are used.

Power9



Power10

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We guide you to success step by step

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