Free performance monitoring and capacity planning for IBM Power Systems™

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Summary

- LPAR2RRD introduction
  - HMC agent-less monitoring
- Data sources
- News in 4.50
  - New GUI
  - NMON data as a data source
  - WPAR support
- POWER8 migrations
- Resource Configuration Advisor
- Custom Groups

LPAR2RRD overview

- Free performance monitoring and capacity planning tool for IBM Power Systems™ platform
- It creates system utilization graphs in highly virtualized environment (CPU pools, LPARs)
- It creates historical, trends and nearly on-line graphs
- It is agent less
  - no need to install agents on monitored virtual partitions – LPARs
- It natively supports following IBM technologies
  - CPU sharing
  - Live Partition Mobility
  - Active Memory Sharing
  - Active Memory Expansion
  - Capacity on Demand

LPAR2RRD overview

- It allows simulating of CPU load and its prediction on other IBM Power HW
- You might export its data to other 3rd party tools via CVS export
- It graphically represents complete physical and logical configuration of your IBM Power environment
- It supports every OS running on IBM Power
  - AIX, Linux, i5/OS
- It is able of alerting itself or via 3rd party like Nagios
- Resource Configuration Advisor (CPU, Mem, IO)

Where it can help you?

- **Operational monitoring**: quick search of utilization anomalies
- **Capacity planning**: recognizing future needs based on historical trends
- **Migrations:** as pre-check whether migrated LPARs fit into target HW (new or existing)
- It is intended as a **front-end tool**
  - it monitors critical resources and their metrics
  - use other tools for deep performance analysis

Data sources

LPAR2RRD

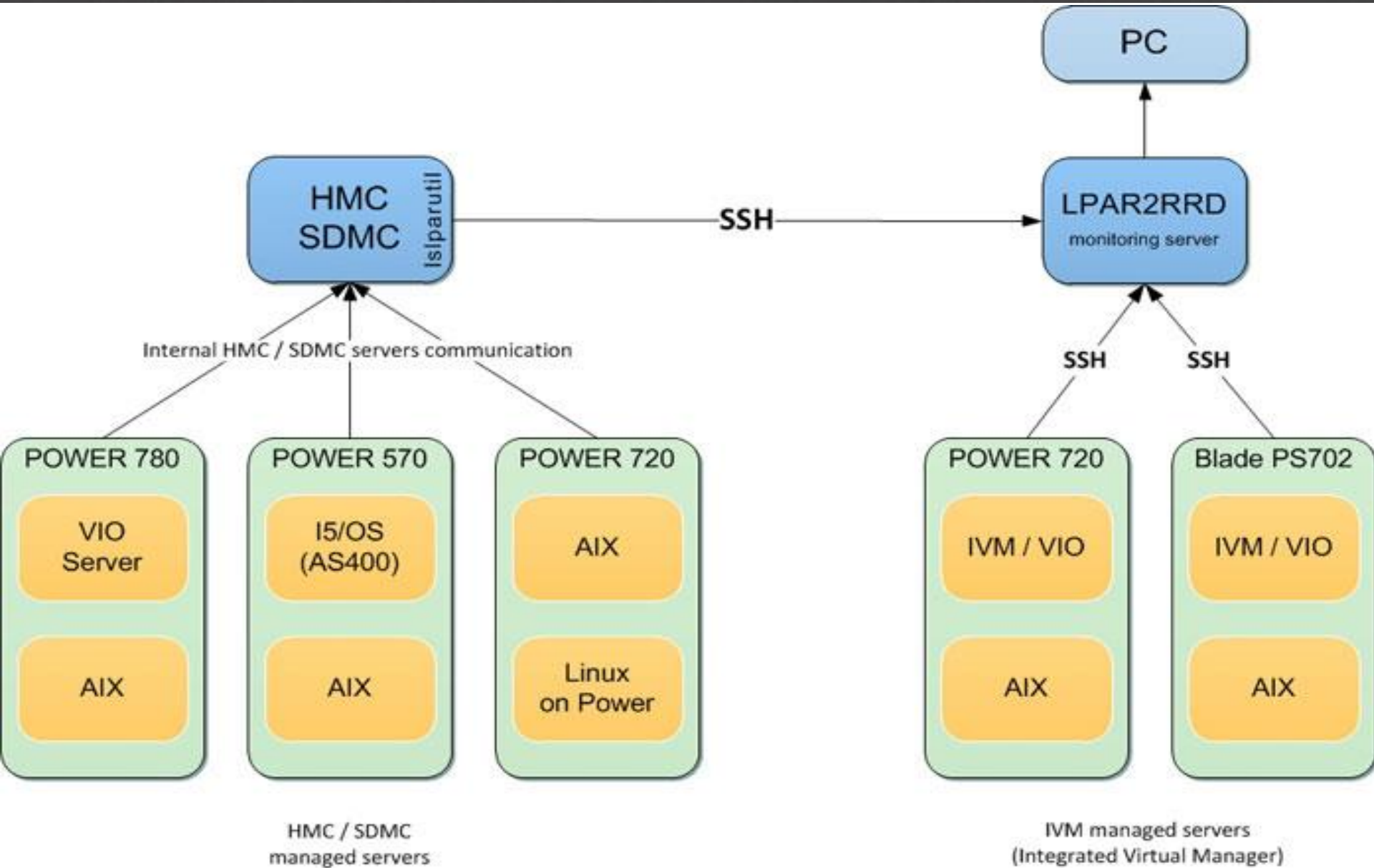
- agent less: HMC, IVM, SDMC, FSM
  - CPU utilization, Mem allocation, AMS, CoD, configuration
  - level: Server, LPAR
- OS agent
  - OS CPU, Mem utilization, Paging, LAN, SAN, SEA, AME
  - level: LPAR, WPAR
- NMON (v4.50)
  - OS CPU, Mem utilization, Paging, LAN, SAN
  - level: LPAR, WPAR

Data sources

LPAR2RRD

Type	Source	Sample rate	Data download
agent-less	HMC	60 secs	1 hour
	IVM		
	SDMC		
	FSM		
OS agent	AIX	60 secs	10 mins
	VIOS		
	Linux on POWER		
NMON	AIX	60s - 10mins as NMON is configured	10 mins or offline batch
	VIOS		
	Linux on POWER		

HMC data source



OS agent & NMON

- LPAR2RRD server is running TCP/IP server (port 8162, IANA registered)
- OS agents are issued from crontab every 1 minute and send data every 10 minutes
- NMON
  - **on-line** checking growing nmon file
  - **off-line** batch processing of many nmon files

New GUI

LPAR2RRD

- Dynamic dashboard
  - add graphs to the dashboard on a click
  - drag&drop
  - use predefined option

CPU Workload Estimator

LPAR 2 RRD

- It might act as pre-check for migration of logical partitions to other already existed or new physical HW
- It answers you a question if CPU load of migrated partitions fit to the target HW
- Calculations are done based on official IBM benchmarks **rPerf** or **CPW**
- Simple usage, it is just about a few clicks

POWER8 migration

LPAR 2 RRD

- POWER8 migration?
  - but where to start with?
  - how to choice the right model for us?
  - Reliability, Availability, Serviceability, I/O adapters, CPU workload, RAM, Security, Compatibility, SW licenses ...??

- There is no simple answer
  - money savings is one of the biggest motivation nowadays!
  - how do we save money by buying POWER8 then?
    - with keeping our application smoothly running

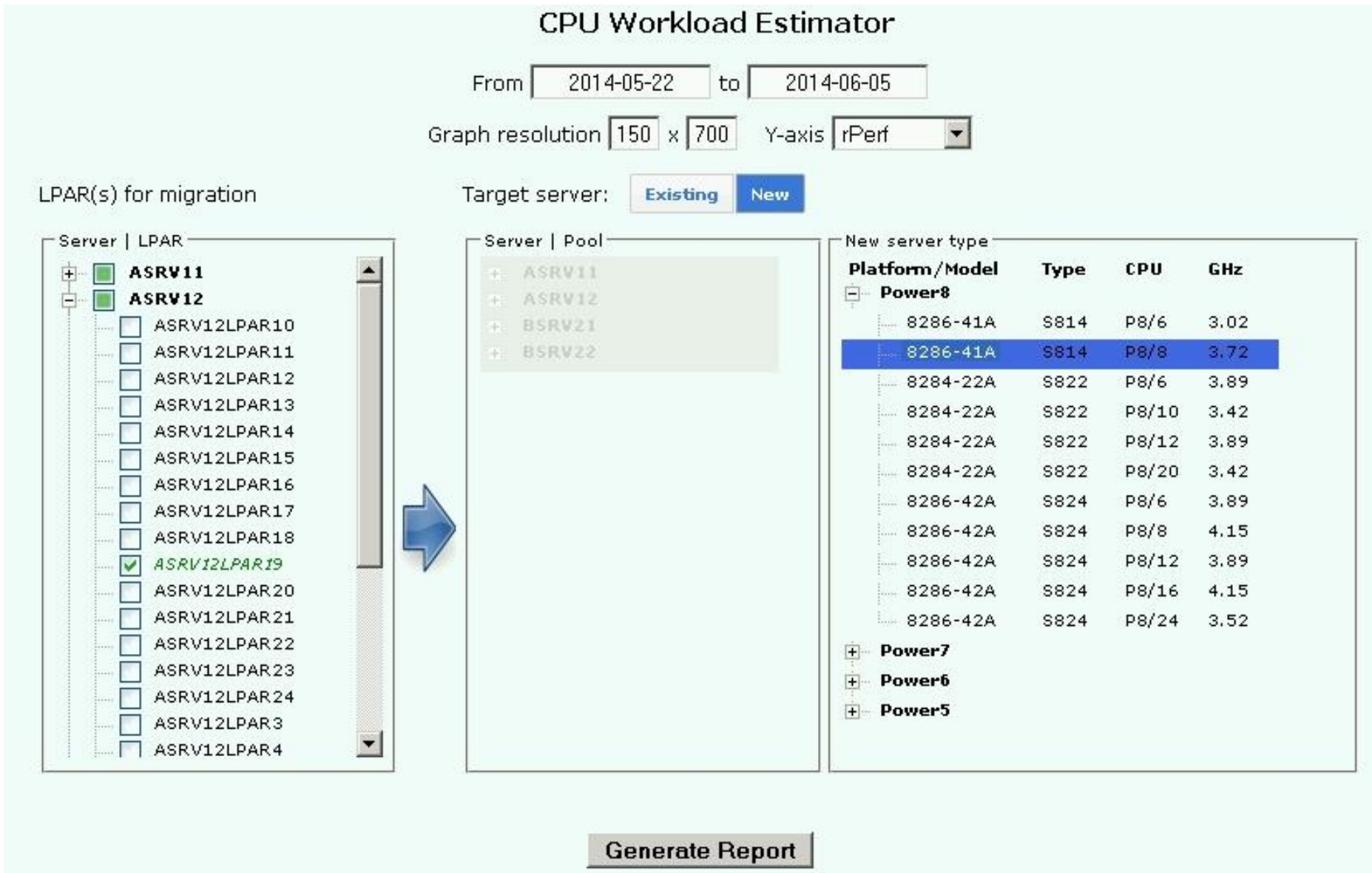
CPU Workload Estimator

LPAR 2 RRD

- Migration of 5 **LPARs** to new POWER8
  - just a test if that HW would cope with CPU load of those LPARs
- It is based on last week performance data
  - you might select other time range
- Based on rPerf benchmark
  - the target server has **144 rPerfs**
  - LPARs together utilize nearly **100 rPerfs** in the highest peek
- **target server cope with such CPU load!**

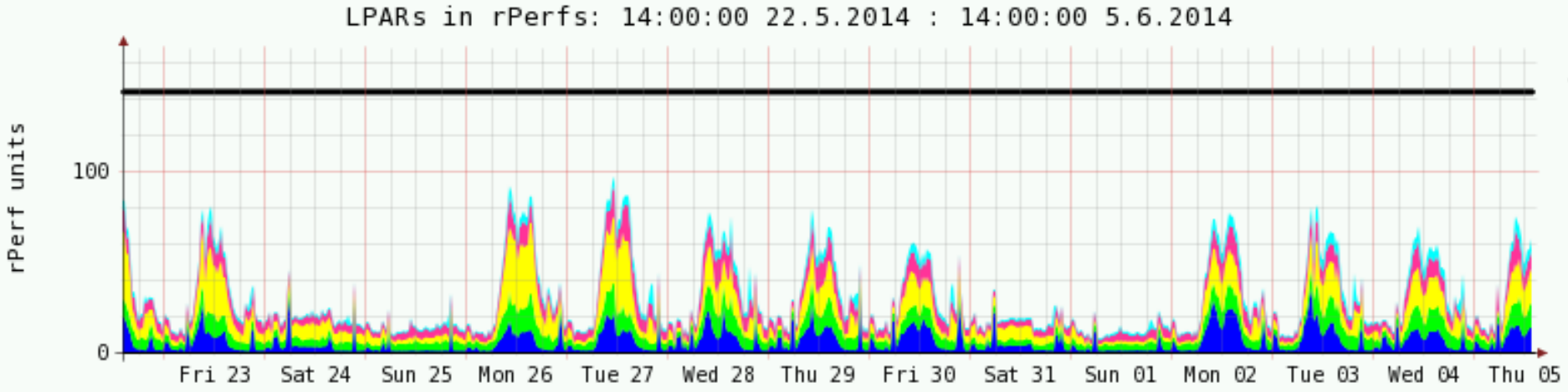
CPU Workload Estimator

LPAR2RRD



CPU Workload Estimator

LPAR2RRD



Server - LPAR (will be migrated)	average	maximum	[rPerfs]
ASRV11 - ASRV11LPAR10	5.9	35.4	
ASRV11 - ASRV11LPAR19	6.3	21.4	
ASRV11 - ASRV11LPAR7	9.0	41.8	
ASRV12 - ASRV12LPAR19	6.2	19.9	
ASRV12 - ASRV12LPAR6	2.1	18.5	

CPU limit for target server:

IBM Power S814 (model 8286-41A)	144 rPerfs

Server details	number of cores	GHz	rPerf/core
IBM Power S814 (target)	8	3.72	18.0
ASRV11	16	3.0	9.7
ASRV12	16	3.0	9.7

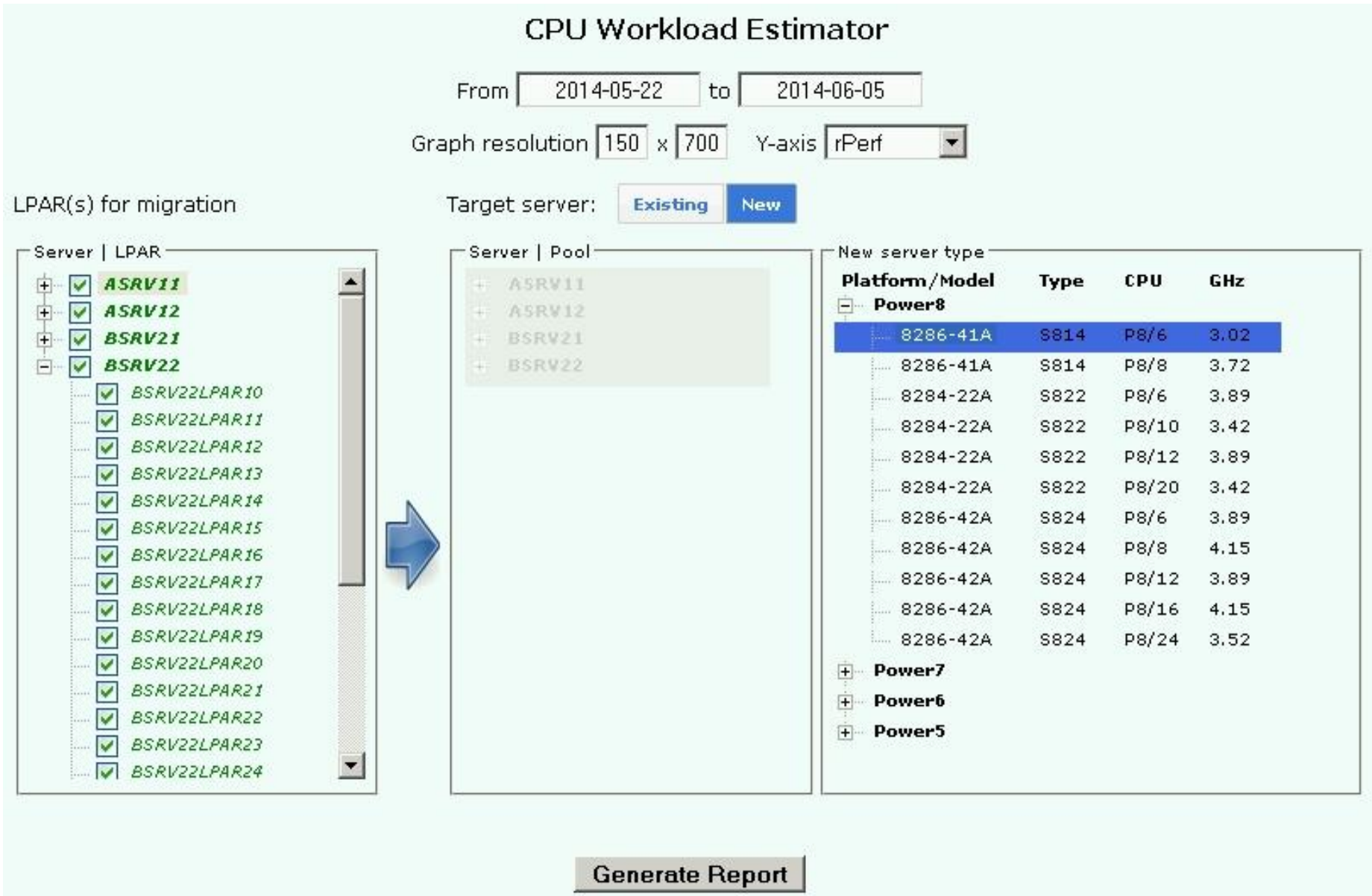
CPU Workload Estimator

LPAR 2 RRD

- Migration of **4 Servers** to new POWER8
- It is based on last week performance data
- Based on rPerf benchmark
  - the target server has **98 rPerfs**
  - Servers and all their LPARs use **160 rPerfs** in a peek
- **target does not cope with such CPU load!**

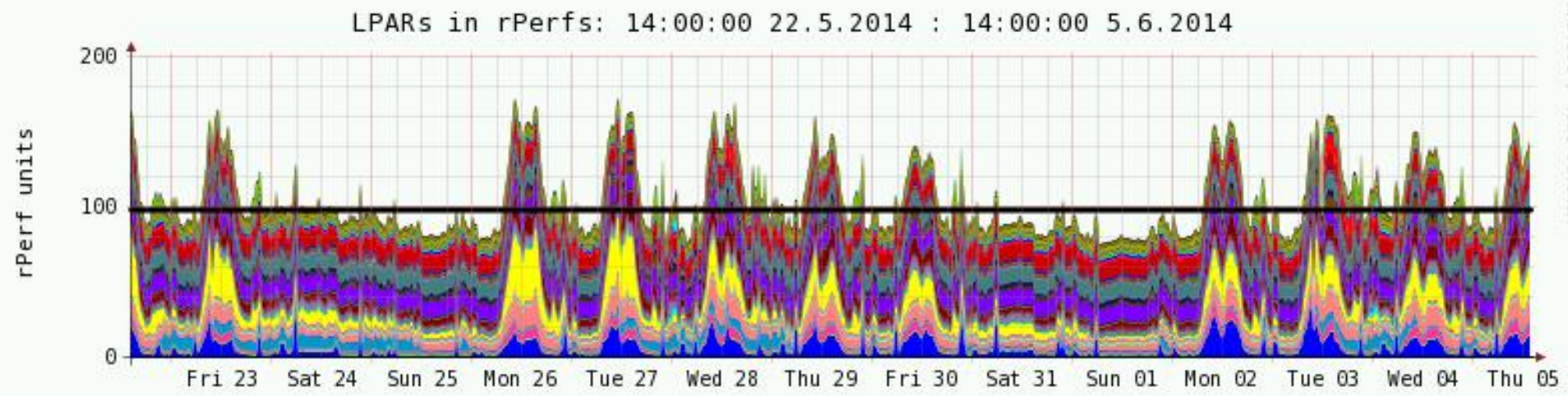
CPU Workload Estimator

LPAR2RRD



CPU Workload Estimator

LPAR2RRD



Server - LPAR (will be migrated)	average	maximum	[rPerfs]
ASRV11 - ASRV11LPAR10	5.9	35.4	
ASRV11 - ASRV11LPAR11	0.4	1.0	
ASRV11 - ASRV11LPAR12	0.4	1.0	
ASRV11 - ASRV11LPAR13	2.3	7.5	
ASRV11 - ASRV11LPAR14	0.4	1.0	

CPU limit for target server:
IBM Power S814 (model 8286-41A) 98 rPerfs

Server details	number of cores	GHz	rPerf/core
IBM Power S814 (target)	6	3.02	16.2
ASRV11	16	3.0	9.7
ASRV12	16	3.0	9.7
BSRV21	16	3.0	9.7
BSRV22	16	3.0	9.7

CPU Workload Estimator

LPAR 2 RRD

- pros
  - very easy usage
  - reasonable outcome as it is based on YOUR real data and official IBM benchmarks
- cons
  - data need to be collected at first
  - results can be affected by:
    - OS levels
    - OS and application setting/tuning
    - firmware levels
    - type of load (single threaded vrs multi), SMT
    - limited by rPerf/CPW accuracy
- **... but how else get POWER5/6/7/8 comparison ???**

Resource Configuration Advisor

LPAR 2 RRD

- It is a batch job which once a day checks utilization of all LPARs and CPU pools (servers)
- It reports **over-utilized** and **under-utilized** resources
- It suggests new configuration setting
- Resources being checked:
  - CPU
  - Memory
  - IO
- All is reported per last day, week and month

Resource Configuration Advisor

LPAR 2 RRD

- CPU
  - CPU entitlement (high/low)
  - Number of logical (virtual) CPUs (high/low)
    - per LPAR and CPU pool
- Memory
  - low/high memory usage
- IO
  - high IO wait

Resource Configuration Advisor

LPAR 2 RRD

CPU last day

Type	Name	Server	CPU cores				VP:Ent ratio	Max:Ent ratio	Avg:Ent ratio	Recommended	
			Max	VP	Avg	Ent				Ent	VP
LPAR	BSRV22LPAR11	BSRV22	1.00	1	0.05	1.00	1.0	1.0	0.1	ok	2
LPAR	BSRV21LPAR11	BSRV21	1.00	1	1.00	1.00	1.0	1.0	1.0	2.0	2
LPAR	ASRV11LPAR19	ASRV11	6.23	7	0.73	1.00	7.0	6.2	0.7	1.5	ok
LPAR	ASRV12LPAR19	ASRV12	5.78	7	0.61	1.00	7.0	5.8	0.6	1.8	ok
LPAR	ASRV11LPAR10	ASRV11	3.99	8	0.67	2.00	4.0	2.0	0.3	ok	ok

....

Mem last day

LPAR	Server	Memory [GB]	Paging [GB]	Paging space [%]	Paging rate [kBps]		Memory usage [%]		Advise [GB]	Diff [GB]
					AVG	MAX	AVG	MAX		
ASRV11LPAR16	ASRV11	6.0	7.0	57.0	42	6433	79.8	99.3	6.7	0.7
BSRV22LPAR11	BSRV22	6.0	6.0	20.0	1	306	93.6	97.2	6.6	0.6
ASRV12LPAR6	ASRV12	4.0	6.0	46.0	21	1545	95.2	97.0	4.5	0.5
ASRV11LPAR13	ASRV11	8.0	4.0	18.0	0	50	95.1	95.9	8.8	0.8
BSRV21LPAR11	BSRV21	7.0	8.0	12.0	0	279	90.0	96.7	ok	0.0

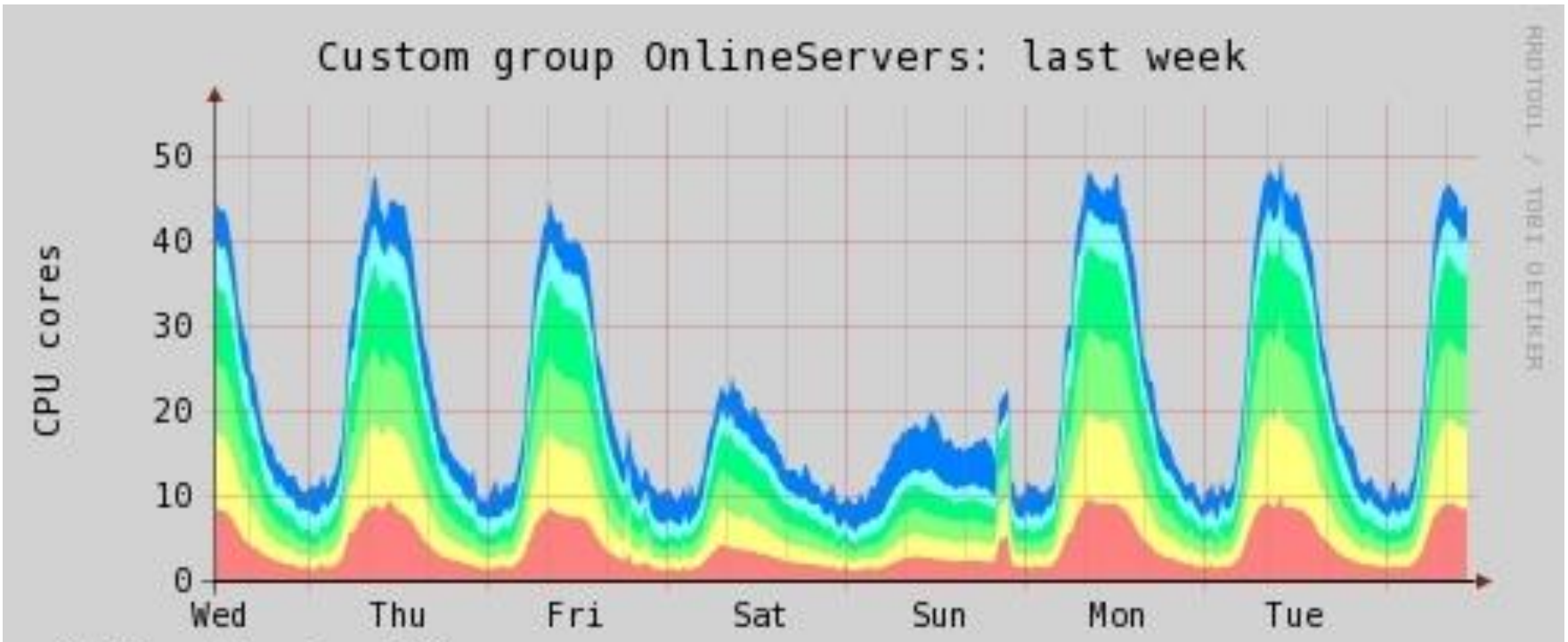
....

Custom Groups

LPAR2RRD

- You can group selected LPARs, CPU pools or whole servers and place them into aggregated graphs
- It allows you grouping whatever what make sense
  - applications
  - OS clusters
  - application clusters ...
- Following example shows
  - Total CPU utilization of 6 physical servers in last week graph

Custom Groups



Utilization in CPU cores

Server	Pool	average	maximum
p6-570-[redacted]	all_pools	3.931	9.960
p6-570-[redacted]	all_pools	4.134	11.075
p6-570-[redacted]	all_pools	4.042	10.351
p6-570-[redacted]	all_pools	4.112	10.688
p6-570-[redacted]	all_pools	2.626	5.551
p6-570-[redacted]	all_pools	3.410	6.567

Custom Groups

LPAR2RRD

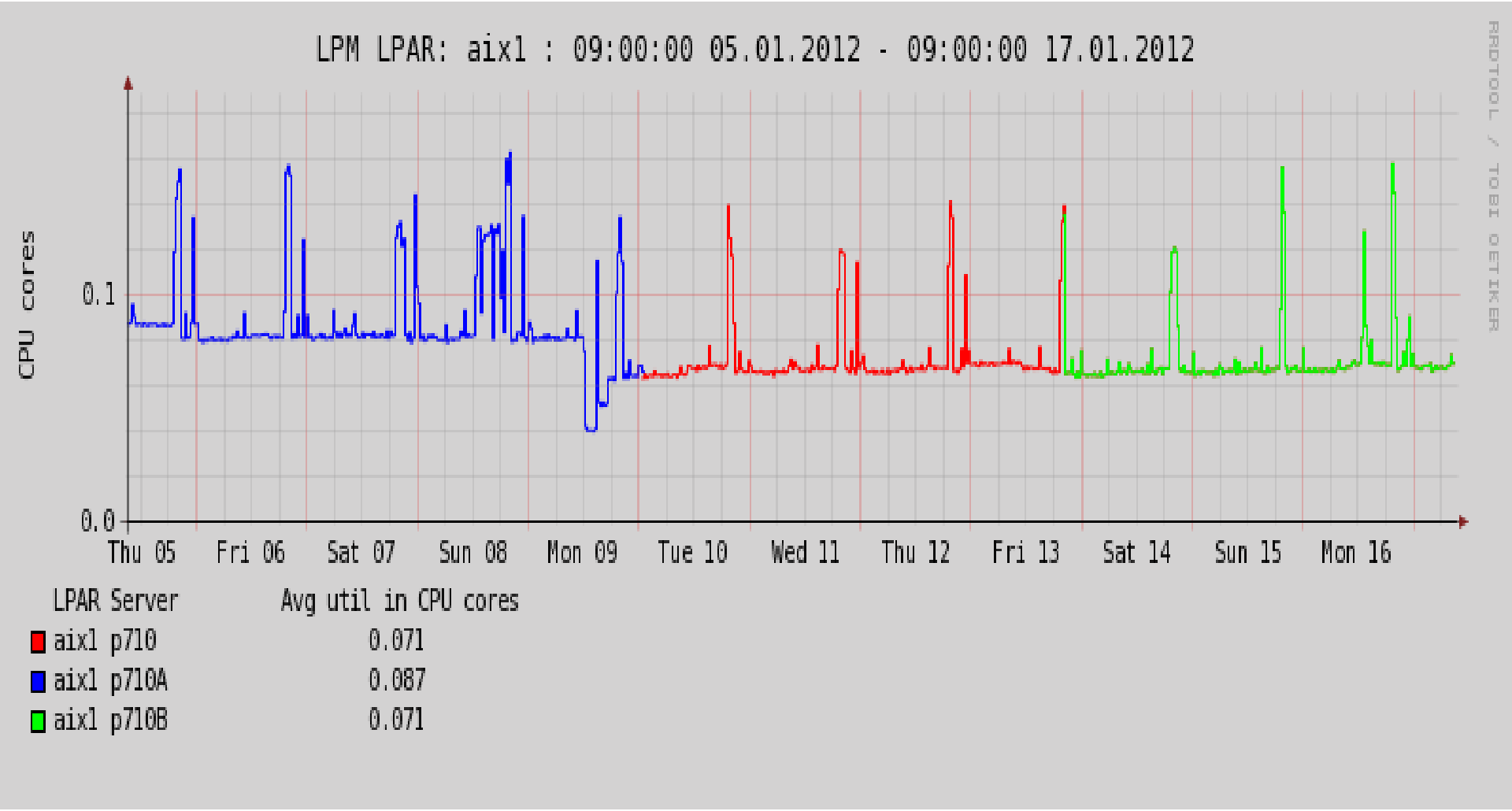
- You can group whatever across your all environment to get it to one graph
- Examples what can be grouped
  - all production Oracle DB LPARs
  - all SAP application LPARs
  - all development servers/LPARs
  - .....
- Again simple usage and configuration, results are available on 2 clicks
- CPU, MEM, LAN, SAN

Live Partition Mobility

- Following example shows how LPAR2RRD works in environment where Live Partition Mobility technology is used
- You might see there LPAR called **aix1** which has run on 3 different physical servers in 2 weeks
- It keeps a track of all LPARs moves together with keeping their utilization **all in one graph!**

Live Partition Mobility

LPAR2RRD



Alerting

LPAR 2 RRD

- You can define alarms for any
  - CPU pool (or complete server).
    - this feature cannot be found in traditional monitoring tools!
  - LPAR
- Useful especially for CPU pools and servers
- Alerting
  - Email
  - Native Nagios support
  - External script
  - Integration with other monitoring tools on a request
  - Receiving graphs in alerts

Licensing

LPAR 2 RRD

- It is an OpenSource distributed under GPL v3
- You might optionally order support
- Some functionality is shipped only to customers under support

Why LPAR2RRD?

- Apart of its functionality
  - It is very simple to use it. You mostly get the information you are looking for in 2 - 3 clicks!
  - Used graphical form is understandable from technician to management level
  - It does not require any management! It automatically recognizes and follows all changes in your virtual environment.
    - all is automatic: server / lpar / pool : add / remove / rename
    - only a new HMC addition/remove requires admin attention

STOR2RRD

LPAR 2 RRD

- **Free storage performance and capacity monitoring tool**

- Supported storages
  - IBM DS8000
  - IBM DS6800
  - IBM Storwize
  - IBM SVC
  - IBM XIV under development

- It graphically presents
  - **IO rate, data throughput, response times**
  - **Ports, Pools, Ranks, Mdisks, Volumes, Drives**.

Resources

- **LPAR2RRD**: www.lpar2rrd.com
  - Live demo: www.lpar2rrd.com/live_demo.html
  - feature matrix: www.lpar2rrd.com/feature_matrix.htm

- **STOR2RRD**: www.stor2rrd.com
  - demo: www.stor2rrd.com/live_demo.html
  - feature matrix: www.stor2rrd.com/support_matrix.htm