

# Forecasting Performance Metrics using the IBM Tivoli Performance Analyzer

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## Abstract

The IBM Tivoli Performance Analyzer (ITPA) is a component of the IBM Tivoli Monitoring Infrastructure that analyzes data stored in the Tivoli Data Warehouse to forecast future trends and values, using both linear and non-linear forecasting models. This session walks through the technical installation and usage of ITPA for both product provided and custom data forecasting, and shows how it can be applied against both z/OS and distributed data to aid performance and capacity planning efforts.

# Agenda

- IBM Tivoli Performance Analyzer (ITPA) overview and architecture
- Solution requirements and implementation
- Solution usage
  - Product provided
  - Custom forecasts
  - Report examples

# Overview and Architecture

# What is the IBM Tivoli Performance Analyzer (ITPA)?

- A component included in IBM Tivoli Monitoring (ITM) version 6.23 and later that provides predictive capabilities
- Analytic engine for linear and nonlinear forecasting and basic transformation analysis
- Produces short, medium and long term forecasts
- Uses the Tivoli Enterprise Portal (TEP) interface for
  - Creating and modifying analytical tasks
  - Defining trending/forecasting for any metrics stored in the ITM Tivoli Data Warehouse (TDW)
- Provides workspaces, tasks situations, and Tivoli Common Reporting (TCR) reports

## Uses of ITPA

- To forecast data to determine future resource usage
  - Example: what is the expected CPU trend for a virtualization host?
- To estimate when warning or critical thresholds may occur in the future
  - Example: How many days until workload throughput hits a constraint level
- To calculate new metrics not directly provided by an agent
  - Example:  $\text{new metric} = \text{metric1} / \text{metric2}$
- To determine if a linear or non-linear forecasting best matches a monitored metric



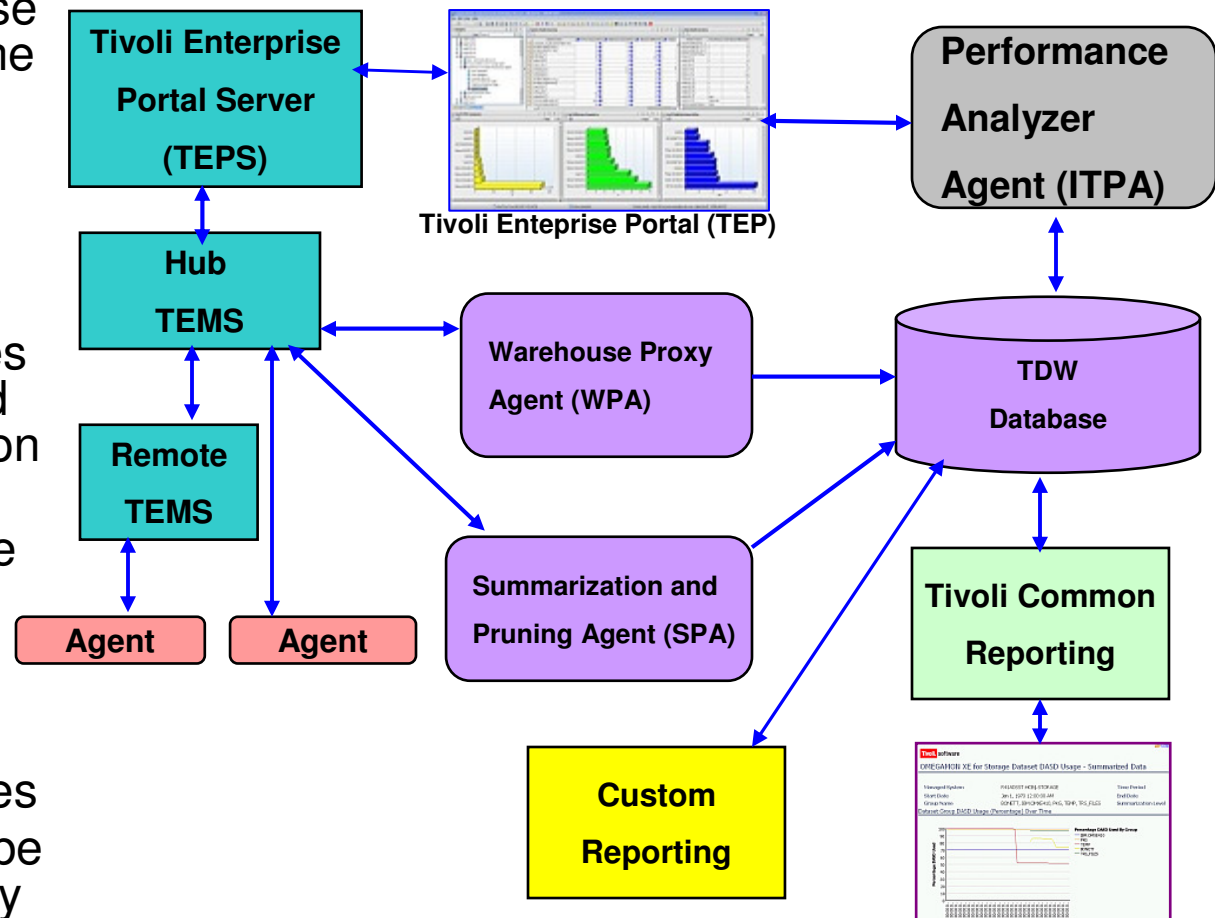
# ITPA Requirements

- Provided in ITM 6.23 and later
  - 6.23 fp1 required for non-linear forecasting (also requires IBM SPSS Statistics Server)
- Execution platform: Linux Intel, Windows, AIX
  - If SPSS is used, it must be installed on same system
- Tivoli Data Warehouse enabled
- Historical collection active for desired metrics
  - Predefined forecasting provided by ITPA
    - Operating System (Unix, Linux, Windows)
    - DB2 (distributed)
    - Oracle
    - IBM Composite Application Management (ITCAM) Response Time
    - VMware
    - pSeries
  - Any metric provided by any agent (requires custom built forecast model)
- Optional
  - Tivoli Common Reporting (reports provided)



# Architecture

1. Agents enabled for historical collection notify a Warehouse Proxy Agent (WPA) when the data is to be offloaded.
2. The WPA obtains data from agent and stores into the TDW.
3. The Summarization and Pruning Agent (SPA) creates summarization tables based on the desired summarization level(s).
4. ITPA analyzes data from the appropriate warehouse summarization tables and creates forecasts.
5. The forecast results are displayed in TEP workspaces
6. The forecasted results can be stored in the TDW for use by Tivoli Common Reporting or a custom reporting mechanism.



# Solution Requirements and Implementation

# Tivoli Data Warehouse Considerations

- The TDW is a relational database containing tables populated with data (attribute groups) from agents in the ITM Infrastructure
- Supported database environments are DB2 (distributed and z/OS), Oracle, SQL Server
- Table types in the TDW
  - “Raw” data – metric attribute groups sent from agents to a Warehouse Proxy Agent (WPA), which creates tables and inserts data
  - Summarized data – created by the Summarization and Pruning agent from the raw data tables
    - Hourly, daily, weekly, monthly, quarterly, yearly summarization options
    - Average/sum/minimum/maximum values created for numeric data for each summarization period
- The tables should be pruned to control TDW growth
- Metrics to be analyzed must be collected and summarized

# TDW Database View



SERVER3 - NDEAC88B (db2inst1) - WHSVR3 (WAREHOUS) - Tables

Name	Schema	Table space	Comment	Index table space	Large data table space	Type	Cardinality	Statistics time
"Address_Space_Summary"	ITMUSER	USERSPACE1				T	4080	7/1/12 8:29 PM
"Address_Space_Summary_D"	ITMUSER	USERSPACE1				T	46	7/5/12 3:39 AM
"Address_Space_Summary_H"	ITMUSER	USERSPACE1				T	1056	7/3/12 8:23 PM
"CPU_Utilization_LT_Fcast"	ITMUSER	USERSPACE1				T	2990	7/5/12 2:04 PM
"CPU_Utilization_LT_Status"	ITMUSER	USERSPACE1				T	545	7/1/12 6:24 PM
"CPU_Utilization_NLT_Fcast"	ITMUSER	USERSPACE1				T	2808	7/7/12 4:04 PM
"CPU_Utilization_NLT_Fcast_PA"	ITMUSER	USERSPACE1				T	2250	7/14/12 12:10 ...
"CPU_Utilization_NLT_Status"	ITMUSER	USERSPACE1				T	836	7/4/12 2:38 AM
"CPU_Utilization_NLT_Status_PA"	ITMUSER	USERSPACE1				T	25	7/14/12 12:10 ...
"ComputerSystem"	IBM_TRAM	USERSPACE1				T	0	4/30/12 9:23 PM

309 of 309 items displayed

Table - "Address\_Space\_Summary\_D"

Schema : ITMUSER  
Creator : ITMUSER  
Columns : 40

**Actions:**  
[Open](#)  
[Query](#)  
[Show Related Objects](#)  
[Create New Table](#)

**Columns**

Key	Name	Data type	Length	Nullable
	SAMPLES	INTEGER	4	No
	DBTMZDIFF	INTEGER	4	No
	DBWRITETIME	CHARACTER	16	No
	SHIFTPERIOD	INTEGER	4	No
	VACATIONPERIOD	INTEGER	4	No
	TMZDIFF	INTEGER	4	No
	WRITETIME	CHARACTER	16	No
	"Managed_System"	VARCHAR	32	No
	"MIN_Address_Space_Count"	INTEGER	4	Yes
	"MAX_Address_Space_Count"	INTEGER	4	Yes
	"SUM_Address_Space_Count"	DECIMAL	31	Yes
	"AVG_Address_Space_Count"	DECIMAL	31	Yes
	"MIN_Started_Task_Count"	INTEGER	4	Yes
	"MAX_Started_Task_Count"	INTEGER	4	Yes
	"SUM_Started_Task_Count"	DECIMAL	31	Yes

# TDW Collection and Summarization Options



- ITCAM for SOA
- ITCAM for WebSphere
- ITCAM Response Time Track
- ITM 5.x: Health
- Linux
- Linux KVM Agent
- NetApp Agent
- NetView for z/OS Enterprise M
- Network Devices Monitoring A
- OMEGAMON XE for CICS on z
- OMEGAMON XE for CICS TG
- OMEGAMON XE for DB2 PE a
- OMEGAMON XE for IMS on z/C
- OMEGAMON XE for Mainfram
- OMEGAMON XE for Storage o**
- OMEGAMON XE on z/OS
- OMEGAMON XE on z/VM and
- OMEGAMON z/OS Manageme
- Oracle
- P1ORDERS
- Robotic Response Time
- Sybase Server
- Tivoli Decision Support for z/C
- Tivoli Enterprise Monitoring S

**Select Attribute Group(s)**

Group	Prune Detailed	Summarize Hourly	Prune Hourly	Summarize Daily	Prune Daily	Summarize Weekly	F V
S3 SMS Data Class							
S3 SMS Management Class							
S3 SMS Storage Class							
<b>S3 SMS Storage Group</b>	90 Days	On	90 Days	On	90 Days		
S3 SMS Storage Group Status							
S3 SMS Systems							

**Configuration Controls**

**Summarization**

☐ Yearly

☐ Quarterly

☒ Monthly

☐ Weekly

☒ Daily

☒ Hourly

**Pruning**

☐ Yearly keep  Years

☐ Quarterly keep  Years

☒ Monthly keep  Months

☐ Weekly keep  Months

☒ Daily keep  Days

☒ Hourly keep  Days

☒ Detailed data keep  Days

Basic | Distribution | Filter

**Attribute Group**  
S3 SMS Storage Group

**Name**  
KS3\_SMS\_ST\_GRP

**Description**  
S3\_SMS\_Storage\_Group

**Configuration**  
Collection Interval: 15 minutes  
Collection Location: TEMS  
Warehouse Interval: 1 day



# ITPA Agent

- Installation
  - Agent
  - Desired product provided forecast environments (“domains”)
    - ITPA Tasks, TEP Workspaces, TEP queries, TDW attribute groups, situations, and TCR Reports
  - Application support for agent and desired domains on TEPS, Hub TEMS, Remote TEMS

Domain	Required agent
DB2	ITM for Databases (DB2)
Oracle	ITM for Databases (Oracle)
Operating System	ITM Windows, AIX, or Linux OS
ITCAM RT	ITCAM for Response Time (V7.2 or higher)
System p Series	AIX/VIOS Premium
VMware	ITM for Virtual Servers/Virtualized Environments (VMware)

# ITPA Agent Customization



**Configure Tivoli Performance Analyzer**

☐ Data Warehouse  
☐ Advanced Configuration  
☐ SPSS Configuration

\*Agent Database Connection Type: JDBC  
\*Database Type: DB2  
\*Hostname: server3  
\*Port: 50000  
\*Database Name: WAREHOUS  
\*Username: ITMUSER  
\*Password: .....  
\*JDBC Driver: com.ibm.db2.jcc.DB2Driver  
\*JDBC Driver Path: C:\myprograms\sqlibjava\db2jcc.jar;C:\myprograms\sqlibjava\db2jcc\_license\_cu.jar

**Browse** **Test connection**

---

**Configure Tivoli Performance Analyzer**

☒ Data Warehouse  
☐ **Advanced Configuration**  
☐ SPSS Configuration

☐ Enable Advanced Configuration  
TDW Schema (leave empty for default):  
Configuration Schema (leave empty for default):  
\*Initialize PA tables: NO  
☐ Bypass Connection Tests

---

**Configure Tivoli Performance Analyzer**

☒ Data Warehouse  
☒ Advanced Configuration  
☐ **SPSS Configuration**

☒ Enable SPSS Configuration  
Path to SPSS Server: C:\myprograms\spssv20 **Browse**  
**Validate**



# Optional Components

- **SPSS Statistics Server (separate purchase)**
  - Version 20
  - Provides non-linear forecasting models (ITPA 6.23 fp1 and higher)
  - Must be installed on same platform with ITPA
  - No special customization needed (install and start server)
  - ITPA will analyze data against provided non-linear models and select one which provides the best fit
- **Tivoli Common Reporting Server (part of ITM)**
  - Provided with ITM
  - Supported on Windows, AIX, or Linux (Intel and System z)
  - WAS CE + Cognos 8 reporting engine under the covers
  - Connects to TDW to access data for reports
  - ITPA provides canned reports, and custom reports can be built

# TCR Reports



Domain	# of Reports	Names
DB2	4	Databases Forecast Databases Daily Status Instances Forecast Table Spaces Forecast
Operating System	6	Overall System Health Available Memory Utilization CPU Workload Forecast Outbound Network Traffic Forecast Inbound Network Traffic Forecast Hard Disk Utilization Forecast
Oracle	4	Databases Forecast Table Spaces Forecast Databases Daily Status Namespaces Forecast
System pSeries	3	Logical Partitions Forecast Networking Forecast Storage Forecast
ITCAM	3	Client Response Time Forecast Robotic Response Time Forecast Web Response Time Forecast
VMware	5	CPU Utilization Disk Utilization Forecast Memory Network Predicted Critical and Warning States

# Solution Usage


# Terminology Level Set

- Linear trending
  - Least Squares Regression Method ( $y=mx + k$ )
- Nonlinear trending
  - Uses SPSS Expert Modeler Algorithm to automatically select best model
    - Various Exponential Smoothing models or ARIMA models
- Forecast periods
  - 7, 30, 90 days used as defaults
- Confidence
  - Indicates forecast accuracy
    - Correlation coefficient (R-squared) \* 100
  - 0 = no confidence, 100 = perfect forecast

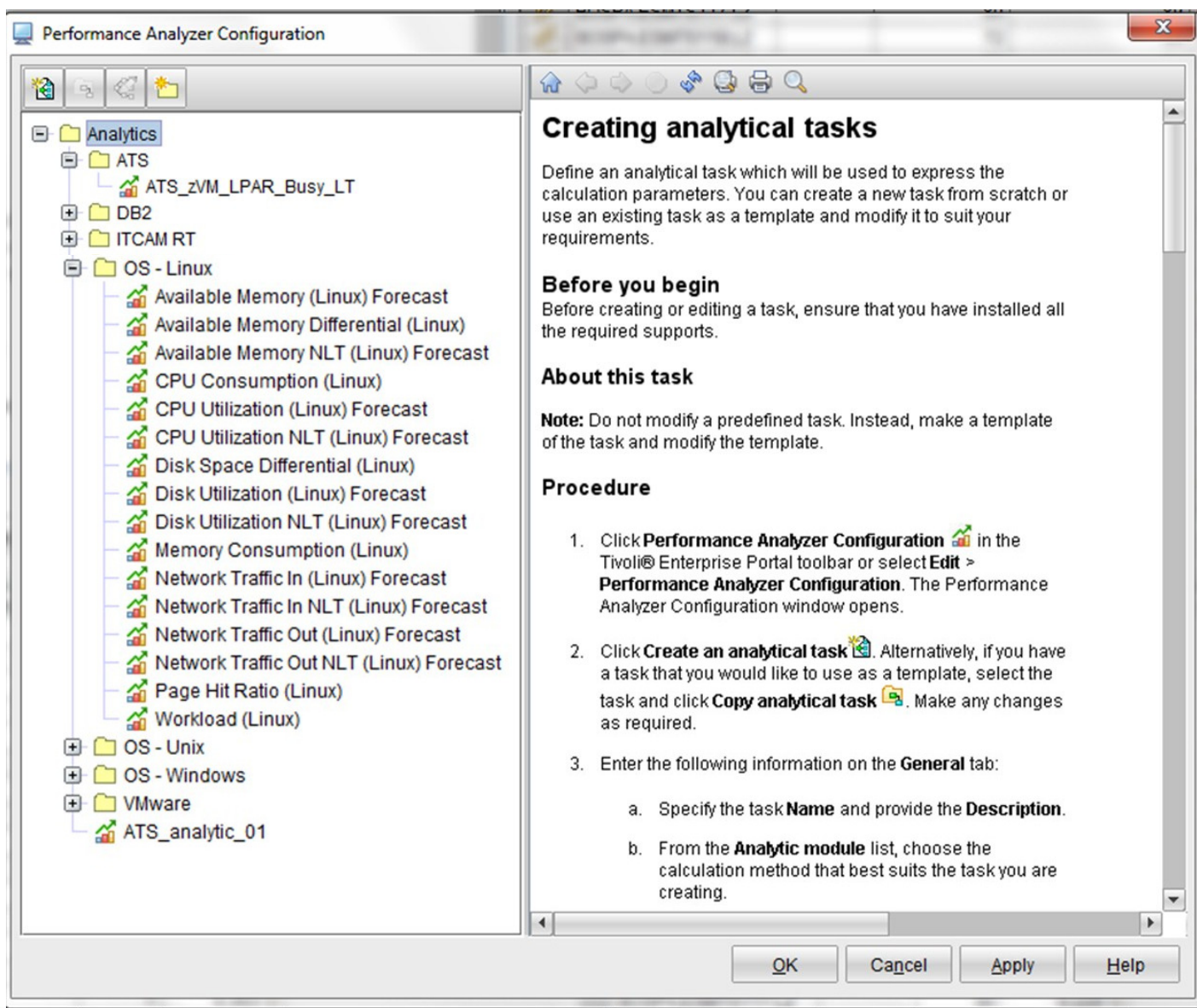
# Terminology Level Set...

- Direction (linear only)
  - Upward trend (1) downward trend (-1) or no trend (0)
- Samples
  - Sample range used to forecast can be controlled
- Strength
  - Based on Confidence + Number of Samples
    - 1 (Weak): confidence < 50, samples <10
    - 2 (Moderate): confidence >= 50, samples >=10
    - 3 (Strong): confidence >=65, samples >=25
- Time to threshold
  - Predicted number of days in future when threshold is reached (or NEVER)

# Analytic Tasks

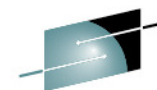
- A task defines the TDW data to be analyzed, how it will be analyzed, how frequently the analysis will be done, and where the results will be stored
- Three types
  - Arithmetic – calculate a new metric based on existing metrics
  - Linear trending
  - Nonlinear trending
- Tasks are stored in TEPS database and managed through the Tivoli Enterprise Portal
  - Performance Analyzer Configuration icon 
  - Edit->Performance Analyzer Configuration
- Tasks provided for domains which can be copied and modified
- Tasks can be built from scratch
- Task output
  - Workspaces (for pre-defined Domains)
  - Attribute tables (Build custom workspaces to view)
  - TDW for historical collection (to see forecast trends)

# Viewing and Creating Tasks





# Product Workspaces



SHARE  
Connections • Results

**Navigator**

View: Physical

- HASLE303
- HASLE304
- HASLE305
- HASLE306
- HASLE315
- HASLE316
- HASLE318
- HASLE320
  - DB2 - DB2 HASLE320:UD
  - Summarization and Pruning Agent
  - Performance Analyzer Warehouse
    - DB2
    - OS
    - Disk\_TimeToCriticalThresh
    - ITCAM RT
    - VMware

**Agent Statistics**

Operating System	Version	Agent Start Time	Last Evaluation Start Time	Last Evaluation End Time	Last Evaluation Time	State	Last Error
Windows Server 2003 Service Pack 2	06.23.01	06/30/12 08:24:02	07/14/12 17:37:09	07/14/12 17:37:09	0	WAITING	Forecast not computed for some of the resources

**Analytical Modules**

Name	Version	Build	Build Date
PA_FRM	06.23.01	120551	02/24/12 00:00:00
PA_FIR	06.23.01	120551	02/24/12 00:00:00
PA_FAR	06.23.01	120551	02/24/12 00:00:00
PA_FLT	06.23.01	120551	02/24/12 00:00:00
PA_SPS	06.23.01	120551	02/24/12 00:00:00

**DB Configuration**

ID	Connection Type	DB Type	JDBC Driver	URL or DSN	Username	Schema	State	Last Error
TDW	ODBC	DB2		WAREHO...	ITMUSER	ITMUSER	OK	[IBM][CLI Driver][DB2...

**Task Statistics**

Task Name	Last Evaluation Start Time	Last Evaluation Time	Processing Speed Rows per Sec	Processing Speed Resources per Sec	State	Last Error	Number Of Resources Evaluated	Number Of Resources Failed	Total Number Of Measurements	Next Evaluation Start Time
ATS_analytic_01	07/13/12 21:31:21	0	540.00	9.00	COMPLETED		9	0	540	07/14/12 22:31:21
ATS_zVM_LPAR_Busy_LT	07/14/12 17:26:55	0	30.00	1.00	COMPLETED		1	0	30	07/14/12 18:26:55
Available Memory (Linux) Forecast	07/14/12 08:35:37	0	221.00	9.00	COMPLETED		9	0	221	07/15/12 08:35:37
Available Memory (UNIX) Forecast	07/14/12 08:52:21	0	68.00	3.00	COMPLETED		3	0	68	07/15/12 08:52:21
Available Memory (Windows) Forecast	07/14/12 08:35:35	0	245.00	9.00	COMPLETED		9	0	245	07/15/12 08:35:35
Available Memory Differential (Linux)	07/14/12 17:28:56	1	6.00	6.00	COMPLETED		6	0	6	07/14/12 18:28:57
Available Memory Differential (UNIX)	07/14/12 17:28:57	0	2.00	2.00	COMPLETED	Not Sufficient Data-Points	2	0	2	07/14/12 18:28:57
Available Memory Differential (Windows)	07/14/12 17:33:07	1	9.00	9.00	COMPLETED	Not Sufficient Data-Points	9	0	9	07/14/12 18:33:08
Available Memory NLT (Linux) Forecast	07/14/12 08:51:26	8	97.38	1.88	COMPLETED		15	0	779	07/15/12 08:51:34
Available Memory NLT (UNIX) Forecast	07/14/12 08:51:34	3	67.00	1.00	COMPLETED		3	0	201	07/15/12 08:51:37
Available Memory NLT (Windows) Forecast	07/14/12 08:51:19	6	132.50	1.83	COMPLETED		11	0	795	07/15/12 08:51:25
Client Response Time Percent Available	07/14/12 08:52:23	0	0.00	0.00	FAILED	No managed system found	0	0	0	07/15/12 08:52:23
Client Response Time Percent Failed	07/14/12 08:52:23	0	0.00	0.00	FAILED	No managed system found	0	0	0	07/15/12 08:52:23
Client Response Time Percent Slow	07/14/12 08:52:23	0	0.00	0.00	FAILED	No managed system found	0	0	0	07/15/12 08:52:23
Client Response Time Response Time	07/14/12 08:52:23	0	0.00	0.00	FAILED	No managed system found	0	0	0	07/15/12 08:52:23
CPU Consumption (Linux)	07/14/12 17:28:57	0	5.00	5.00	COMPLETED	Not Sufficient Data-Points	5	0	5	07/14/12 18:28:57
CPU Consumption (UNIX)	07/14/12 17:28:58	0	2.00	2.00	COMPLETED	Not Sufficient Data-Points	2	0	2	07/14/12 18:28:58
CPU Consumption (Windows)	07/14/12 17:29:00	1	9.00	9.00	COMPLETED	Not Sufficient Data-Points	9	0	9	07/14/12 18:29:01
CPU Utilization (Linux) Forecast	07/14/12 08:52:21	0	221.00	9.00	COMPLETED		9	0	221	07/15/12 08:52:21

# Product Workspaces – Operating System

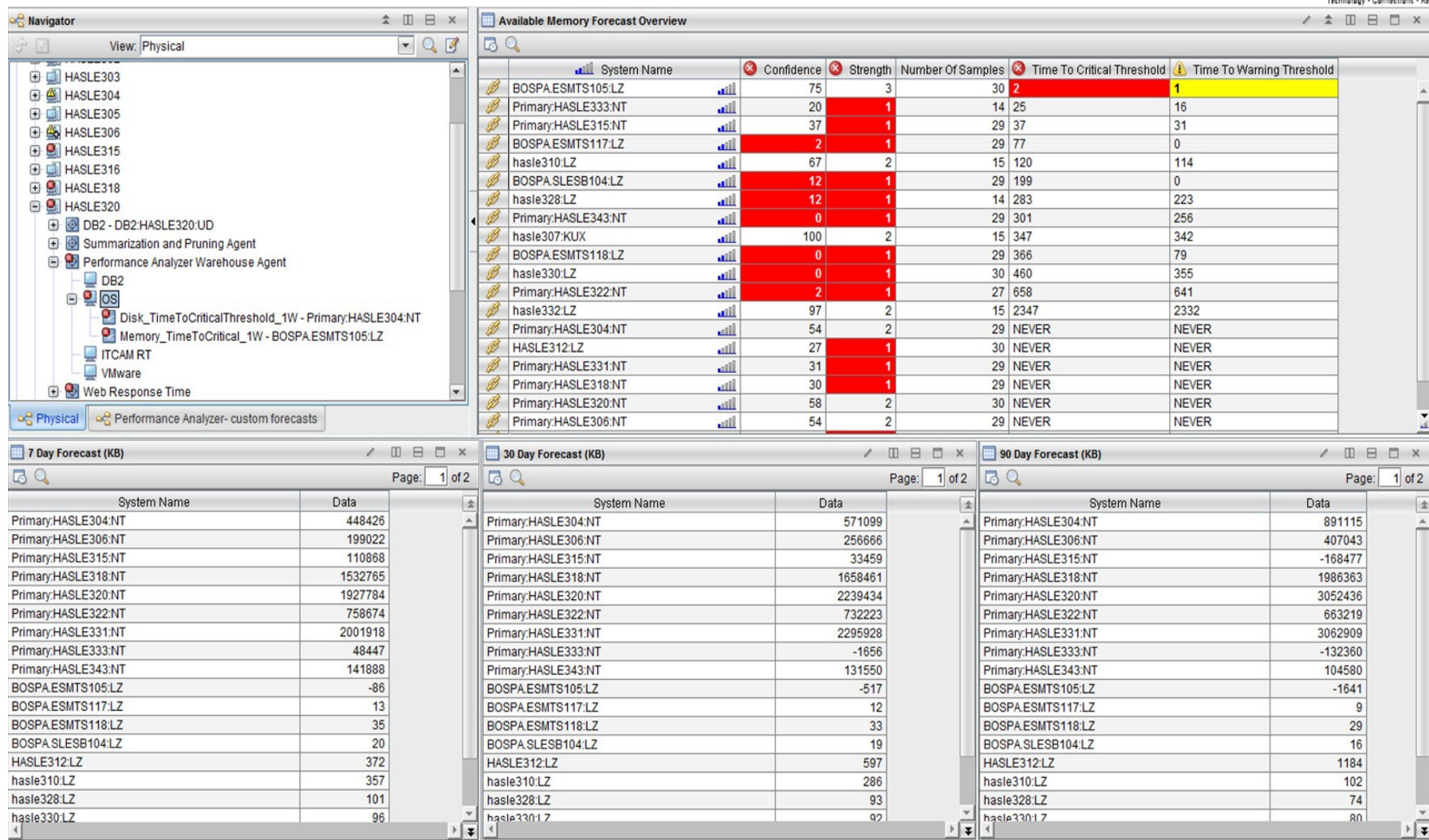


The screenshot displays the SHARE application interface. On the left, a 'Navigator' pane shows a tree view of system components, including 'DB2', 'Performance Analyzer Warehouse Agent', and various 'HASLE3' and 'LANCE' systems. A context menu is open over the 'DB2' component, listing actions like 'Workspace', 'Take Action...', 'Link To...', 'Launch...', 'Situations...', 'Show Navigator List...', 'Split vertically', 'Split horizontally', 'Remove', 'Print Preview...', 'Print...', 'Find...', and 'Properties...'. The main pane on the right shows a list of system forecasts under the heading '7 Day Forecast (%)'. The list includes columns for 'System Name' and 'Date'. Below the list, a table shows the following data:

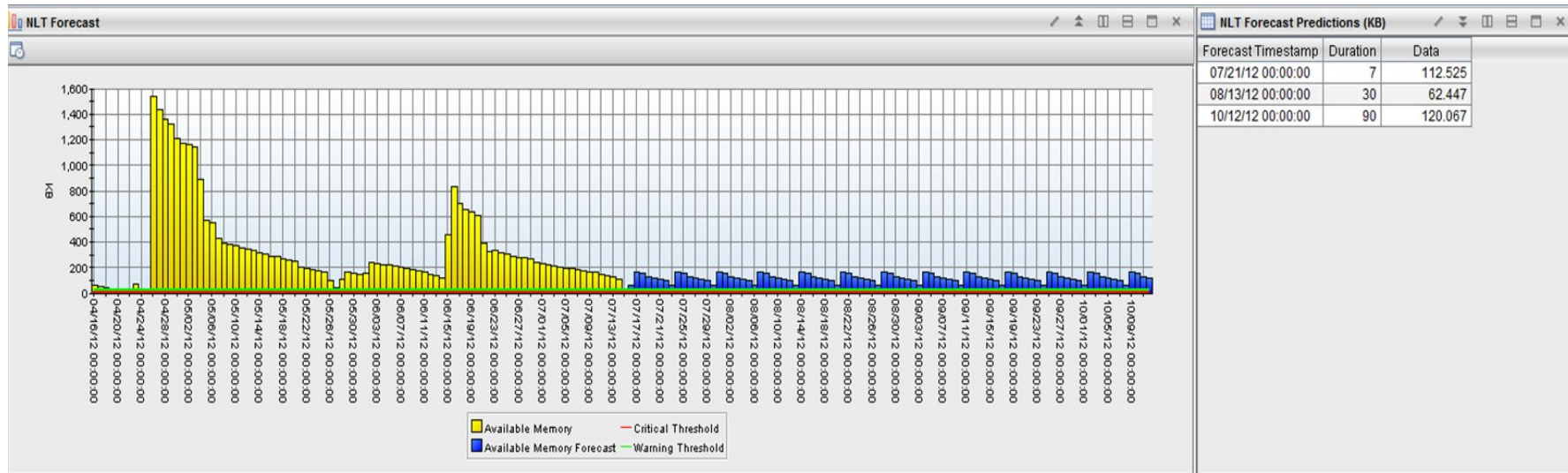
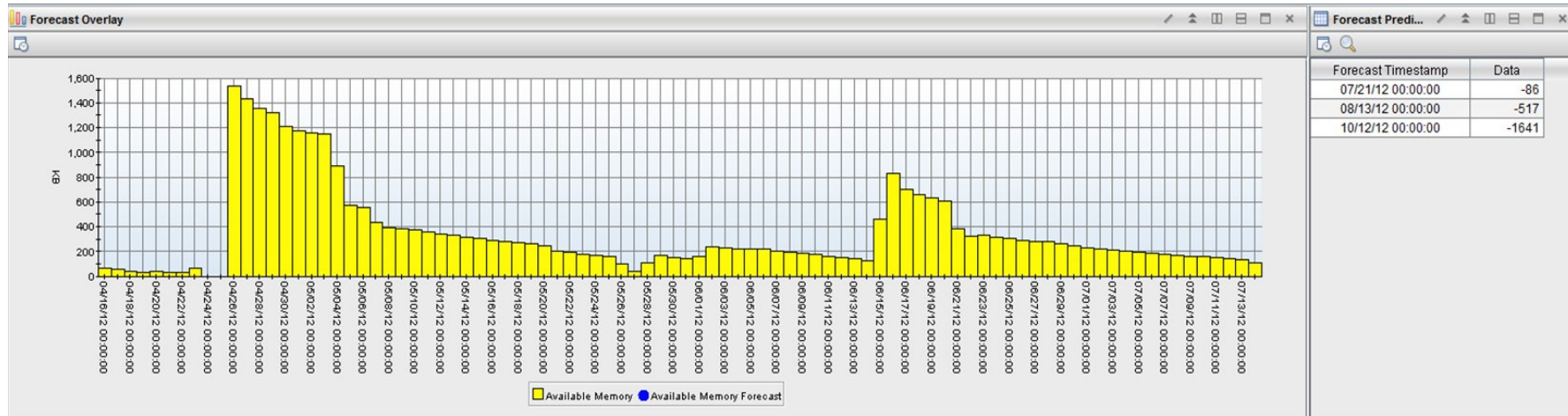
System Name	Date
Primary:HASLE304:NT	-9
Primary:HASLE306:NT	1
Primary:HASLE315:NT	21
Primary:HASLE318:NT	0
Primary:HASLE320:NT	3
Primary:HASLE322:NT	-2
Primary:HASLE331:NT	2
Primary:HASLE333:NT	13
Primary:HASLE343:NT	2
BOSPA.ESMTS105:LZ	1
BOSPA.ESMTS117:LZ	0
BOSPA.ESMTS118:LZ	2
BOSPA.SLESB104:LZ	0
HASLE312:LZ	-1
hasle310:LZ	1
hasle328:LZ	10
hasle330:LZ	2



# Product Workspaces – OS Memory



# Linear and Nonlinear Memory Forecast



# Situations



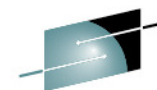
- Over 80 situations provided
  - Raise alerts when resource usage trends start approaching critical/warning thresholds
- Custom situations can be created for custom analytic tasks

The screenshot displays three windows from the IBM SHARE application:

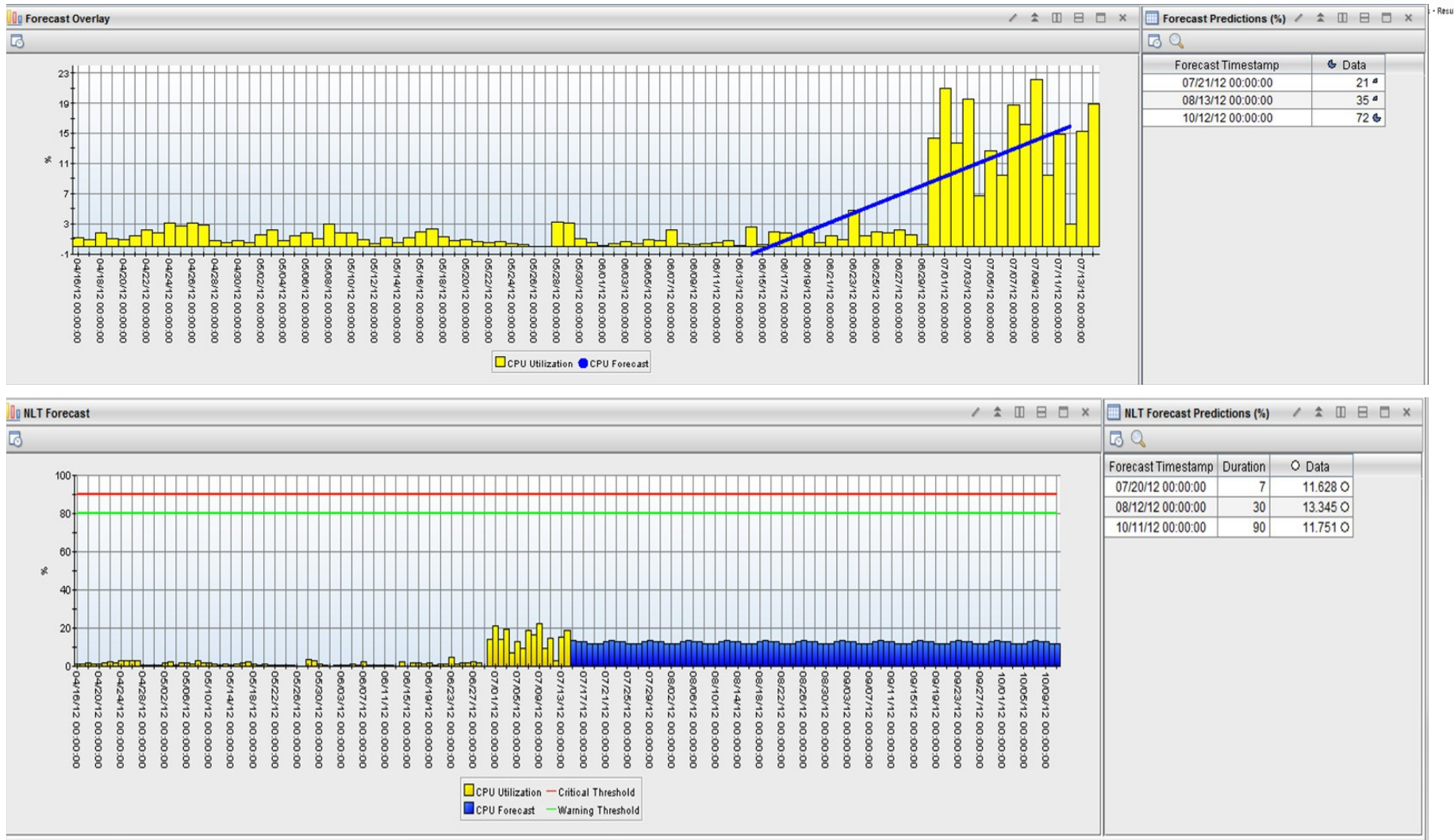
- Initial Situation Values:** A table with columns: Time To Critical Threshold (2), Strength (3), Node (HASLE320:PA), Timestamp (07/14/12 08:35:37), System Name (BOSPA.ESMTS105:LZ), Confidence (75), Direction (-1), Number Of Samples (30), and Time To Warning Threshold (1).
- Current Situation Values:** A table with identical data to the Initial Situation Values window.
- Expert Advice:** A window showing the location [http://hasle330.wsclab.washington.ibm.com:15200/classes/candle/kp3/resources/advice/en\\_US/Memory\\_TimeToCritical\\_1W.htm](http://hasle330.wsclab.washington.ibm.com:15200/classes/candle/kp3/resources/advice/en_US/Memory_TimeToCritical_1W.htm). It contains a section titled "Memory\_TimeToCritical\_1W" with links for "Situation Description", "Possible Causes", and "Suggested Actions". The "Situation Description" text reads: "It is predicted, that in less than 7 days, you will reach the defined critical threshold of available memory".



# Linear and Nonlinear CPU Forecast



SHARE



# Custom Forecast: z/VM LPAR Utilization



**General** Input Output

**Task**

Name:

Identifier:

Domain:

**Description**

**Analytic module**

**Linear Trending**

Use Linear Trending for forecasting purposes. The linear trending calculations use the Least Squares Regression method. This method approximates a linear pattern of use, over time, for selected attributes based on their values in the past. For example, use linear trending to estimate when a machine will run out of disk space based on the current rate of growth.

Linear trending uses the Least Squares Regression method to calculate the trended value of a monitored attribute and status data such as the strength of

**Task definition**

Task interval:  /  :

ddd hh mm

☒ Run at startup

☐ Enable scheduling

Schedule Time:

☒ Active

Run after task:

OK Cancel Apply Help



# Task Input Specifications



**General** **Input** **Output**

Expression:  Apply Expression

Parameter definitions

Application:

	Input Data	Constraint 1
Attribute	LPAR Busy Percent ...	LPAR Name ...
1		= BOSPA
2		

Granularity:  Advanced... Add Constraint

Compute trend on data

☐ all available ☐ from date  ☒ latest

☐ With Exceptions Override...

Source node(s)

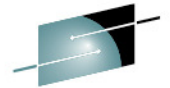
Assigned:

Available managed systems:

Available managed system lists:

OK Cancel Apply Help

# Agent and Summarization Level



Parameter definitions

Application: z/VM Linux Systems

Attribute	Input Data
1	LPAR Busy
2	

Granularity: z/VM Linux Systems

WebSphere Portal Server  
WebSphere Process Server  
WebSphere XD Cell  
WebSphere XS Zone  
Windows OS  
i5/OS  
z/OS Management Console

Granularity: Daily

Compute trend on data

☐ all available ☐ from d

Yearly  
Quarterly  
Monthly  
Weekly  
Daily  
Hourly

# Sampling Data Specifications

Compute trend on data

☐ all available   ☐ from date Apr 5, 2012 ▼   ☒ latest 30 ▲▼ day(s) ▼

☐ With Exceptions

Override...

Time frame exceptions

Parameter definitions

	From Date	Constraint 1
Attribute	FromDate	...
1		

Add Constraint

OK Cancel

# Attribute Selection

Input Data - Source Attribute Selection...

Attribute group selection	Available attribute(s)	Aggregation type(s)
KVLCPU Device	LPAR Busy Percent	AVG
KVLChannel Data	LPAR CPU	MAX
KVLDevice	LPAR Capped	MIN
KVLChannel Data	LPAR Load	SUM
KVLHiperSocket	LPAR Number	
KVLLChannel Data	LPAR Overhead Percent	
<b>KVLLPAR Info</b>	LPAR Overhead Time	
KVLMinidisk Cache	LPAR Status	
KVLPTKStat	LPAR Suspend Time	
KVLProcessor Data	LPAR Wait	
KVLSystem	LPAR Weight	
KVLTCP/IP Svr Data		

☐ Also show un-configured groups

OK Cancel

# Task Output Status Specification



Σ General **Input** **Output**

Application: Performance Analyzer Warehouse Agent

**Status** Forecast

Attribute group: Generic\_LT\_Status  
☐ Also show groups already in use

Identifiers

Identifiers	Destination Attributes
Analytic Time	Timestamp
LPAR Name	Identifier 1
Processor Type	
System Name	System Name
ATS_zVM_LPAR_Busy_LT	Analytic Task Name

Add Constant Identifier...

Output set definition(s)

	Attribute	Threshold
Confidence Factor	Confidence	
Trend Direction	Direction	
Num Samples	Number Of Samples	
Forecast Strength	Strength	
Time to Critical	Time To Critical Threshold	80
Time To Warning	Time To Warning Threshold	60

OK Cancel Apply Help



# Task Output Forecast Specification



General Input **Output**

Application: Performance Analyzer Warehouse Agent

Status Forecast

Attribute group: Generic\_LT\_Fcast  
☐ Also show groups already in use

Identifiers

Identifiers	Destination Attributes
Analytic Time	Timestamp
Duration	Duration
LPAR Name	
Processor Type	
System Name	System Name
ATS_zVM_LPAR_Busy_LT	Analytic Task Name

Add Constant Identifier...

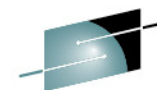
Output set definition(s)

	Attribute	Duration
TimeStamp	Forecast Timestamp	
Trended Value	Data	7 day(s)
Trended Value	Data	30 day(s)

Add Output Set

OK Cancel Apply Help

# Custom Forecast Workspace



**SHARE**  
Technology · Connections · Results

**Navigator**  
View: Performance Analyzer- custom forecasts  
Performance Analyzer- custom forecasts  
Performance\_Analyzer\_Generic

**Dataset Groups Space Usage Forecast - 30 days**

Node	Timestamp	Analytic Task Name	System Name	Forecast Timestamp	Duration	Data	Task Base OS	Identifier 1
HASLE320:PA	07/13/12 21:31:21	BACKUP	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	99		
HASLE320:PA	07/13/12 21:31:21	BONETT	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	78		
HASLE320:PA	07/13/12 21:31:21	IBM.OMXE410	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	94		
HASLE320:PA	07/13/12 21:31:21	NIXON	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	89		
HASLE320:PA	07/13/12 21:31:21	PKG	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	96		
HASLE320:PA	07/13/12 21:31:21	SA4ZOS	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	86		
HASLE320:PA	07/13/12 21:31:21	TEMP	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	87		
HASLE320:PA	07/13/12 21:31:21	TEST	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	99		
HASLE320:PA	07/13/12 21:31:21	TRS_FILES	R41ADSST.HCB\$.STORAGE	08/13/12 00:00:00	30	100		

**zVM LPAR Busy Forecast - 30 Days**

Node	Timestamp	Analytic Task Name	System Name	Forecast Timestamp	Duration	Data	Task Base OS	Identifier 1
HASLE320:PA	07/14/12 16:26:36	ATS_zVM_LPAR_Busy_LT	HASL113.WSCLAB.WASHINGTON.IBM.CO	08/13/12 00:00:00	30	5		

**DataSet Groups Trending Status**

Node	Timestamp	Analytic Task Name	System Name	Confidence	Direction	Strength	Number Of Samples	Time To Warning Threshold	Time To Critical Threshold	Task Base OS	Identifier 1
HASLE320:PA	07/13/12 21:31:21	BACKUP	R41ADSST.HCB\$.STORAGE	0	1	1	60	0	0		
HASLE320:PA	07/13/12 21:31:21	BONETT	R41ADSST.HCB\$.STORAGE	74	1	3	60	122	161		
HASLE320:PA	07/13/12 21:31:21	IBM.OMXE410	R41ADSST.HCB\$.STORAGE	16	-1	1	60	0	NEVER		
HASLE320:PA	07/13/12 21:31:21	NIXON	R41ADSST.HCB\$.STORAGE	0	0	1	60	NEVER	NEVER		
HASLE320:PA	07/13/12 21:31:21	PKG	R41ADSST.HCB\$.STORAGE	0	-1	1	60	NEVER	NEVER		
HASLE320:PA	07/13/12 21:31:21	SA4ZOS	R41ADSST.HCB\$.STORAGE	0	-1	1	60	NEVER	NEVER		
HASLE320:PA	07/13/12 21:31:21	TEMP	R41ADSST.HCB\$.STORAGE	8	1	1	60	1220	2928		
HASLE320:PA	07/13/12 21:31:21	TEST	R41ADSST.HCB\$.STORAGE	6	-1	1	60	0	0		
HASLE320:PA	07/13/12 21:31:21	TRS_FILES	R41ADSST.HCB\$.STORAGE	0	1	1	60	0	0		

**zVM Trending Status**

Node	Timestamp	Analytic Task Name	System Name	Confidence	Direction	Strength	Number Of Samples	Time To Warning Threshold	Time To Critical Threshold	Task Base OS	Identifier 1
HASLE320:PA	07/14/12 16:26:36	ATS_zVM_LPAR_Busy_LT	HASL113.WSCLAB.WASHINGTON.IBM.CO	9	-1	1	30	NEVER	NEVER		BOSPA

Hub Time: Sat, 07/14/2012 05:04 PM    Server Available    Performance\_Analyzer\_Generic - hasle330.wsclab.washington.ibm.com - SYSADMIN \*ADMIN MODE\*



# Custom Forecast Workspace - Historical



Page: 1 of 1+								
Recording Time	Node	Timestamp	Analytic Task Name	System Name	Forecast Timestamp	Duration	Data	Task Base
07/07/12 08:00:12	HASLE320:PA	07/07/12 07:30:30	ATS_zVM_LPAR_Busy_LT	HASL113.WSCLAB.WASHINGTON.IBM.CO	08/06/12 00:00:00	30	8	
07/08/12 08:00:13	HASLE320:PA	07/08/12 07:38:24	ATS_zVM_LPAR_Busy_LT	HASL113.WSCLAB.WASHINGTON.IBM.CO	08/07/12 00:00:00	30	8	
07/09/12 08:00:13	HASLE320:PA	07/09/12 07:46:28	ATS_zVM_LPAR_Busy_LT	HASL113.WSCLAB.WASHINGTON.IBM.CO	08/08/12 00:00:00	30	7	
07/10/12 08:00:14	HASLE320:PA	07/10/12 07:57:32	ATS_zVM_LPAR_Busy_LT	HASL113.WSCLAB.WASHINGTON.IBM.CO	08/09/12 00:00:00	30	7	

# Reports



## Tivoli Performance Analyzer



### Memory Utilization per Operating System

Operating system Linux

### Forecast Overview

System name	Timestamp	Confidence	Strength	Number of samples	Time to critical threshold (days)	Time to warning threshold (days)
BOSPA.ESMTS105:LZ ↓	Jul 17, 2012 8:38 AM	74	3	30	4	2
BOSPA.ESMTS117:LZ ↑	Jul 17, 2012 8:38 AM	0	1	29	2147483647	0
BOSPA.ESMTS118:LZ ↑	Jul 17, 2012 8:38 AM	0	1	29	2147483647	2147483647
BOSPA.SLESB104:LZ ↓	Jul 17, 2012 8:38 AM	9	1	29	216	0
HASLE312:LZ ↑	Jul 17, 2012 8:38 AM	14	1	30	2147483647	2147483647
hasle310:LZ ↓	Jul 17, 2012 8:38 AM	93	2	12	223	211
hasle328:LZ ↓	Jul 17, 2012 8:38 AM	10	1	11	228	178
hasle330:LZ ↓	Jul 17, 2012 8:38 AM	1	1	30	157	119
hasle332:LZ ↓	Jul 17, 2012 8:38 AM	95	2	12	2251	2236

### Brief Forecasts

#### 7 Day Forecast

System name	7 day forecast
BOSPA.ESMTS105:LZ	-40
BOSPA.ESMTS117:LZ	15
BOSPA.ESMTS118:LZ	37
BOSPA.SLESB104:LZ	20
HASLE312:LZ	322
hasle310:LZ	386
hasle328:LZ	98
hasle330:LZ	89
hasle332:LZ	3063

# Reports



## Performance Analyzer



System name	30 day forecast
BOSPA.ESMTS105:LZ	-366
BOSPA.ESMTS117:LZ	15
BOSPA.ESMTS118:LZ	38
BOSPA.SLESB104:LZ	19
HASLE312:LZ	478
hasle310:LZ	346
hasle328:LZ	89
hasle330:LZ	77
hasle332:LZ	3032

### 90 Day Forecast

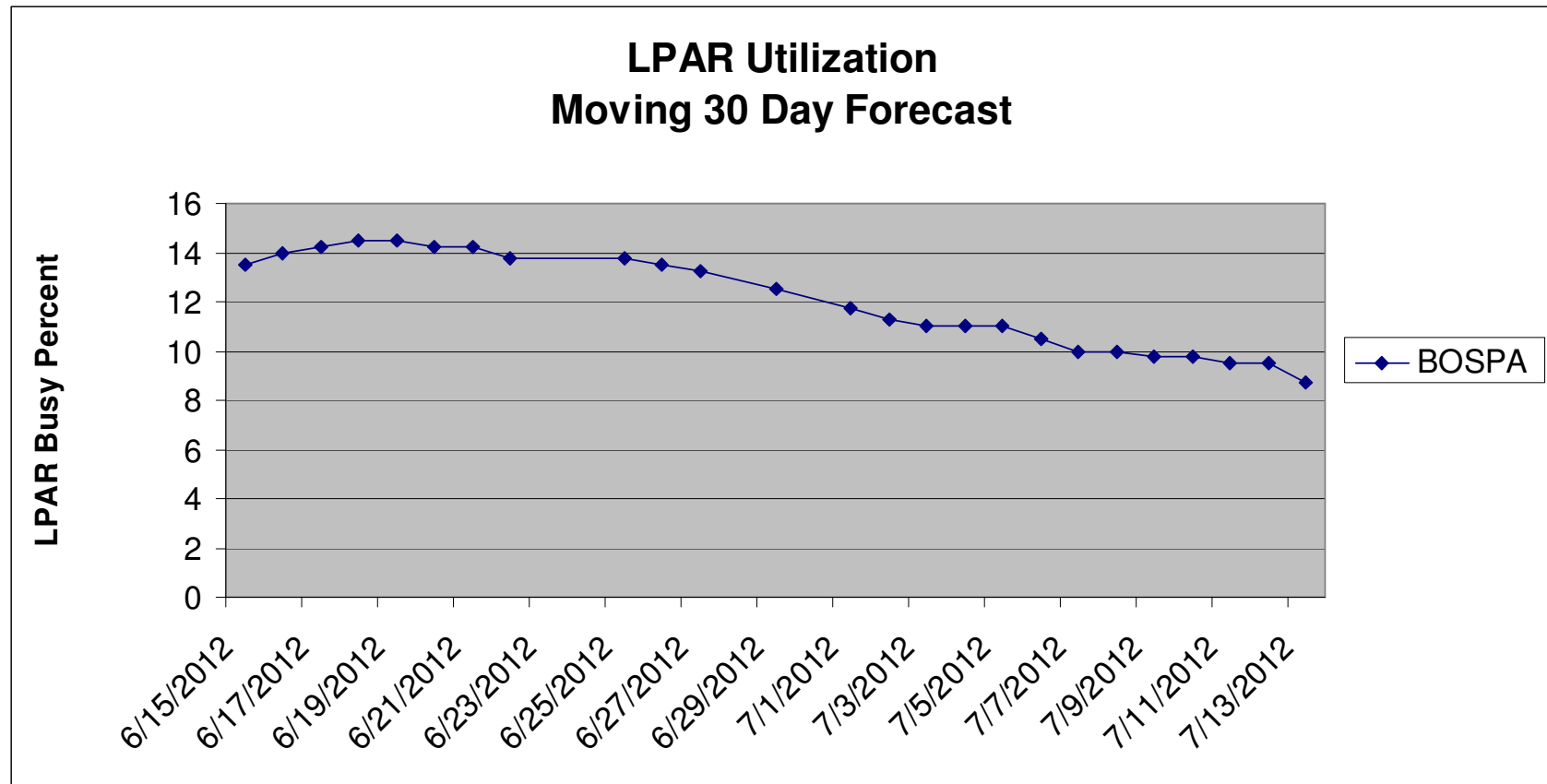
System name	90 day forecast
BOSPA.ESMTS105:LZ	-1217
BOSPA.ESMTS117:LZ	16
BOSPA.ESMTS118:LZ	41
BOSPA.SLESB104:LZ	16
HASLE312:LZ	884
hasle310:LZ	241
hasle328:LZ	65
hasle330:LZ	45
hasle332:LZ	2950

This report presents the forecast overview of available memory utilization followed by the brief forecasts for each monitored system. The top table (Forecast Overview) displays the general trend information, for example 'Number of samples' on which a given trend is calculated, 'Confidence' showing how certain the outcome is, or 'Time to critical/warning threshold' that indicates when a particular limit will be exceeded. Brief Forecasts section comprises three tables presenting the values for 7, 30 and 90 day forecast.

# Roll Your Own Report



Rolling 30 day forecast from ITPA historical data (SQL Query->Import to Spreadsheet)



# ITPA Domain Generator



- “AS-IS” tool available from the Integrated Service Management (ISM) Library website
- Allows created of custom ITPA domains
- Uses templates to generate ITPA task definitions for linear trending and all objects needed to present it in TEP and in TCR (workspaces, reports, situations, queries, attribute groups),
- Generates domain deployment packages that may be deployed in any ITM 6.2.2 or 6.2.1 environment supported by ITPA (Windows, Linux, Aix, Solaris) 6.2.2 or 6.1.1 FP3
- Generates the standard TCR report set that can be deployed using TCR tools
- Requires ITM TEP/TEMS/ITPA installed on single Windows system for development (package can be later deployed to “production” environments)
- ***CURRENTLY NOT SUPPORTED FOR ITM 6.2.3***

## For More Information



- IBM Developerworks
  - <https://www.ibm.com/developerworks/wikis/display/tivolidoccentral/Tivoli+Performance+Analyzer>
    - Links to product documentation and related information
- Getting started with the IBM Tivoli Performance Analyzer 6.1
  - <http://www.redbooks.ibm.com/abstracts/sg247478.htm>

# Tivoli System z Session at SHARE

## Monday

- 11:00 11207: Automating your IMSplex with System Automation for z/OS Platinum 7
- 1:30 11832: What's New with Tivoli System Automation for z/OS Elite 1
- 3:00 11886: Improve Service Levels with Enhanced Data Analysis Elite 1

## Tuesday

- 9:30 11792: What's New with System z Monitoring with OMEGAMON Elite 1
- 11:00 11791: Tuning Tips To Lower Costs with OMEGAMON Monitoring Platinum 8
- 1:30 11900: Understanding Impact of Network on z/OS Performance Grand Salon A

## Wednesday

- 9:30 11835: Automated Shutdowns using either SA for z/OS or GDPS Elite 1
- 1:30 11479: Predictive Analytics and IT Service Management Grand Salon E/F
- 1:30 11899: Top 10 Tips for Network Perf. Monitoring w/ OMEGAMON Platinum 9
- 4:30 11836: Save z/OS Software License Costs with TADz Elite 1

## Thursday

- 9:30 11905: Using NetView for z/OS for Enterprise-Wide Mgmt and Auto Grand Salon A
- 11:00 11909: Get up and running with NetView IP Management Grand Salon A
- 11:00 11887: Learn How To Implement Cloud on System z Grand Salon E/F

## Friday

- 9:30 11630: Getting Started with URM APIs for Monitoring & Discovery Elite 1



# System z Social Media

- System z official Twitter handle:
  - [@ibm\\_system\\_z](https://twitter.com/ibm_system_z)
- Top Facebook pages related to System z:
  - [Systemz Mainframe](#)
  - [IBM System z on Campus](#)
  - [IBM Mainframe Professionals](#)
  - [Millennial Mainframer](#)
- Top LinkedIn Groups related to System z:
  - [Mainframe Experts Network](#)
  - [Mainframe](#)
  - [IBM Mainframe](#)
  - [System z Advocates](#)
  - [Cloud Mainframe Computing](#)
- YouTube
  - [IBM System z](#)



- Leading Blogs related to System z:
  - [Evangelizing Mainframe \(Destination z blog\)](#)
  - [Mainframe Performance Topics](#)
  - [Common Sense](#)
  - [Enterprise Class Innovation: System z perspectives](#)
  - [Mainframe](#)
  - [MainframeZone](#)
  - [Smarter Computing Blog](#)
  - [Millennial Mainframer](#)