



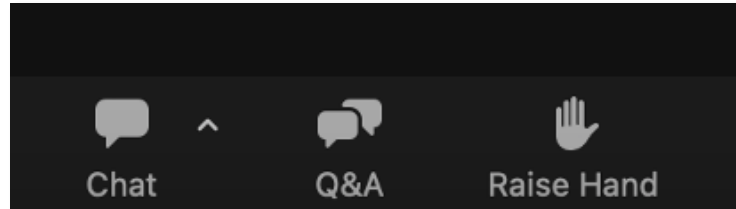
**SENTURUS**

# **Cognos Analytics Performance Tuning Tips**

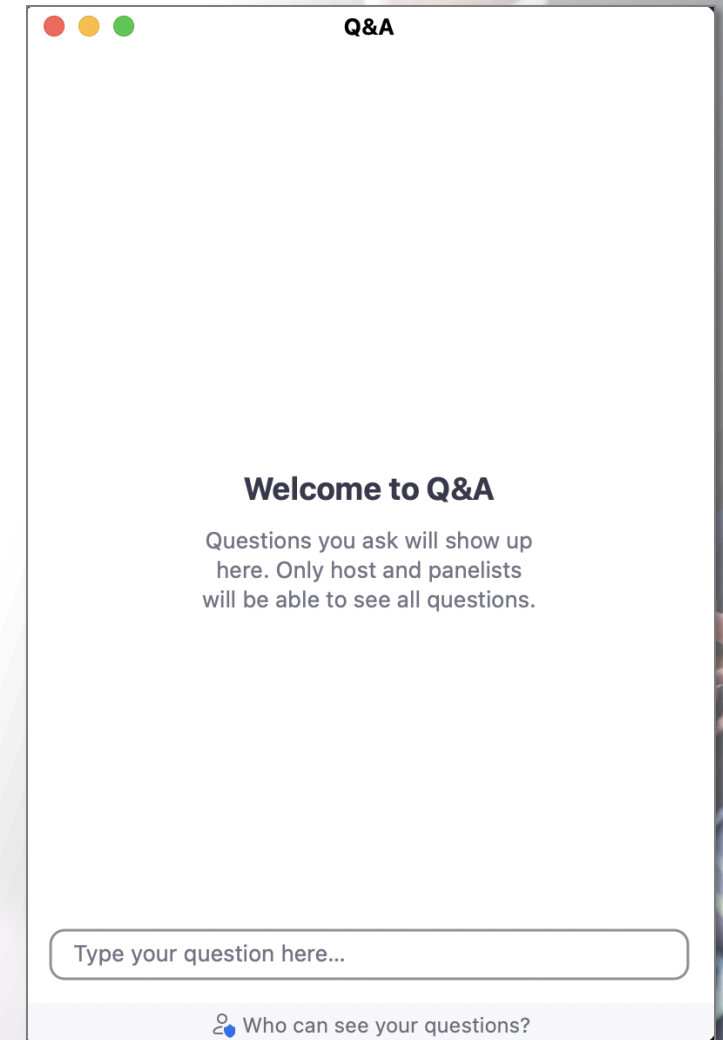


# Questions?

Click Q&A at the  
bottom of your screen



Submit questions  
in this section

A screenshot of a 'Q&A' window. At the top, it has a title bar with three colored circles (red, yellow, green) and the text 'Q&A'. The main area contains the text 'Welcome to Q&A' followed by 'Questions you ask will show up here. Only host and panelists will be able to see all questions.' At the bottom, there is a text input field with the placeholder 'Type your question here...' and a button with a person icon and the text 'Who can see your questions?'.


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[senturus.com/resources](https://senturus.com/resources)

### Topics


- Analytics Connector
- Cross Vendor Comparisons
- Dashboards Reporting & Visualizations
- Data & Cloud Architecture
- Data Prep & Modeling
- Deployments & Performance Optimization
- IBM Analytics & Cognos
- Microsoft Azure & Power BI
- Security, governance & administration
- Snowflake
- Tableau




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How-to demo and discussion of pros, cons and considerations




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Agile, governed self-service BI with a focus on Cognos analytics




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**Webinar**  
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Learn the basics, including the software and plotting libraries



**Webinar**  
**Streamline Cognos Migrations and Consolidations**  
Automatically decode Cognos content and reduce migration time by 90%

# Agenda

Introductions

Locating the source of poor performance

Report specific tuning

Architecture/environment tuning

Dispatcher tuning

Senturus overview and additional resources

Q&A



# Introductions



**Todd Schuman**

Practice Lead  
Installations, Upgrades and Optimization  
Senturus, Inc.



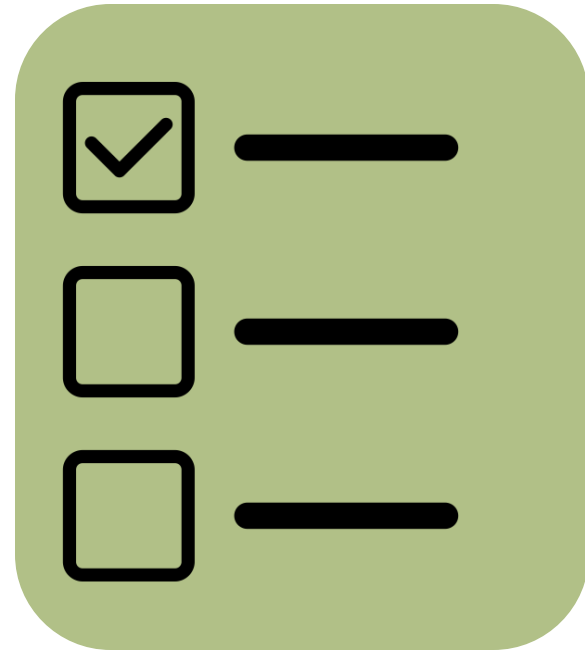
**Steve Reed Pittman**

Director  
Enterprise Architecture and Engineering  
Senturus, Inc.

# Poll #1

What version of Cognos are you using?

- Before Cognos 10
- Cognos 10
- Cognos 11.0.x
- Cognos 11.1.x
- Cognos 11.2.x

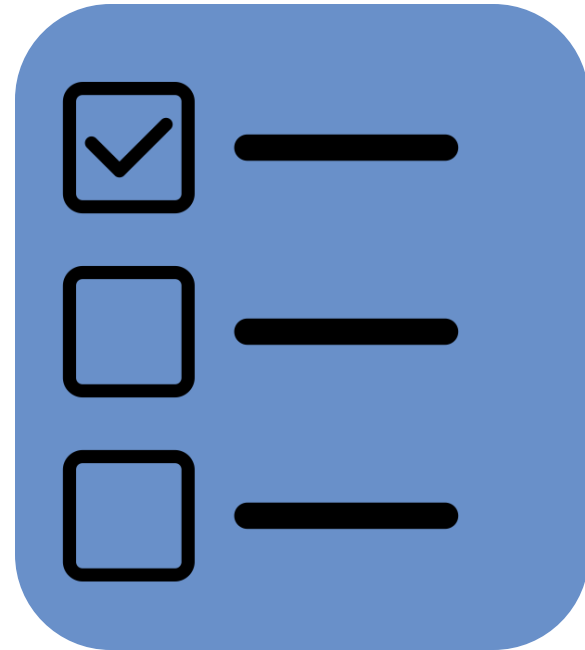


<input checked="" type="checkbox"/>	<input type="radio"/>
<input type="checkbox"/>	<input type="radio"/>
<input type="checkbox"/>	<input type="radio"/>

# Poll #2

What are your current performance pain points? (Select all that apply)

- Reports run slow
- Reports are failing
- System is unstable
- Administration is confusing
- Other

A blue rounded rectangle containing three checkboxes and three horizontal lines. The top checkbox is checked, and the other two are unchecked. The horizontal lines are positioned to the right of each checkbox, suggesting a list of options or a form for additional input.

# An overview of Cognos tuning

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- Cognos Analytics is a complex environment. A single bottleneck in either the software or hardware has a ripple effect for the entire system.
- Some of the most common software and hardware bottlenecks include:

Reports

Queries/  
SQL/  
Modeling

Hardware/  
User Load

Dispatcher  
Settings

Software  
Defects/  
Bugs

- Nothing minimizes the impact of a sub-optimal analytics model or poorly authored report or dashboard.

# Finding the source of poor performance

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Where to begin?



# Questions to ask

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## Is it a single report?

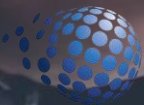
- Or a single subject area/ data mart?

## Is the whole environment slow?

- Is it always slow or just times of the day?
- Specific days of the month/year?



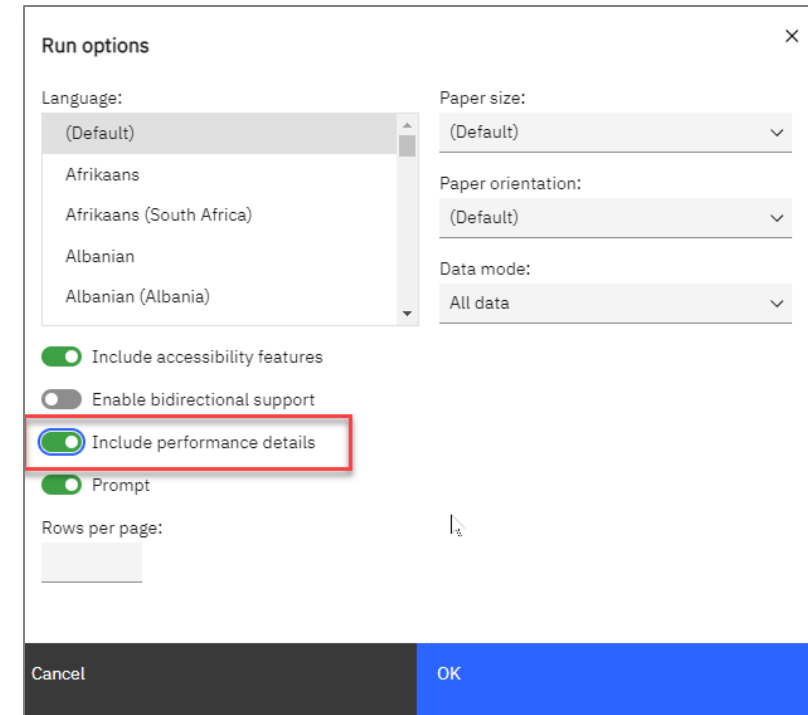
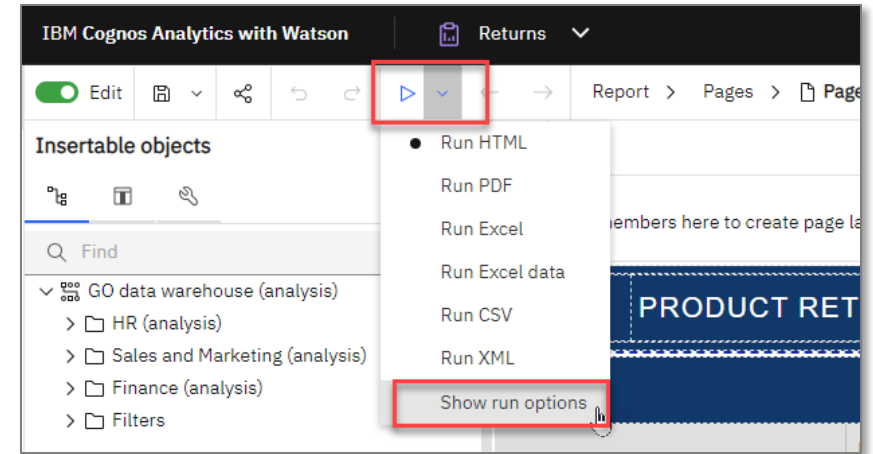
# Poor performing reports



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# Interactive Performance Analyzer (IPA)

- Built into Reporting Tool
- Click *drop down arrow* next to *Run* button
- Select *Show run options*
- Enable *Include performance details*
- Run report (HTML only)



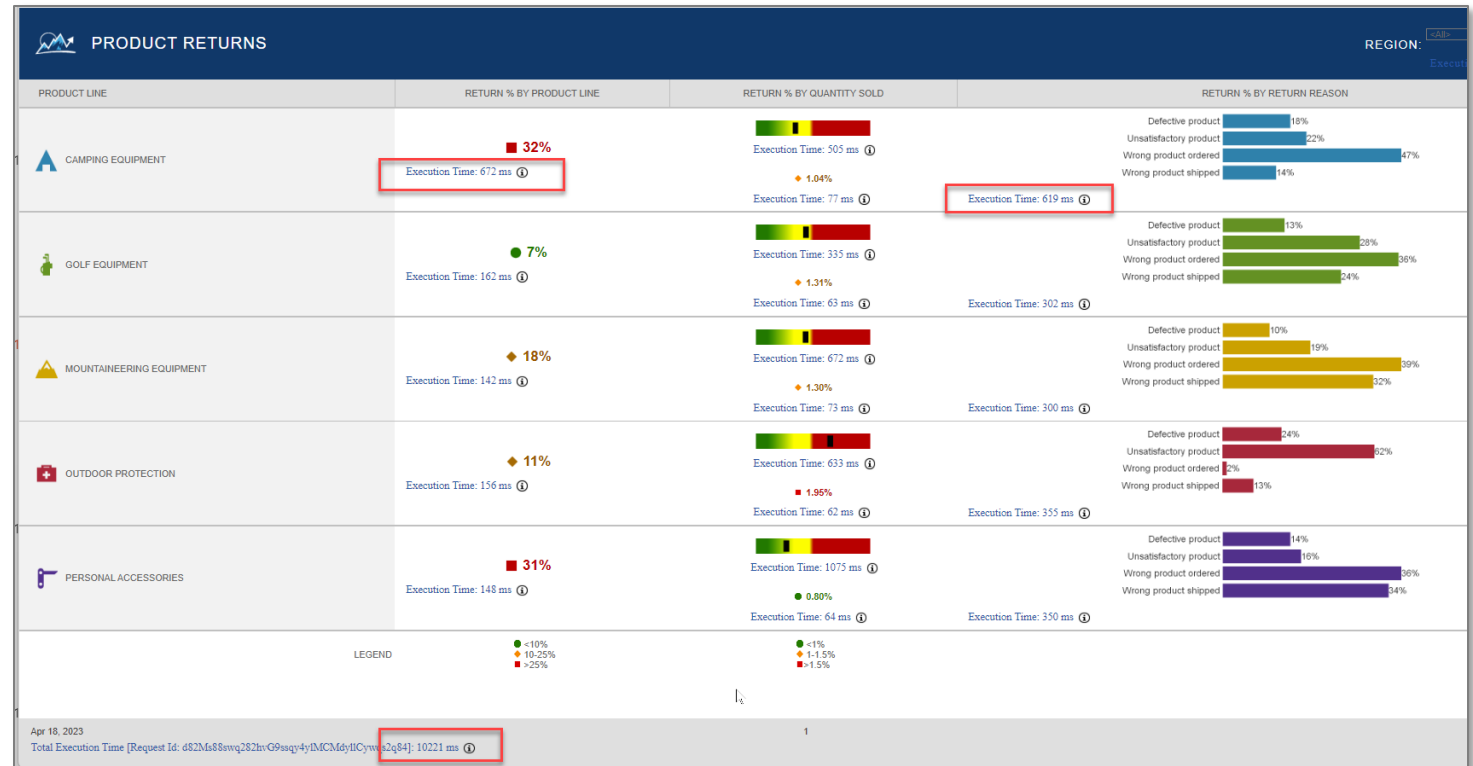
# IPA output

## Execution time per Object

- Camping Equipment is the longest running crosstabs and visualizations

## Total for page

- If multipage report, which page is the slowest



# Now what?

---

- Review data/query for slow running objects identified from IPA
- View tabular data
  - Review SQL
- Review performance





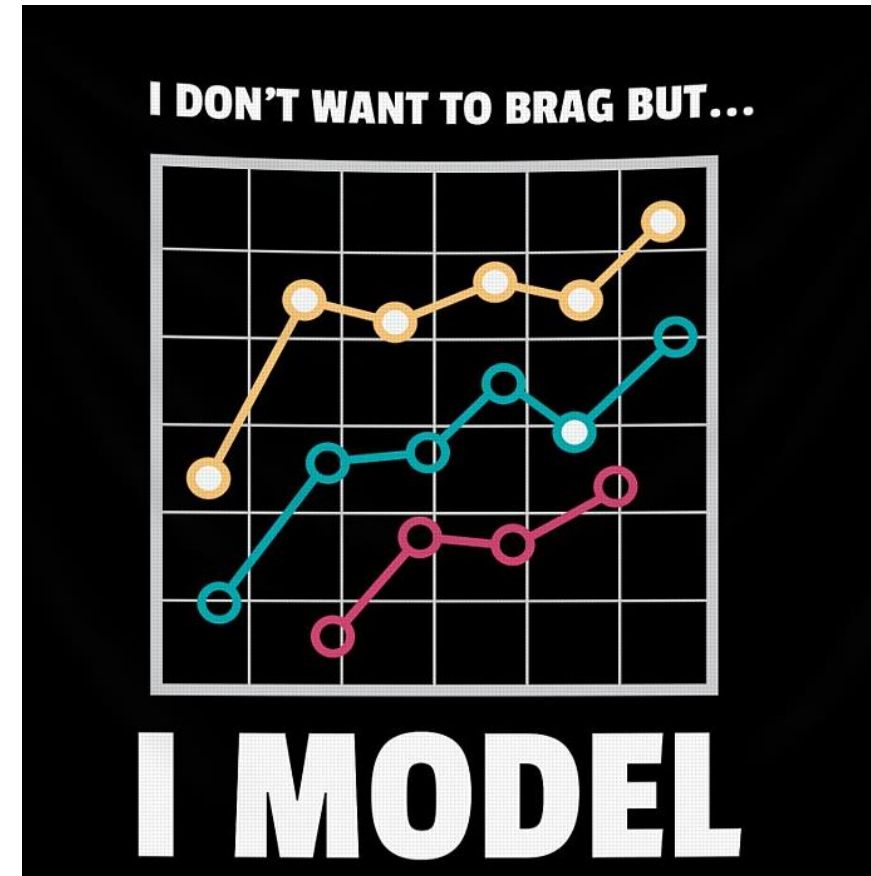
## Next steps

---

- Slow query
  - Bad SQL? Bad modeling?
    - Fix in model
    - Star schema
  - Optimize SQL
    - Indexes
    - Summary table
    - Materialized view

# Modeling

- Always need well-designed data models
- Avoid OLTP reporting
- Star schema!



# Data sets!

In Memory data extracts pulled from DB and saved as a snapshot in Cognos.

Apache parquet file uploaded into Content DB, pulled down locally for usage and then removed when not in use.

Extremely fast!

Can be refreshed on a schedule or trigger.

## APACHE PARQUET

Columnar storage for the people

- Combining both column projection and predicate push down is a powerful combination

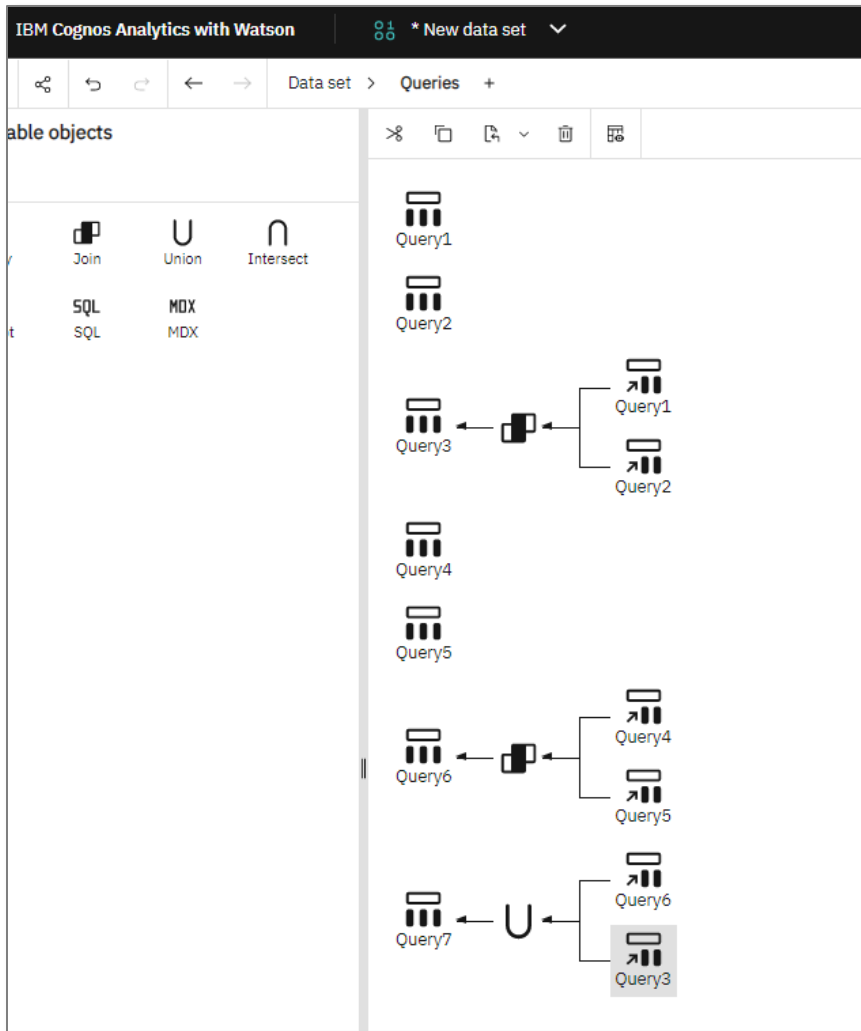
a	b	c
a1	b1	c1
a2	b2	c2
a3	b3	c3
a4	b4	c4
a5	b5	c5

+

a	b	c
a1	b1	c1
a2	b2	c2
a3	b3	c3
a4	b4	c4
a5	b5	c5

=

a	b	c
a1	b1	c1
a2	b2	c2
a3	b3	c3
a4	b4	c4
a5	b5	c5



# Data Set Editor (11.1.7)

Allows multiple step queries to be used

- Allows copy/paste from existing reports!

Can be used to generate the entire report data output ahead of time

# Words of caution

- Not best practice to create one-off solutions for each report.
- Requires a data module to expose to report:
  - Need to repoint to the data module
  - Or export the XML and do find/replace on new data path
- Prompting will need to be done on the full data set after it's extracted, DS size can get large.





# Poor performing environments



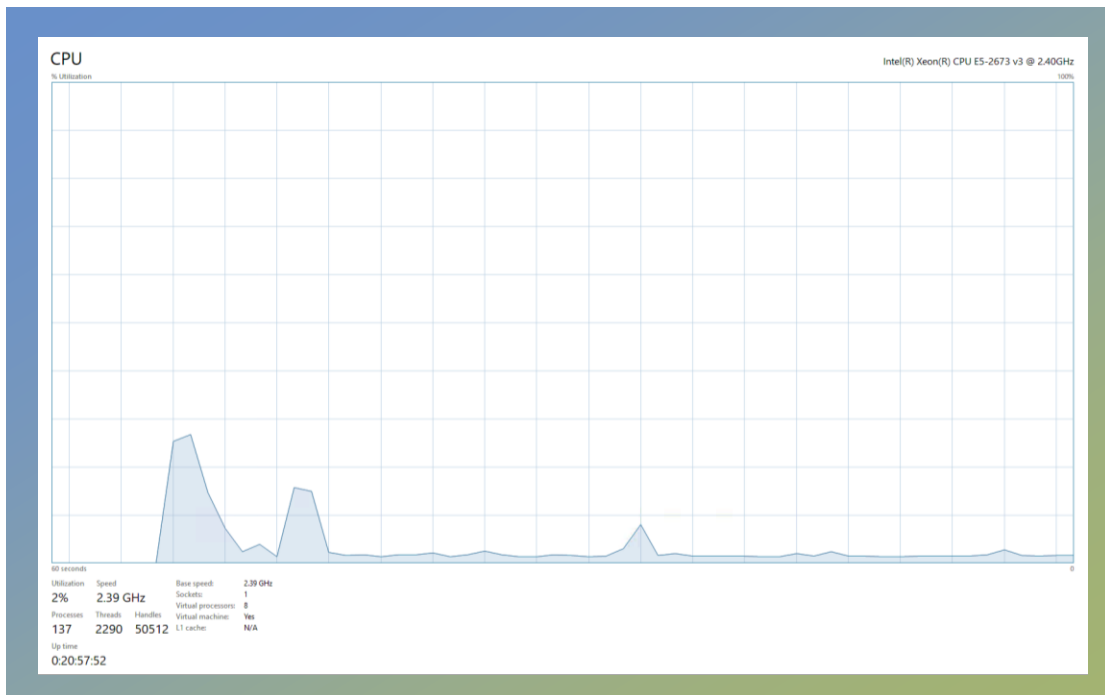
# Where to begin?

---

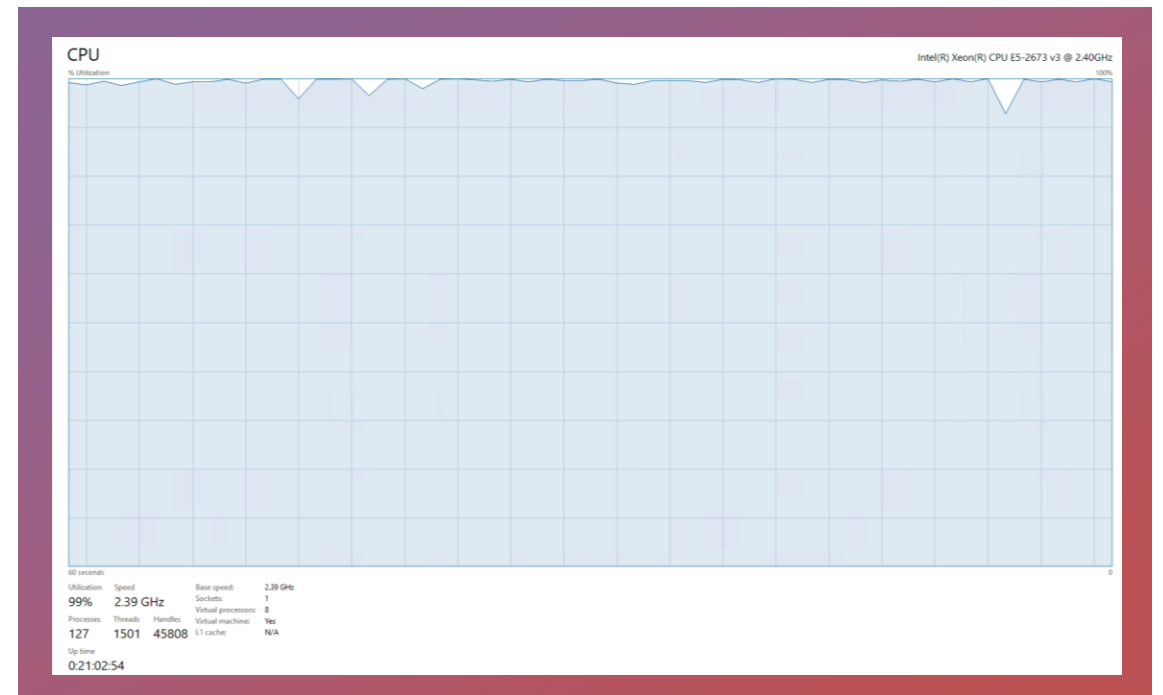
- Server hardware
  - CPU/RAM
  - VM host hardware
  - VM resources shared across other VMs
- Architecture
  - Single server vs. clustered
  - Failover
- Cognos dispatcher tuning

# Monitor changes

Under utilized



Over utilized



# + ○ Hardware and server specifics

## IBM Cognos Analytics on premises 11.2.x: supported software environments

IBM Cognos Analytics on Premises 11.2.x: Supported Software Environments

**Detailed System Requirements**

**Abstract**  
Software Product Compatibility Reports provide up-to-date information about the supported environments and minimum requirements for your product.

**Content**  
Cognos Analytics on Premises 11.2.x compatibility reports for each release are linked in the tables below.

**Note:** If you want to view compatibility reports for a different Cognos Analytics release, click one of these tabs:

Mobile   on Cloud On-Demand   on Cloud Hosted   **11.2.x**   11.1.x   11.0.0   FAQ

Scroll to the release you want, then click the links in the table to view compatibility reports for that release.

**Cognos Analytics on Premises 11.2.4 FP1**

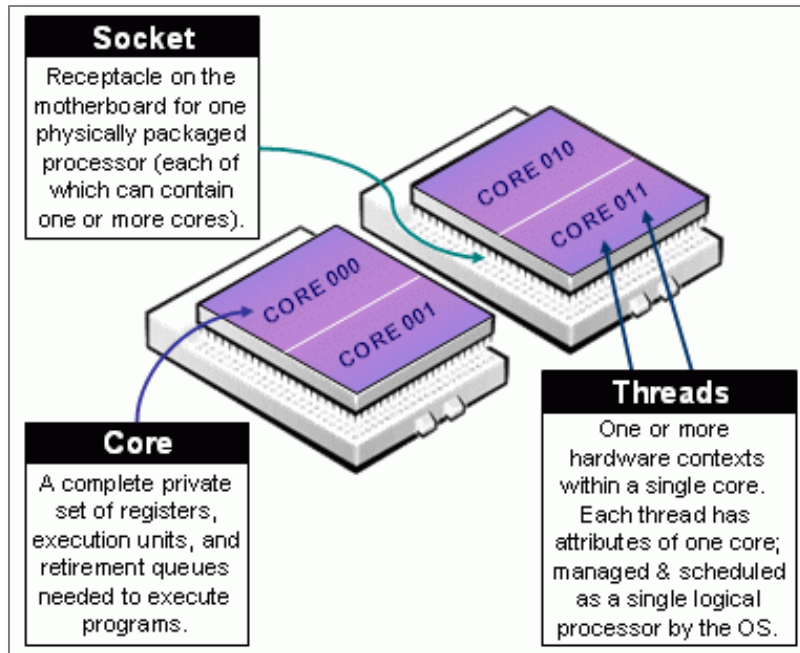
Requirements by type	Requirements by platform	Supplementary information
<ul style="list-style-type: none"><li>• <a href="#">Operating Systems</a></li><li>• <a href="#">Prerequisite Software</a> (Note: Click the <b>Supported Software</b> tab to view application servers, data sources, and web browsers)</li><li>• <a href="#">Hardware</a></li><li>• <a href="#">Hypervisors</a></li></ul>	<ul style="list-style-type: none"><li>• <a href="#">AIX</a></li><li>• <a href="#">Linux</a></li><li>• <a href="#">Mobile OS</a></li><li>• <a href="#">Windows</a></li></ul>	<ul style="list-style-type: none"><li>• Supported and tested client drivers for 11.2.4 FP1 <a href="#">[Relational]</a>   <a href="#">[OLAP]</a></li></ul>

**Cognos Analytics on Premises 11.2.4 (LTS\*)**

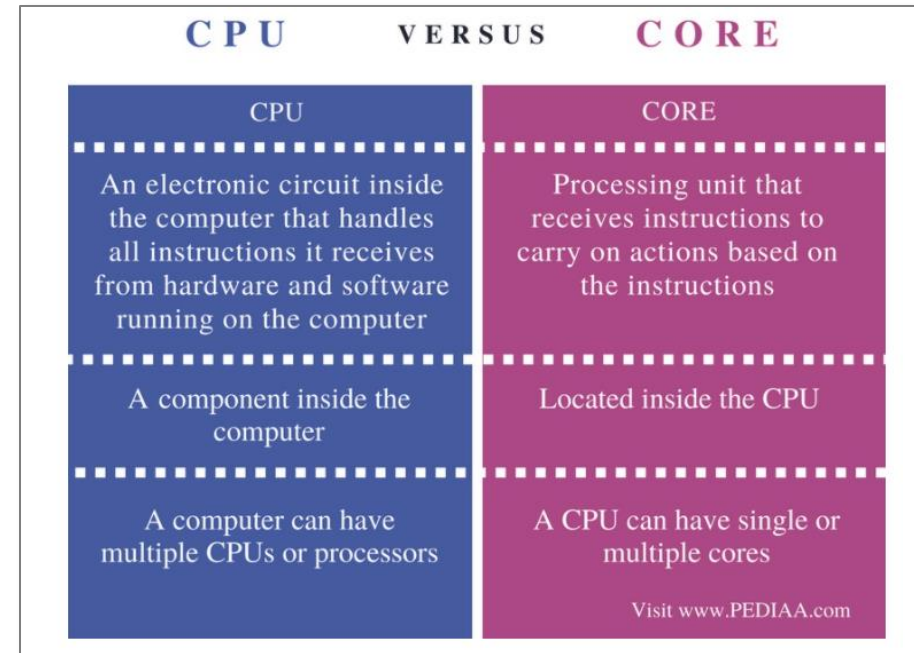
**\* Note:** Version 11.2.4 of IBM Cognos Analytics is a [Long Term Support \(LTS\)](#) release.

Requirements by type	Requirements by platform	Supplementary information
<ul style="list-style-type: none"><li>• <a href="#">Operating Systems</a></li></ul>		

# Hardware (IBM recommended – 11.2.4)



- 4 cores
- 32GB RAM



- Disk space
  - 10GB install
  - 4GB temp space
  - 500MB/user file uploads

# Modern virtual architecture



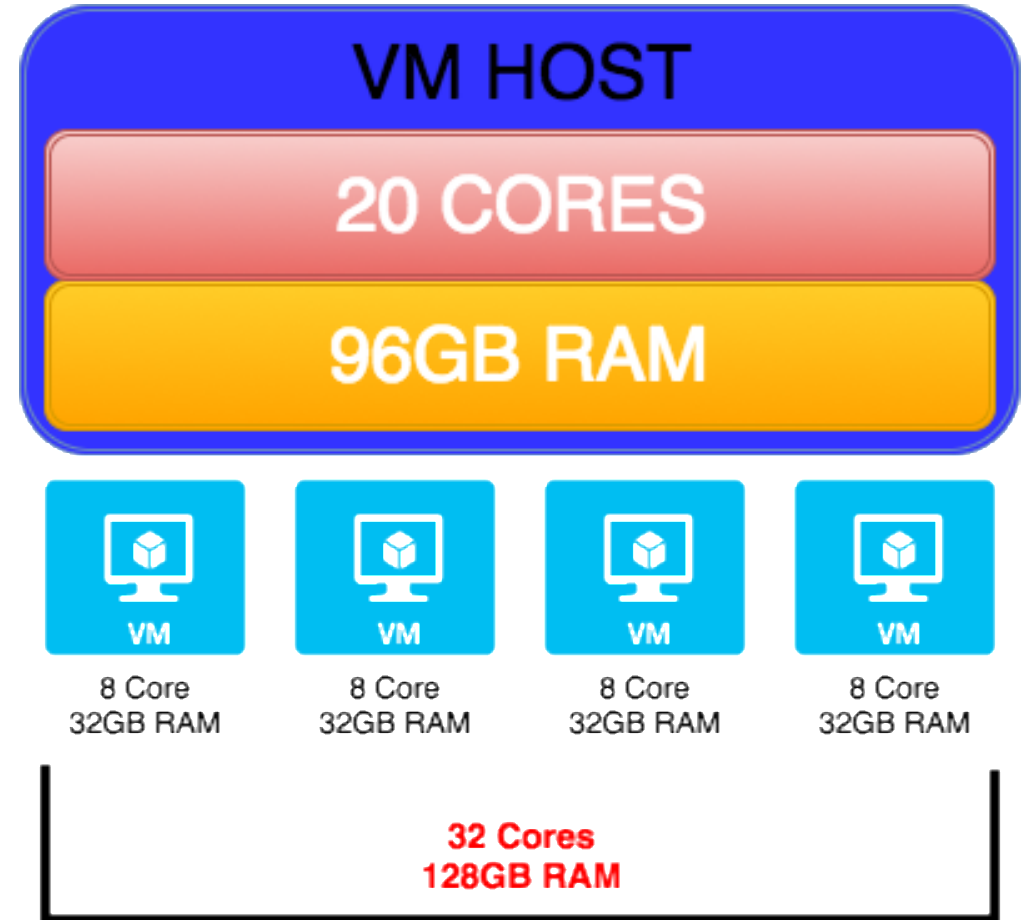
Traditional Architecture



Virtual Architecture

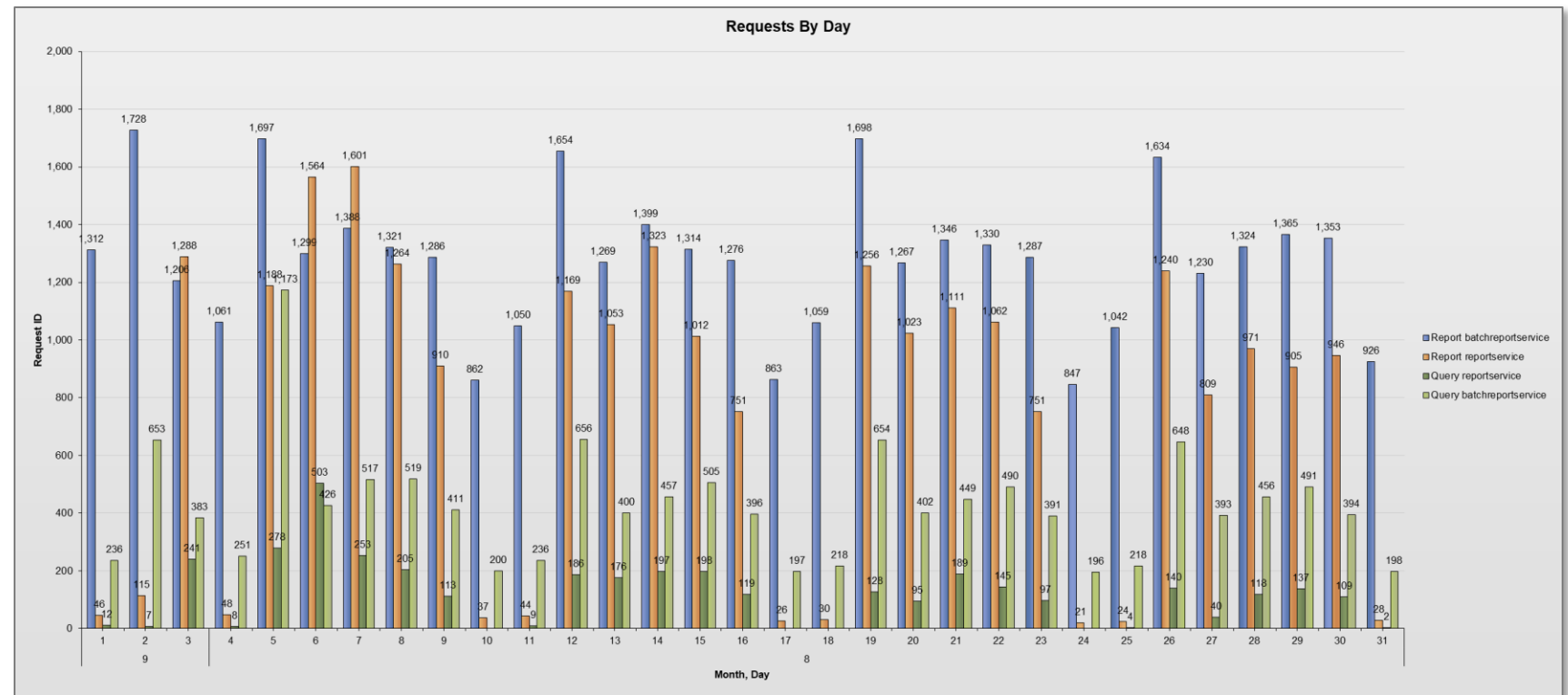
# VM recommendations

- Dedicated resources
  - No sharing
- Plan for 5-10% overhead
- Host should have “enterprise level” hardware



# Audit reports

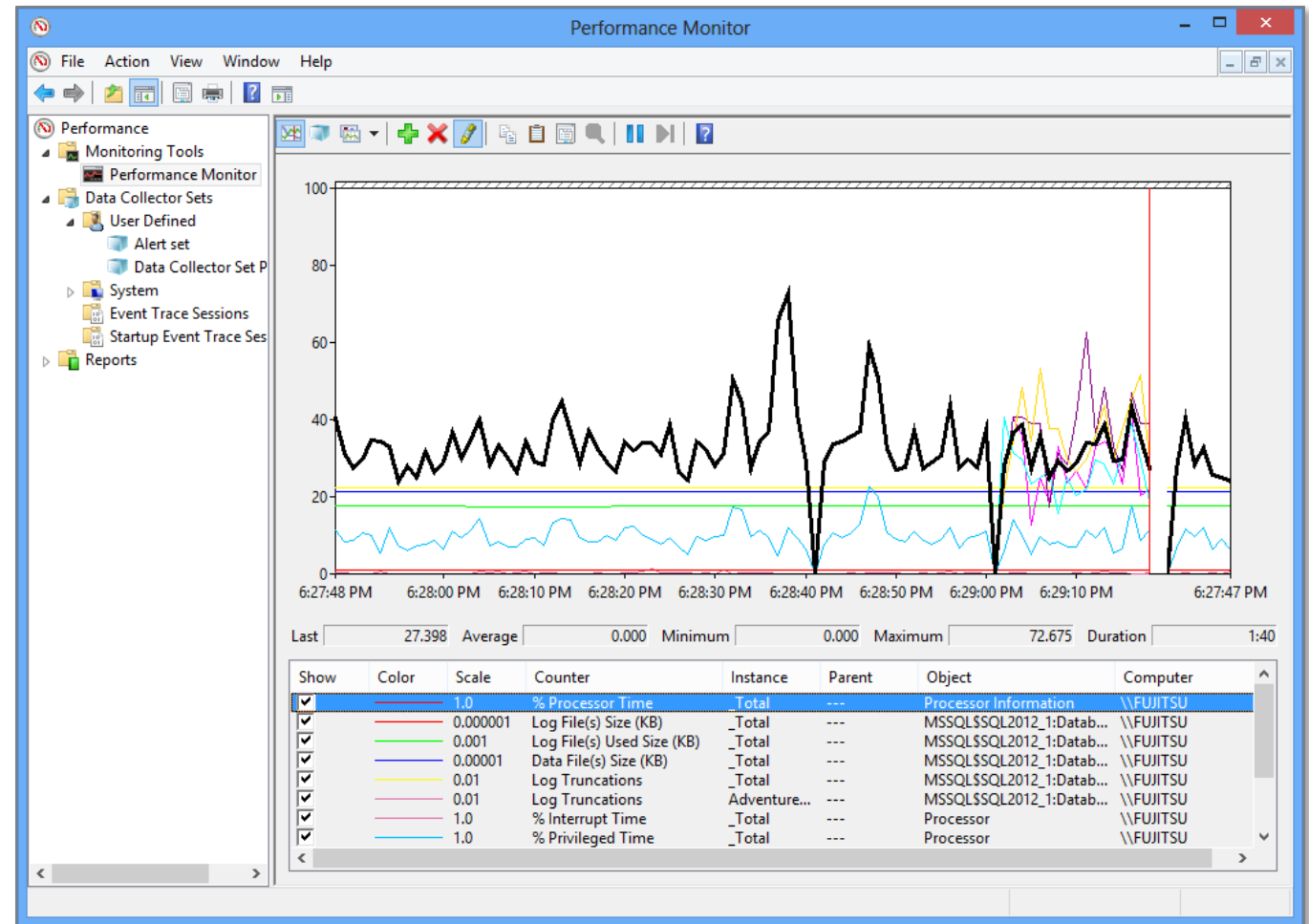
- User requests by
  - Minute
  - Hour
  - Day
  - Month
- Request type
  - Report
  - Batch



# Server monitoring

## PerfMon (Windows)

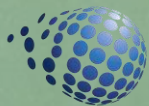
- CAM\_LPSvr.exe
- JAVA.exe
- cogbootstrapervice.exe
- BIBusTKServerMain.exe



## Linux

- Top
- HTOP
- Collectl

# Architecture setups

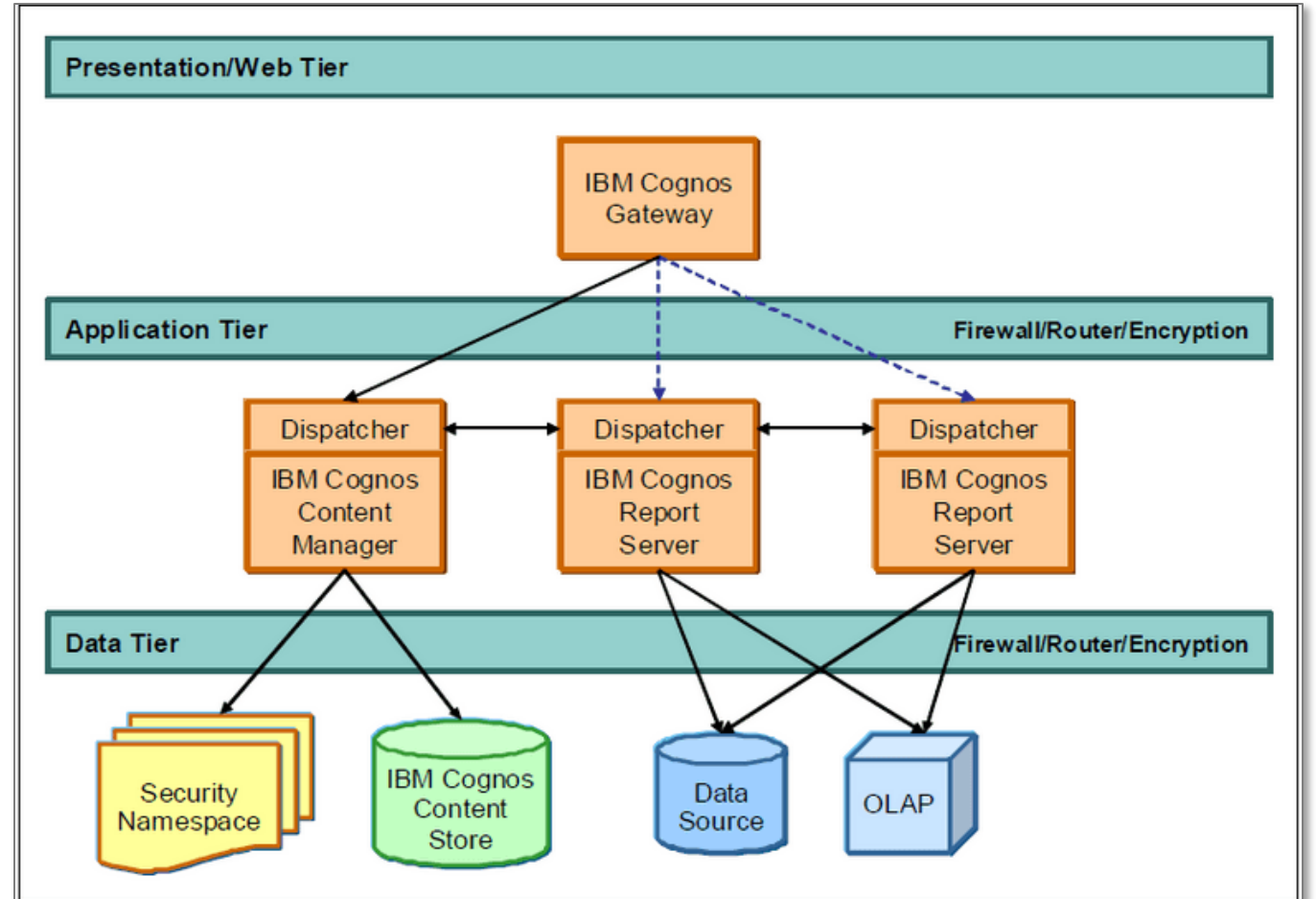


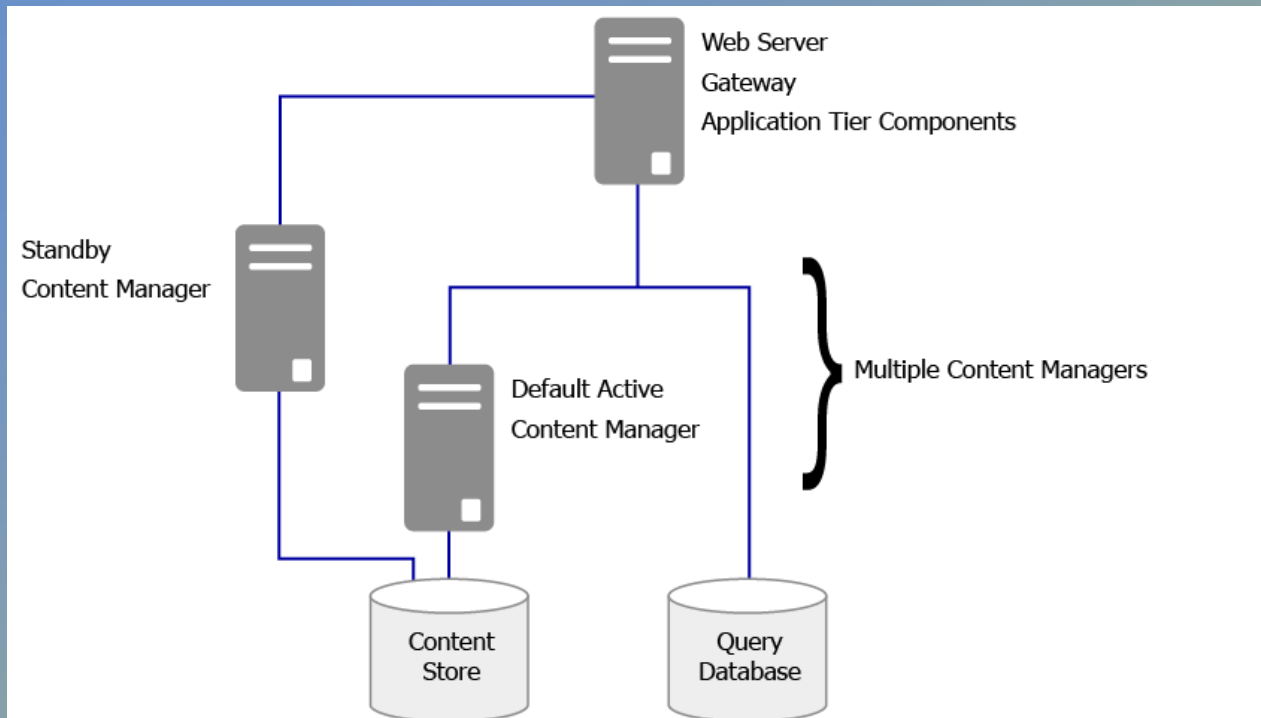
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# Basic distributed environment

## Dedicated

- Gateway
- Dispatchers
- Content Manager



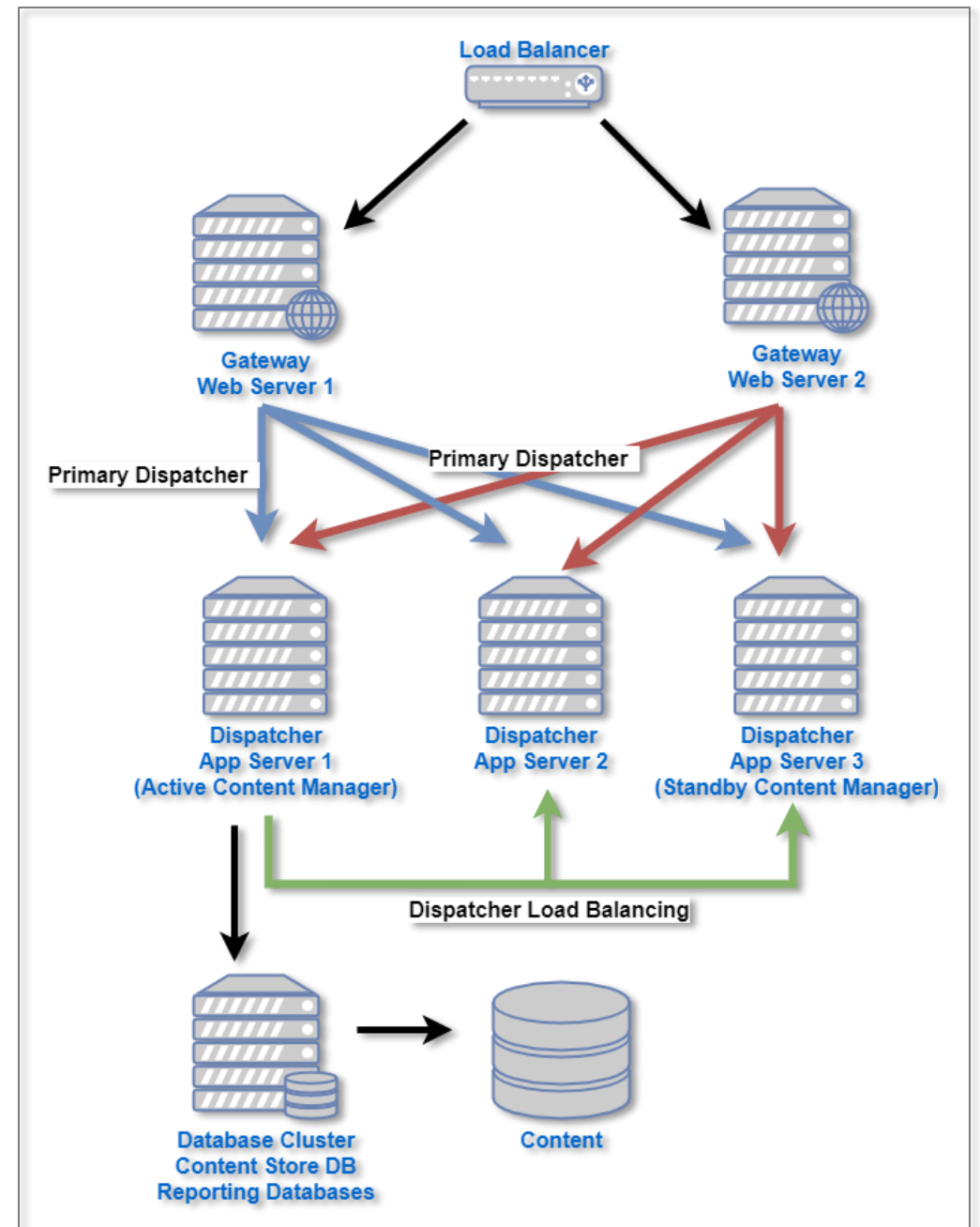


# Distributed environment with failover

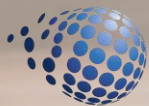
- Active/standby Content Manager
  - Both pointed to same content store
  - First CM to start becomes active
  - Standby always checking for active status
  - Will become active when primary becomes unresponsive

# High availability (HA)

- No single point of failure
- At least 2 of each Cognos component (gateway, dispatcher, CM)
- Load balancer for gateways



# Dispatcher tuning



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# Dispatcher tuning

- 87 options
- Majority 4 types
  - High/low affinity
  - # of processes
  - Peak/non-peak
  - Service

Set properties - Configuration

General Settings Permissions

Specify the configuration settings for this entry. By default, an entry acquires its configuration settings from a parent. You can override those settings with the settings set explicitly for this entry.

Category: Tuning

Entries: 1 - 87

	Category	Name	Value	Default
<input type="checkbox"/>	Tuning	Processing capacity	1.0	Yes
<input type="checkbox"/>	Tuning	Load balancing mode	Weighted Round Robin	Yes
<input type="checkbox"/>	Tuning	Temporary objects location	Server File System	Yes
<input type="checkbox"/>	Tuning	Temporary objects lifetime	4 Hour(s)	Yes
<input type="checkbox"/>	Tuning	Server group		Yes
<input type="checkbox"/>	Tuning	Number of high affinity connections for the batch report service during non-peak period	2	Yes
<input type="checkbox"/>	Tuning	Number of low affinity connections for the batch report service during non-peak period	4	Yes
<input type="checkbox"/>	Tuning	Maximum number of processes for the batch report service during non-peak period	2	Yes
<input type="checkbox"/>	Tuning	Governor limit (MB)	10	Yes
<input type="checkbox"/>	Tuning	Number of high affinity connections for the metadata service during non-peak period	1	Yes
<input type="checkbox"/>	Tuning	Number of low affinity connections for the metadata service during non-peak period	4	Yes
<input type="checkbox"/>	Tuning	Queue time limit of the metadata service (seconds)	240	Yes
<input type="checkbox"/>	Tuning	Maximum execution time for the metadata service (seconds)	0	Yes
<input type="checkbox"/>	Tuning	Maximum connections for relational metadata service during non-peak period	4	Yes
<input type="checkbox"/>	Tuning	Maximum execution time for the relational metadata service (seconds)	0	Yes
<input type="checkbox"/>	Tuning	Maximum number of relational metadata service connections during peak period	4	Yes
<input type="checkbox"/>	Tuning	Number of high affinity connections for the report service during non-peak period	2	Yes
<input type="checkbox"/>	Tuning	Number of low affinity connections for the report service during non-peak period	8	Yes
<input type="checkbox"/>	Tuning	Maximum number of processes for the report service during non-peak period	2	Yes
<input type="checkbox"/>	Tuning	Queue time limit of the report service (seconds)	240	Yes
<input type="checkbox"/>	Tuning	Maximum execution time for the report service (seconds)	0	Yes

# High affinity examples



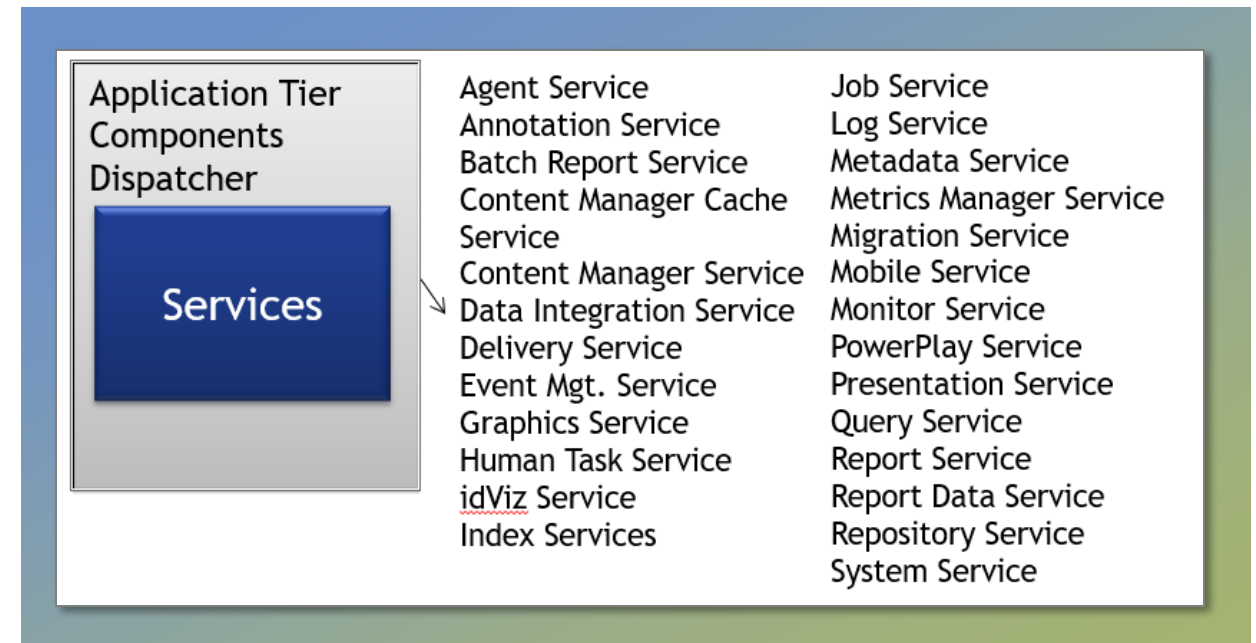
# Low affinity examples



Report  
querying

# Services

- The dispatcher starts all Cognos Analytics BI services configured and enabled on a computer, and routes requests locally
- A dispatcher can also route requests to another dispatcher



# Batch/ reporting/ query services



Batch  
service





# Peak vs. non-peak

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- 24-hour clock
- Defaults
  - 7:00 (am) start
  - 18:00 (6 pm) end
- Recommended
- Give report service priority during peak
- Give batch server priority during non-peak

# Routing rules

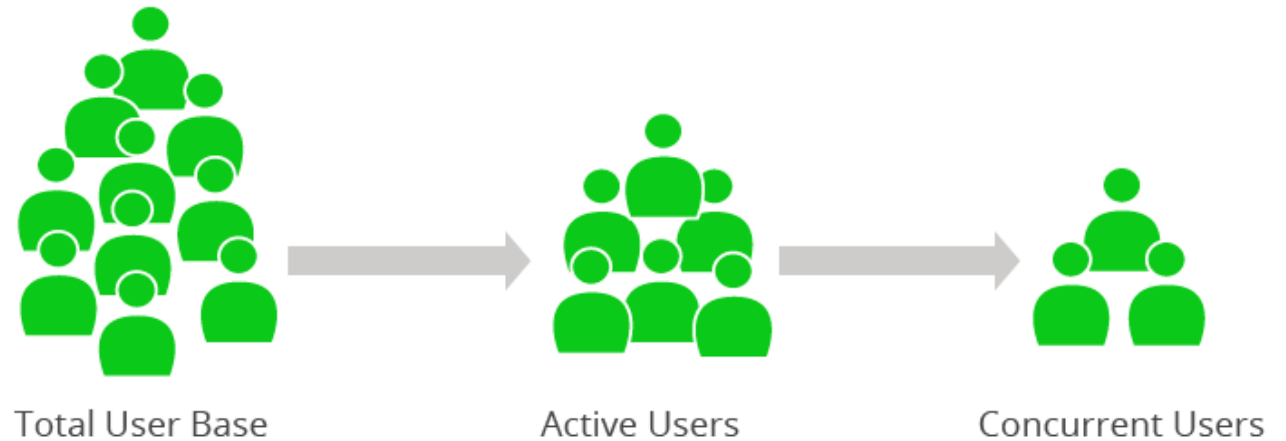
Route requests to servers based on various rules:

- DQM/CQM reporting
- Named users/PVU-based servers
- Report/batch servers



# Concurrent users

- 100:10:1 rule
  - 100 named users
  - 10 active users
  - 1 concurrent user
- 
- 4000 named users = 40 concurrent users



# Tuning the dispatchers

- Affinity + service + peak/non-peak
- Report vs. batch

Number of high affinity connections for the report service during peak period

2

Number of low affinity connections for the report service during peak period

8

Maximum number of processes for the report service during peak period

2

## Be aware:

- Each connection is multiplied by the number of processes
  - 16 low affinity ( $8 \times 2$ )
  - 4 high affinity ( $2 \times 2$ )
  - 20 total connections



# Quick demo

# Java heap settings

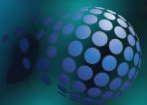
---

- DQM/Query Service only
- Dispatcher settings:
  - Initial JVM heap size for the query service (MB)
    - Default: **1024** Senturus recommendation: **4096**
  - JVM heap size limit for the query service
    - Default: **8192** Senturus recommendation: **16,384**
  - Garbage collection
    - Short pauses, in-frequent occurrences
  - DQM tuning guide: [IBM Cognos Dynamic Query | IBM Redbooks](#)

- **Note:** Dynamic cubes require different sizing  
[IBM Cognos Dynamic Cubes](#)



# Quick tips

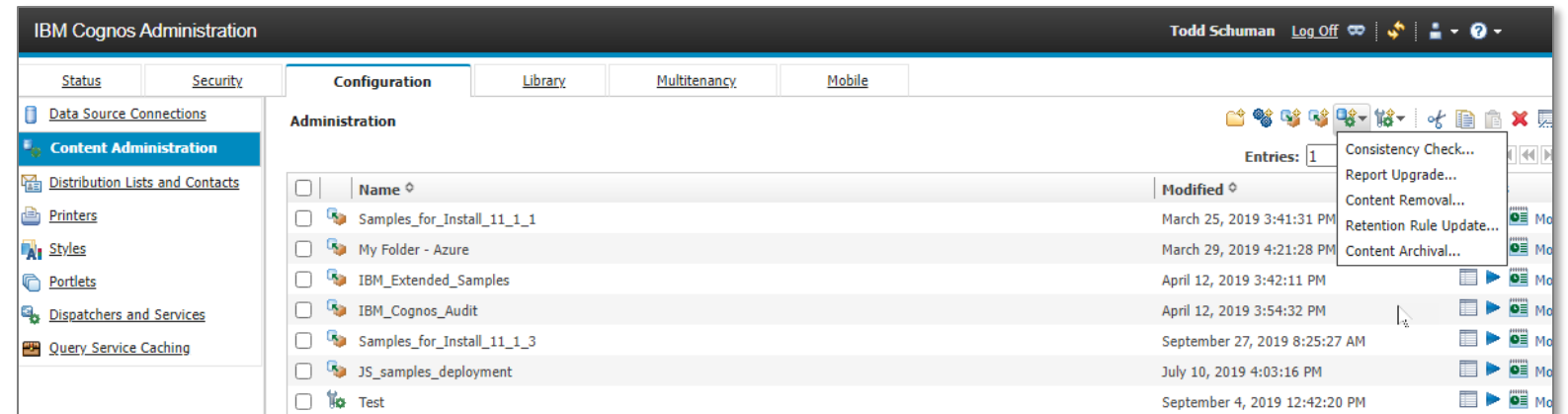


# Clean up your Content Store DB

- Consistency check
- Content removal
- Notification database



- Retention rules
- Migration Assistant





# Notification Database

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- Separate database for notification in situations where you run large volumes of batch reports and email
- Can reduce size of content store
- Can reduce # of connections to content store

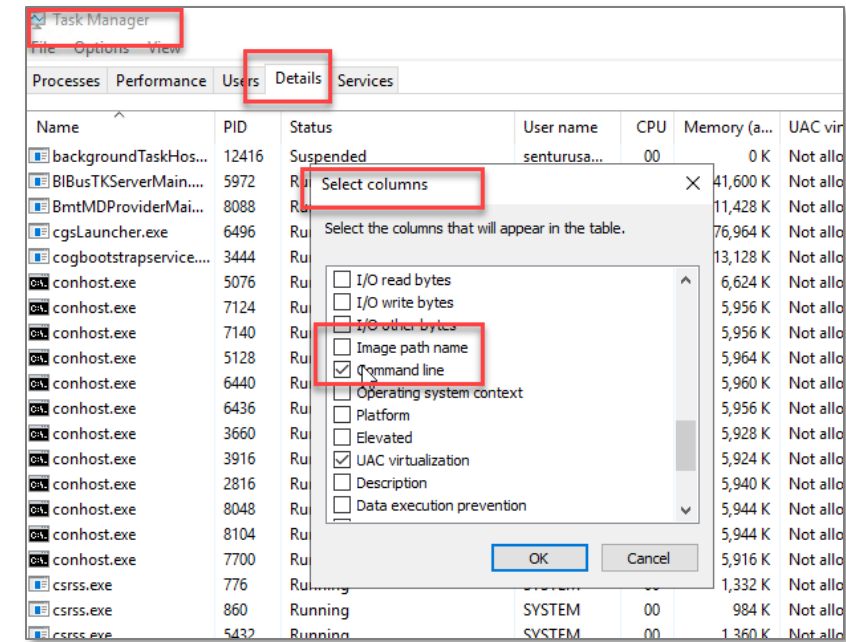
# Task Manager

- Task Manager → Show Columns
- Image Path/Command

+

○

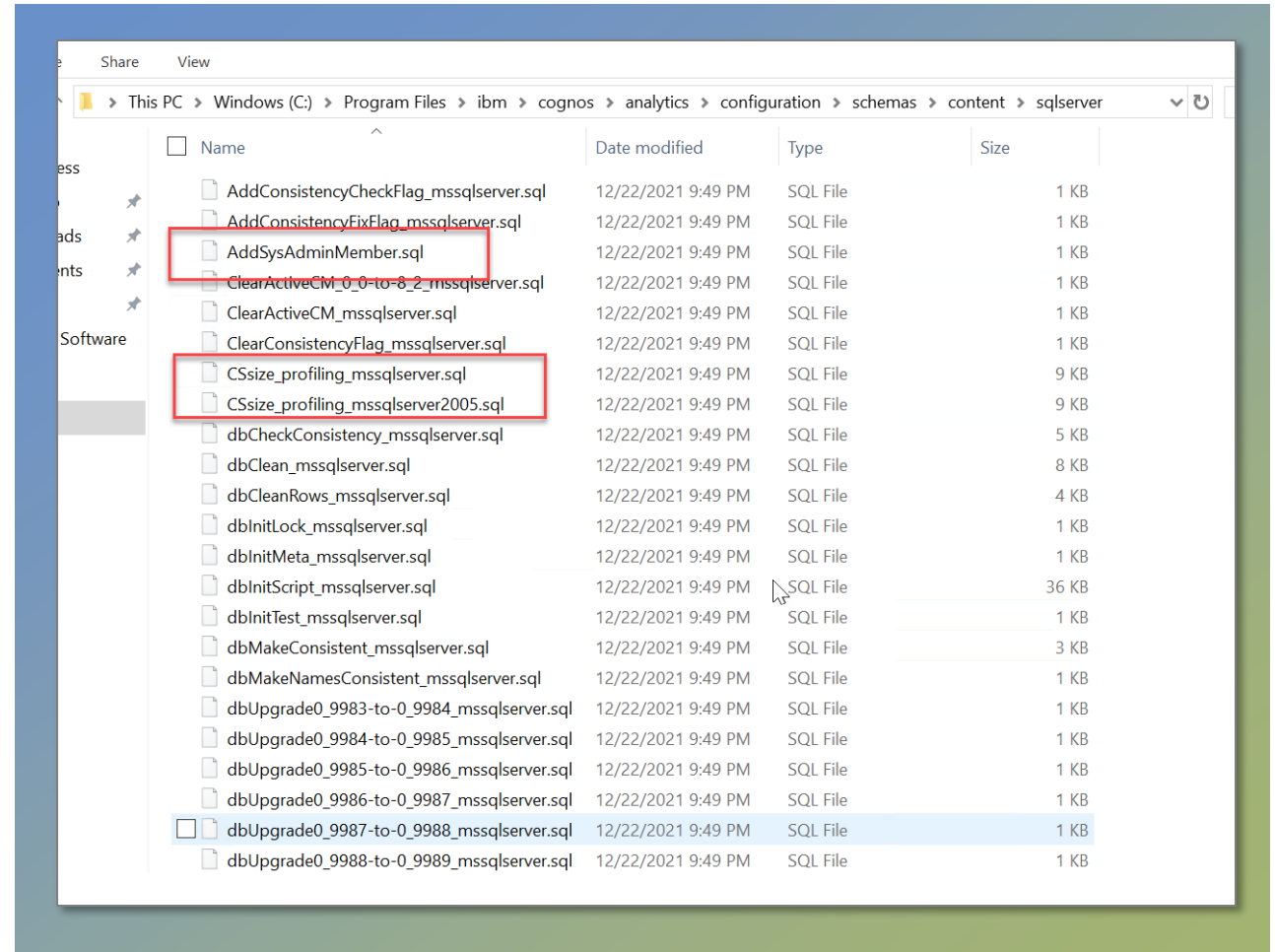
●



bmtmdpvidermai...	8088	Running	SYSTEM	00	11,428 K	C:\Program Files\ibm\cognos\analytics\bin\bmtmdpvidermain.exe -threads=10 -commiss=raise -COG_ROOT=C:\Program Files\ibm\cognos\analytics -ibmtimecimsec=900
cgsLauncher.exe	6496	Running	SYSTEM	00	176,964 K	"C:\Program Files\ibm\cognos\analytics\bin64\cgsLauncher.exe" -option "COG_ROOT=C:\Program Files\ibm\cognos\analytics" idleTimeLimitSec=900 -vmargs Xmx1g DuseNonAsync Xscmx100m Xshareclasses:cachedir=../javasharedresources,name=...
cogbootstrapse...	3444	Running	SYSTEM	00	13,128 K	"C:\Program Files\ibm\cognos\analytics\bin64\cogbootstrapse...
java.exe	2388	Running	SYSTEM	00	1,131,364 K	"C:\Program Files\ibm\cognos\analytics\bin\java.exe" -Xms1024m -Xmx8192m -Xmx4096m -Xmx512m -server -Xscmx100m -Xshareclasses:cachedir=../javasharedresources,name=cognos10%u,nonfatal -Xms512K -XX:+HeapManagemen...
java.exe	8040	Running	SYSTEM	00	509,696 K	"C:\Program Files\ibm\cognos\analytics\bin\java.exe" -Xms1024m -Xmx8192m -XX:MaxDirectMemorySize=512m -verbose:gc -Xverbosegclog:C:\Program Files\ibm\cognos\analytics\logs\XQE\flint_verbosegc_%Y%M%d.%H%M%S.%pid.l...
node.exe	7092	Running	SYSTEM	00	35,356 K	"C:\Program Files\ibm\cognos\analytics\wlp\...\node-services\node\node" js/index.js
node.exe	7156	Running	SYSTEM	00	36,584 K	"C:\Program Files\ibm\cognos\analytics\wlp\...\node-services\node\node" js/server.js
node.exe	7100	Running	SYSTEM	00	41,416 K	"C:\Program Files\ibm\cognos\analytics\wlp\...\node-services\node\node" server.js
node.exe	7132	Running	SYSTEM	00	36,232 K	"C:\Program Files\ibm\cognos\analytics\wlp\...\node-services\node\node" src/server.js
node.exe	6388	Running	SYSTEM	00	45,792 K	"C:\Program Files\ibm\cognos\analytics\wlp\...\node-services\node\node" src/server.js
ServerManager.exe	11872	Running	senturusa...	00	22,032 K	"C:\Windows\system32\ServerManager.exe"
Taskmgr.exe	4880	Running	senturusa...	00	17,016 K	"C:\Windows\system32\taskmgr.exe" /4
SearchUI.exe	11972	Suspended	senturusa...	00	0 K	"C:\Windows\SystemApps\Microsoft.Windows.Cortana_cw5n1h2bxyew\SearchUI.exe" -ServerName:CortanaUI.AppXa50d9qa5gqv4a428c9y1jw7m3btvepj.mca
ShellExperienceHost...	11844	Suspended	senturusa...	00	0 K	"C:\Windows\SystemApps\ShellExperienceHost_cw5n1h2bxyew\ShellExperienceHost.exe" -ServerName:App.AppXtk181tbxbce2qsex02s8tw7hfxa9xb3t.mca
WaSecAgentProv.exe	8692	Running	SYSTEM	00	1,728 K	"C:\WindowsAzure\SecAgent\WaSecAgentProv.exe" -startPoll C:\WindowsAzure\Logs\ 168.63.129.16 5248000 900000 21600000
ctfmon.exe	9112	Running	senturusa...	00	2,980 K	"ctfmon.exe"
dwm.exe	1312	Running	DWM-1	00	14,120 K	"dwm.exe"
dwm.exe	8280	Running	DWM-2	00	11,440 K	"dwm.exe"
fontdrvhost.exe	1044	Running	UMFD-0	00	1,172 K	"fontdrvhost.exe"
fontdrvhost.exe	1052	Running	UMFD-1	00	1,116 K	"fontdrvhost.exe"
fontdrvhost.exe	5516	Running	UMFD-2	00	1,312 K	"fontdrvhost.exe"
LogonUI.exe	1248	Running	SYSTEM	00	8,636 K	LogonUI.exe /hags:0x2 /state:0xa3bd2055 /state:0x41c04e0d
java.exe	5092	Running	SYSTEM	00	7,357,236 K	..ibm-jre\jre\bin\java.exe -Xcompressedrefs -Djava.net.preferIPv4Stack=true -Xmx8192m -Xms4096m -Xgcpolicy:gencon -Xdump:heap+system:none -Xdumps:system:events=gpf+abort,range=1..2,request=serial+compact+prewalk -Xdumps:system:rev...
conhost.exe	5076	Running	SYSTEM	00	6,624 K	??C:\Windows\system32\conhost.exe 0x4
conhost.exe	7124	Running	SYSTEM	00	5,956 K	??C:\Windows\system32\conhost.exe 0x4

# Cognos SQL scripts

- Cognos installation directory
- Specific to database
- Size profiling
  - Object counts
  - Saved output counts by size
- AddSysAdminMember



Name	Date modified	Type	Size
AddConsistencyCheckFlag_mssqlserver.sql	12/22/2021 9:49 PM	SQL File	1 KB
AddConsistencyFixFlag_mssqlserver.sql	12/22/2021 9:49 PM	SQL File	1 KB
AddSysAdminMember.sql	12/22/2021 9:49 PM	SQL File	1 KB
ClearActiveCM_0_0-to-8_2_mssqlserver.sql	12/22/2021 9:49 PM	SQL File	1 KB
ClearActiveCM_mssqlserver.sql	12/22/2021 9:49 PM	SQL File	1 KB
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# Get help improving performance

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Mentor



Assess



Train

# Additional resources

## Unbiased product reviews



## Technical tips



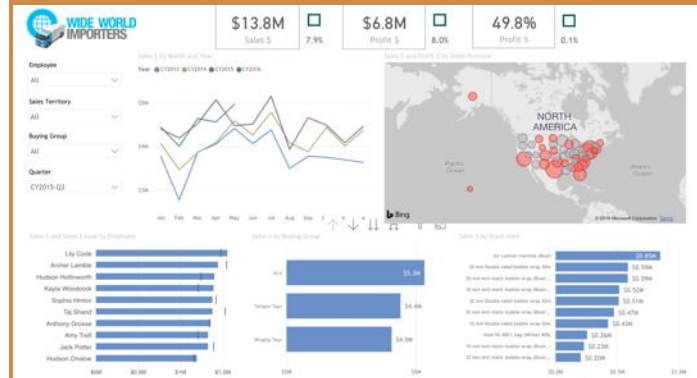
## Insider viewpoints



## More on this subject



## Product demos



## Upcoming events



# Upcoming events

## **Chat with Pat: Building Good Vizzes in Tableau**

Wednesday, May 17, 11am PT/2pm ET

## **Many BI Tools. One Semantic Layer in the Cloud to Rule Them All.**

Thursday, May 18, 11am PT/2pm ET

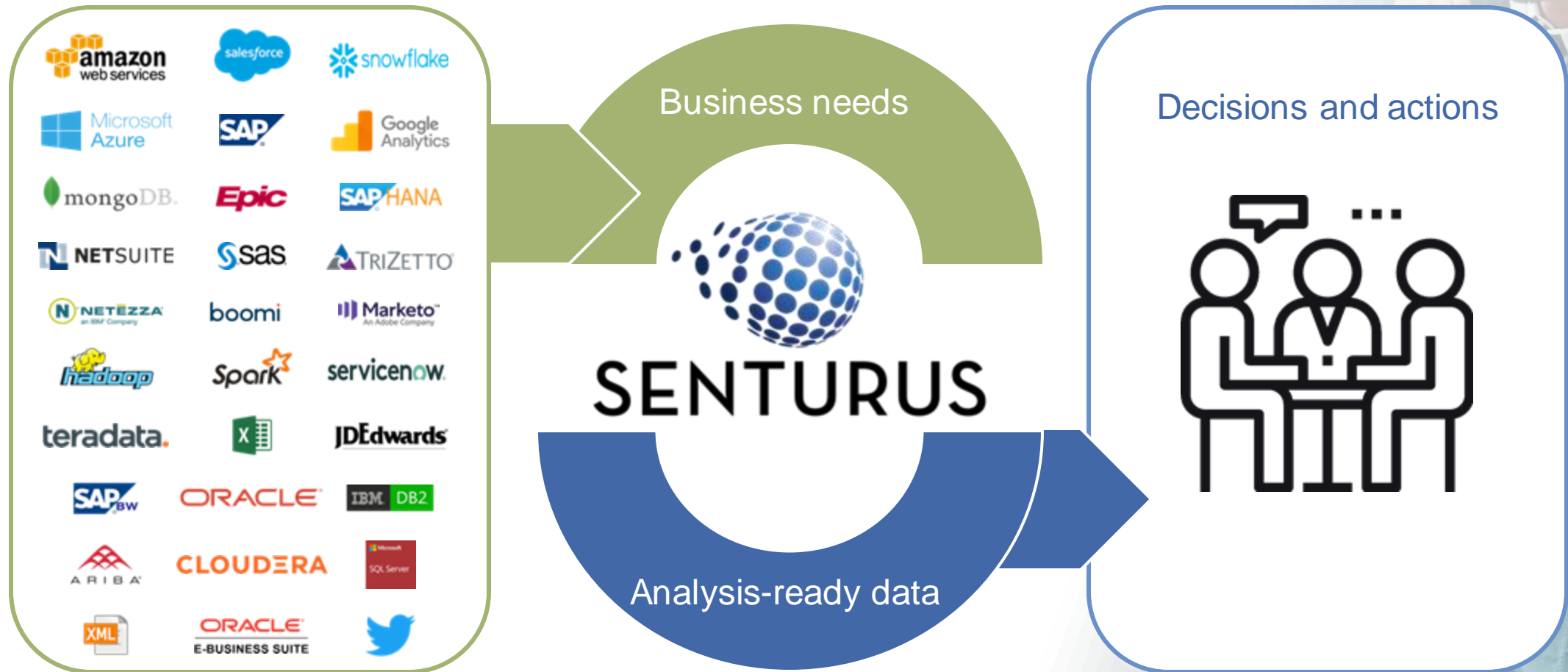
## **Chat with Pat: Building Data Modules in Cognos**

Wednesday, June 21, 11am PT/2pm ET

**Register at [senturus.com/events/](https://senturus.com/events/)**



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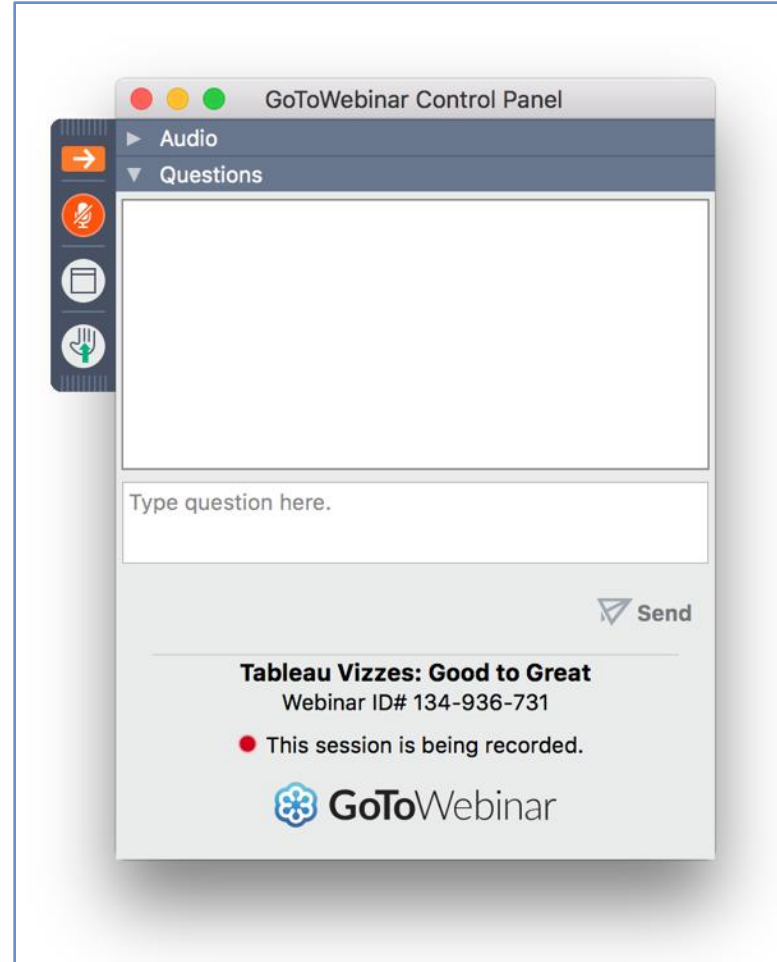
See job descriptions: <https://senturus.com/why-senturus/careers/>  
Send your resume to: [jobs@senturus.com](mailto:jobs@senturus.com)

# Q & A

If your question or issue is broader than what we are able to answer today, contact us at:

[info@senturus.com](mailto:info@senturus.com)

and we will set up a free consultation.



# Thank You



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