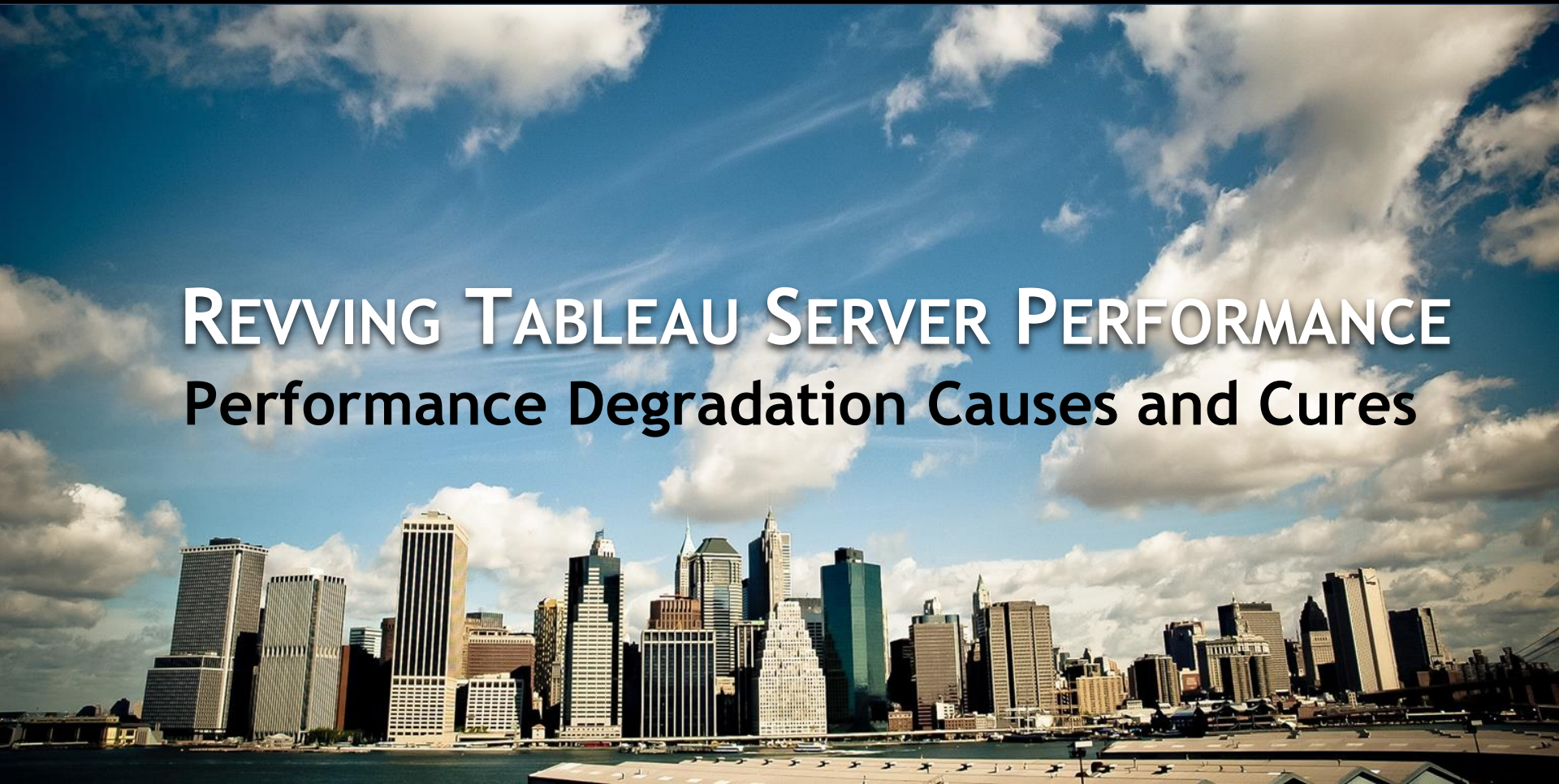




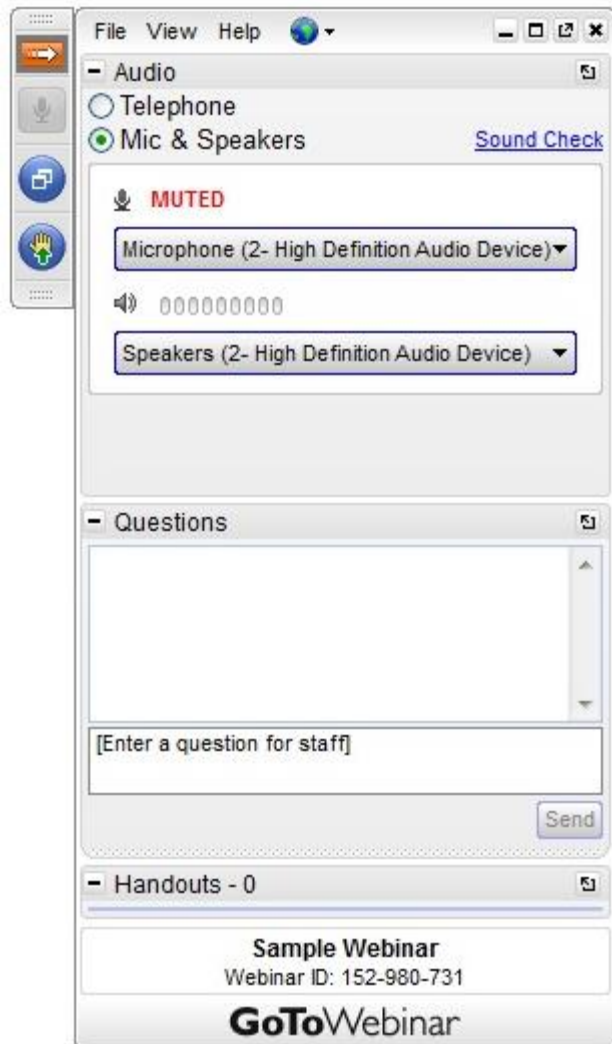
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REVving TABLEAU SERVER PERFORMANCE

Performance Degradation Causes and Cures



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Presentation Slide Deck

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Tableau × **GO**

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
Date

Title

Type

⬆

⬇

RESOURCE TITLE	TYPE	GO
TAMING THE DATA WILDCAT WITH THE SENTURUS ANALYTICS CONNECTOR Northwestern University Leverages Cognos Data in Tableau Visualizations	 FEATURES	→
USE TABLEAU TO GET TO THE GOLD HIDDEN IN SALESFORCE Secrets to Unearthing Missing Valuable Indicators	 BUSINESS STRATEGY	→
EMBEDDING TABLEAU IN SALESFORCE DASHBOARDS A How-To Primer with Demos	 TIPS & TRICKS	→
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Introducing...Today's Presenters



Todd Schuman

Practice Lead
Installations, Upgrades and
Performance Tuning
Senturus, Inc.



Michael Weinbauer

Practice Area Director/
Product Manager
Senturus, Inc.

Today's Agenda

- Introductions
- Common causes of Tableau server performance loss
- Getting ahead of performance issues
- Scaling up vs. scaling out
- Cloud-based options
- Senturus overview
- Additional resources
- Q & A



COMMON CAUSES OF TABLEAU SERVER PERFORMANCE LOSS

Most Common Issues

- Data extract refresh schedules
- Undersized hardware/concurrent users
- Row level security
- Poor workbook/dashboard design

Background Tasks

Tooltip on a task for details.

Status
Error
Success

Task Name	Category	Status	Start Time	End Time
Refresh Extracts	Public	Success	11:4:20	11:4:21
Reap Extracts	None	Success	11:4:21	11:4:22
Refresh Extracts	Default	Success	11:4:22	11:4:23
Refresh Extracts	Default	Success	11:4:23	11:4:24
Refresh Extracts	Default	Success	11:4:24	11:4:25
Refresh Extracts	Default	Success	11:4:25	11:4:26
Refresh Extracts	Default	Success	11:4:26	11:4:27
Refresh Extracts	Default	Success	11:4:27	11:4:28
Refresh Extracts	Default	Success	11:4:28	11:4:29
Refresh Extracts	Default	Success	11:4:29	11:4:30
Refresh Extracts	Default	Success	11:4:30	11:4:31
Refresh Extracts	Default	Success	11:4:31	11:4:32
Refresh Extracts	Default	Success	11:4:32	11:4:33
Refresh Extracts	Default	Success	11:4:33	11:4:34
Refresh Extracts	Default	Success	11:4:34	11:4:35
Refresh Extracts	Default	Success	11:4:35	11:4:36
Refresh Extracts	Default	Success	11:4:36	11:4:37
Refresh Extracts	Default	Success	11:4:37	11:4:38
Refresh Extracts	Default	Success	11:4:38	11:4:39
Refresh Extracts	Default	Success	11:4:39	11:4:40
Refresh Extracts	Default	Success	11:4:40	11:4:41
Refresh Extracts	Default	Success	11:4:41	11:4:42
Refresh Extracts	Default	Success	11:4:42	11:4:43
Refresh Extracts	Default	Success	11:4:43	11:4:44
Refresh Extracts	Default	Success	11:4:44	11:4:45
Refresh Extracts	Default	Success	11:4:45	11:4:46
Refresh Extracts	Default	Success	11:4:46	11:4:47
Refresh Extracts	Default	Success	11:4:47	11:4:48
Refresh Extracts	Default	Success	11:4:48	11:4:49
Refresh Extracts	Default	Success	11:4:49	11:4:50
Refresh Extracts	Default	Success	11:4:50	11:4:51
Refresh Extracts	Default	Success	11:4:51	11:4:52
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Refresh Extracts	Default	Success	11:4:53	11:4:54
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Refresh Extracts	Default	Success	11:4:55	11:4:56
Refresh Extracts	Default	Success	11:4:56	11:4:57
Refresh Extracts	Default	Success	11:4:57	11:4:58
Refresh Extracts	Default	Success	11:4:58	11:4:59
Refresh Extracts	Default	Success	11:4:59	11:5:00
Refresh Extracts	Default	Success	11:5:00	11:5:01
Refresh Extracts	Default	Success	11:5:01	11:5:02
Refresh Extracts	Default	Success	11:5:02	11:5:03
Refresh Extracts	Default	Success	11:5:03	11:5:04
Refresh Extracts	Default	Success	11:5:04	11:5:05
Refresh Extracts	Default	Success	11:5:05	11:5:06
Refresh Extracts	Default	Success	11:5:06	11:5:07
Refresh Extracts	Default	Success	11:5:07	11:5:08
Refresh Extracts	Default	Success	11:5:08	11:5:09
Refresh Extracts	Default	Success	11:5:09	11:5:10
Refresh Extracts	Default	Success	11:5:10	11:5:11
Refresh Extracts	Default	Success	11:5:11	11:5:12
Refresh Extracts	Default	Success	11:5:12	11:5:13
Refresh Extracts	Default	Success	11:5:13	11:5:14

Start time

Yesterday

Task duration (seconds)

0 7202

Site

(All)

Search by task name

Background ID

☒ (All)

☒ localhost:0

☒ localhost:1

Task status

☒ (All)

☒ Error

☒ In Process

☒ Pending

☒ Success

Task type

☐ (All)

☐ Dataengine Configuration Reaper

☐ Delete Expired Tickets

☐ Delete Old Background Jobs

☒ Increment Extracts

- 



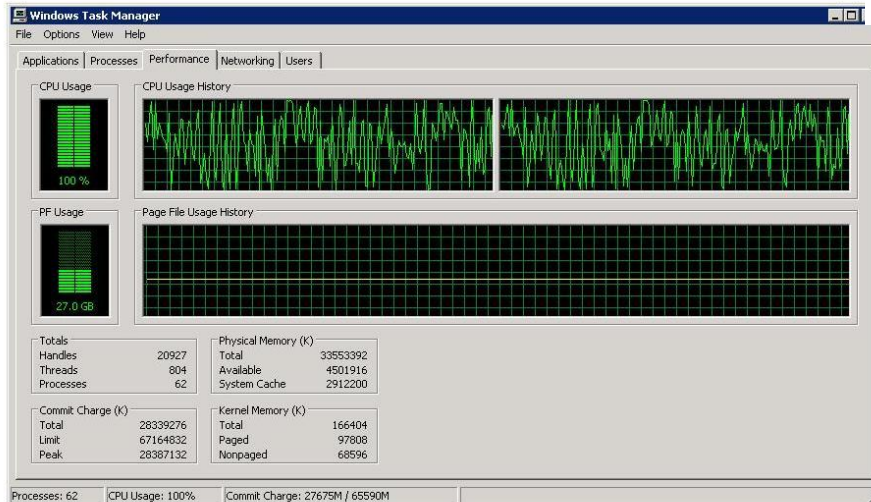
Undersized Hardware/Concurrent Users

On paper, 8 CPU/32GB RAM should support 1000 total users

- Assumes 10% are “active”
- Light workload

Workload Type	Average Load Time	Range of Named Users	Cores
Light	1.5 - 4 seconds	Up to 1120	8
Moderate	4 - 10 seconds	Up to 800	8
Heavy	10 - 20 seconds	Up to 500	8

Figure 8: Scalability of an 8-core Tableau Server based on workload type



Row Level Security in Extracts

Product B: Region	State or Pi City	Postal Coc Order Dat
0.36 Central	Illinois Addison	60101 5/28/2012



Manager	Region
Matt	Central
Bryant	Central
Nena	Central
Nelson	Central



Manager	Region	Product B: Region	State or Pi City	Postal Coc Order Dat
Matt	Central	0.36 Central	Illinois Addison	60101 5/28/2012
Bryant	Central	0.36 Central	Illinois Addison	60101 5/28/2012
Nena	Central	0.36 Central	Illinois Addison	60101 5/28/2012
Nelson	Central	0.36 Central	Illinois Addison	60101 5/28/2012

Row Level Security in Extracts

- Live vs. extracts
 - Live can apply security for each SQL execution
 - Extract needs to store specific rows for each user/group
- One-to-one
 - [Column]=USERNAME()
 - Will create a row for each user
 - 1M rows, 1K users = 1B row extract
- One-to-group
 - IF ISMEMBEROF("GROUP") THEN [Column]="Value"
 - Can help reduce users to multi-user groups
 - 1M rows, 20 groups, 20M row extract

Poor Dashboard Design

- Slow dashboards in Desktop will not run faster on Server
- Usual suspects
 - Custom SQL
 - Too many details/marks
 - Too many quick filters
 - Complex calculations
 - Excel/CSV files as data sources
 - Operational databases
 - LOD calculations










GETTING AHEAD OF PERFORMANCE ISSUES

Restrict Schedules

Don't allow peak hour scheduling

Schedules 5					
+ New Schedule		▼ 0 items selected			
↑ Name			Frequency	Task type	
<input type="checkbox"/>	 End of the month	...	Monthly	Extract Re	
<input type="checkbox"/>	 Monday morning	...	Weekly	Subscripti	
<input type="checkbox"/>	 Saturday night	...	Weekly	Extract Re	
<input type="checkbox"/>	 Weekday early mornings	...	Weekly	Extract Re	
<input type="checkbox"/>	 Weekday mornings	...	Weekly	Subscripti	

Clean Up Extracts

- Hide unused columns
 - Expose only what is needed
- Remove lower level detail if only focused on aggregates
 - If you only report on monthly data, you don't need to store daily row level detail
- Filter
 - If you only need one year of data, filter out the historical data

Clean Up Extracts

Massive reduction in rows and size

+ a b l e a u Content Users Groups Schedules Tasks Status Settings 🔍									
Projects 10 Workbooks 16 Views 40 Data Sources 7									
▼ 0 selected									
View Data Sources Sort by									
Name	Workbooks	Connects to	Project	Owner	Live / Last extract				
❏ Demo SKP	6	Sample - Superstore.xls	Default	admin	LIVE				
❏ 215MHideUnusedCols	0	Euronext 200M.xls	Large TDE file demo	admin	EXTRACT Mar 26, 2016, 11:00 PM				
❏ Demo 215M Extract	0	Euronext 215M.xls	Large TDE file demo	admin	EXTRACT Jul 20, 2016, 6:02 AM				
❏ Demo SKP	0	Superstore Sales Training.xls	Data Sources - Prod	admin	LIVE				
❏ Orders (Sample - Superstore)	0	Sample - Superstore.xls	Default	admin	LIVE				
❏ Orders (Superstore Sales Training)	0	Superstore Sales Training.xls	Default	admin	EXTRACT Jul 25, 2016, 5:25 PM				
❏ SA_Demo April 25	0	Global Superstore.xls	Sales	admin	LIVE				

Same Results!

Demo 215M Extract Save As Revert Done									
Data Analytics Pages Columns (YEAR(trade_date)) Rows (trading_place)									
Sheet 1									
trading_place	2010	2011	Grand Total						
Amsterdam	814,762,060	323,163,064	1,137,915,124						
Brussels	273,625,842	117,677,346	391,303,187						
Lisbon	27,845,359	9,341,524	37,186,883						
Paris	4,341,436,665	1,624,545,550	5,965,982,215						
Grand Total	5,457,659,926	2,074,727,484	7,532,387,410						

215MHideUnusedCols Save As Revert Done									
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Grand Total	5,457,659,926	2,074,727,484	7,532,387,410						

Data Stewards

- Restrict non-stewards from scheduling extract refreshes
- Data steward ensure extracts are only refreshed when needed
- Duplicates are removed
- New extracts are validated



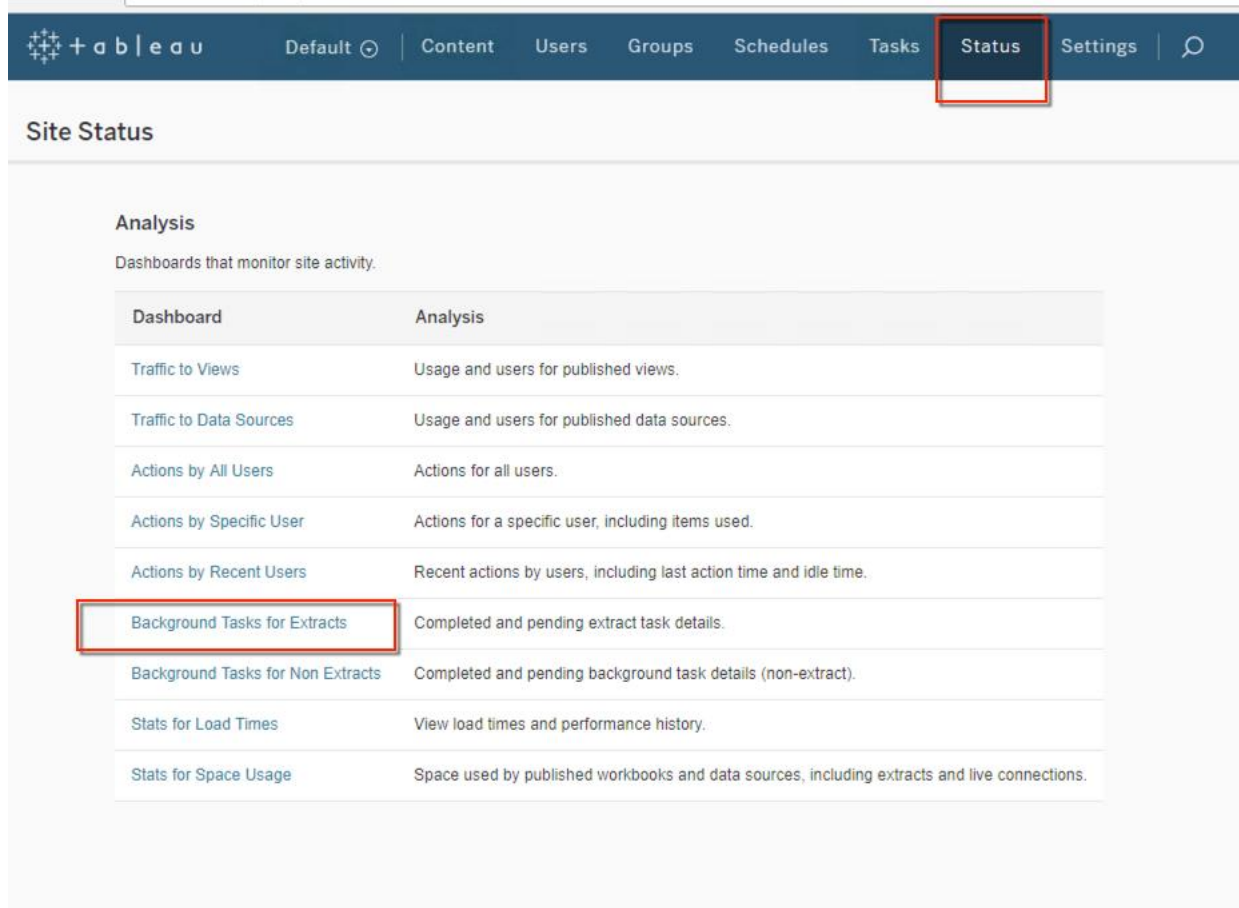
Row Level Security

- CONTAINS()
 - High performing without duplicates
 - Requires creating custom comma delimited fields
 - Note: issues with HYPER in 10.5 and 2018.1.0
- Display name
 - Fast performance
 - Users can edit
 - Ugly for users

User name	Display name
user1	advertiser '19707','20307'
user2	campaign '66013'
user3	subnetwork '3','27','59'

Tableau Admin Tools

Out of the box reports



The screenshot shows the Tableau Admin interface. The top navigation bar includes the Tableau logo, a 'Default' dropdown, and links for 'Content', 'Users', 'Groups', 'Schedules', 'Tasks', 'Status', 'Settings', and a search icon. The 'Status' link is highlighted with a red box. Below the navigation bar, the 'Site Status' section is visible. Under the 'Analysis' heading, there is a table of dashboards that monitor site activity. The 'Background Tasks for Extracts' row is highlighted with a red box.

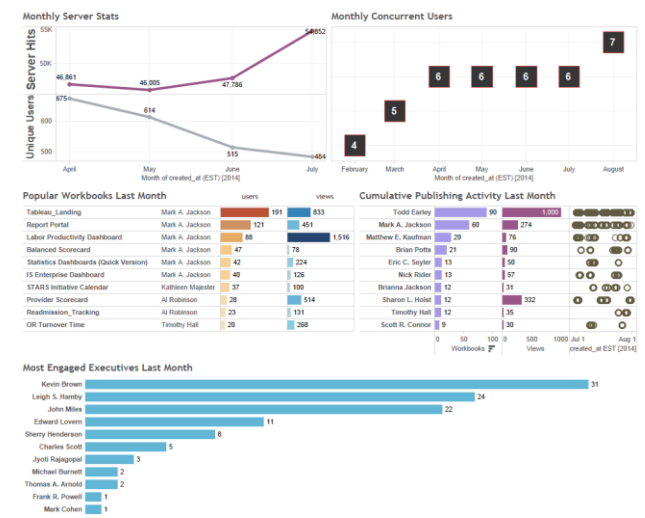
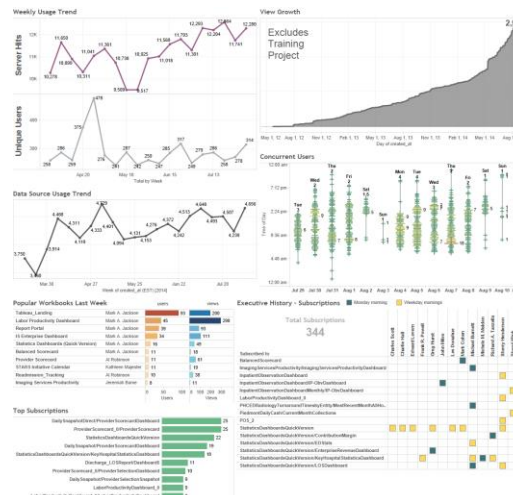
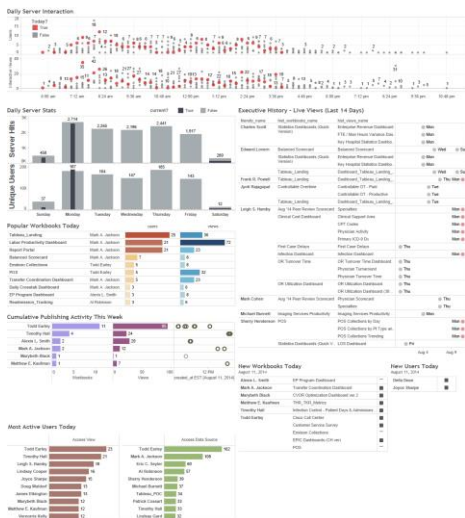
Site Status

Analysis
Dashboards that monitor site activity.

Dashboard	Analysis
Traffic to Views	Usage and users for published views.
Traffic to Data Sources	Usage and users for published data sources.
Actions by All Users	Actions for all users.
Actions by Specific User	Actions for a specific user, including items used.
Actions by Recent Users	Recent actions by users, including last action time and idle time.
Background Tasks for Extracts	Completed and pending extract task details.
Background Tasks for Non Extracts	Completed and pending background task details (non-extract).
Stats for Load Times	View load times and performance history.
Stats for Space Usage	Space used by published workbooks and data sources, including extracts and live connections.

Internal Postgres Tableau Reporting

- Build your own dashboards
- Have it delivered automatically
 - Extract timelines
 - Daily use
 - Weekly use
 - Monthly use





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SCALING UP VS. SCALING OUT

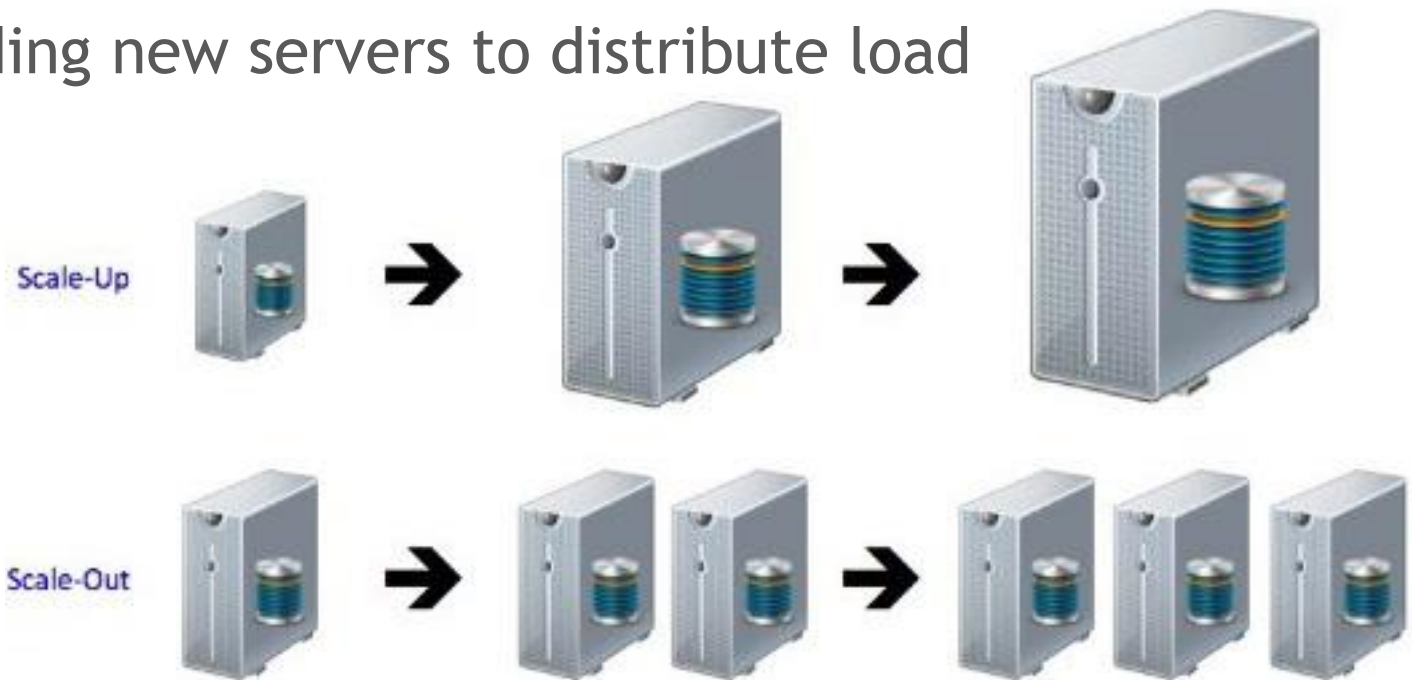
Up vs. Out

Up

- Adding additional hardware/resources to existing servers

Out

- Adding new servers to distribute load



When to Scale Up

- Tableau Server recommended hardware
 - 8 CPU
 - 32GB RAM
 - https://onlinehelp.tableau.com/current/server/en-us/server_hardware_min.htm
- If Less < 8-16 CPU - scale up before out
- If on core-based licensing, make sure you are using what you paid for
 - Single gateway nodes don't count
 - DEV and TEST environments don't count as long as they are \leq prod core count

When to Scale Out

- Single node ≥ 8 CPU
- Need to address failover/high availability (HA)
- Need to dedicate hardware to Tableau processes

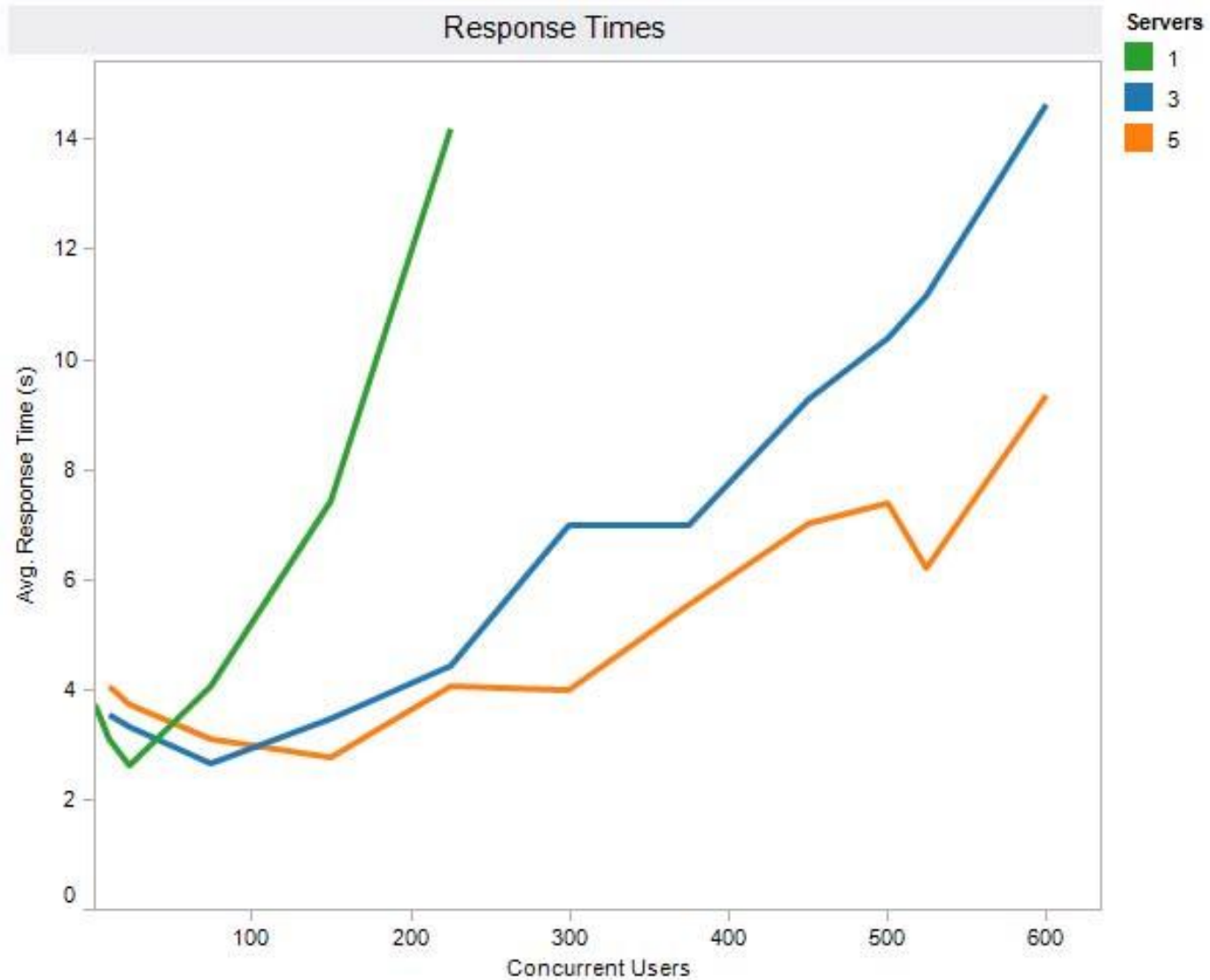
Server Status

Process Status
The real-time status of processes running in Tableau Server.

Process	Primary 10.32.139.21	Worker 1 10.32.139.22	Worker 2 10.32.139.30
Cluster Controller	✓	✓	✓
Gateway	✓	✓	✓
Application Server	✓	✓	
API Server	✓	✓	
VizQL Server	✓✓	✓✓	
Cache Server	✓✓	✓✓	✓✓
Search & Browse	✓	✓	
Backgrounder			✓✓✓✓
Data Server	✓✓	✓✓	
Data Engine	✓	✓	
File Store	✓	✓	
Repository	✓	✓	

Refresh Status ✓ Active ⌂ Busy ✗ Passive ⚠ Unlicensed ✖ Down □ Status unavailable

Response Times Scaling Out



Response Times Scaling Out

Total Users Scales Linearly With Tableau Serve 10

Your results may vary. Model assumes 10% of total users are active amongst other variables

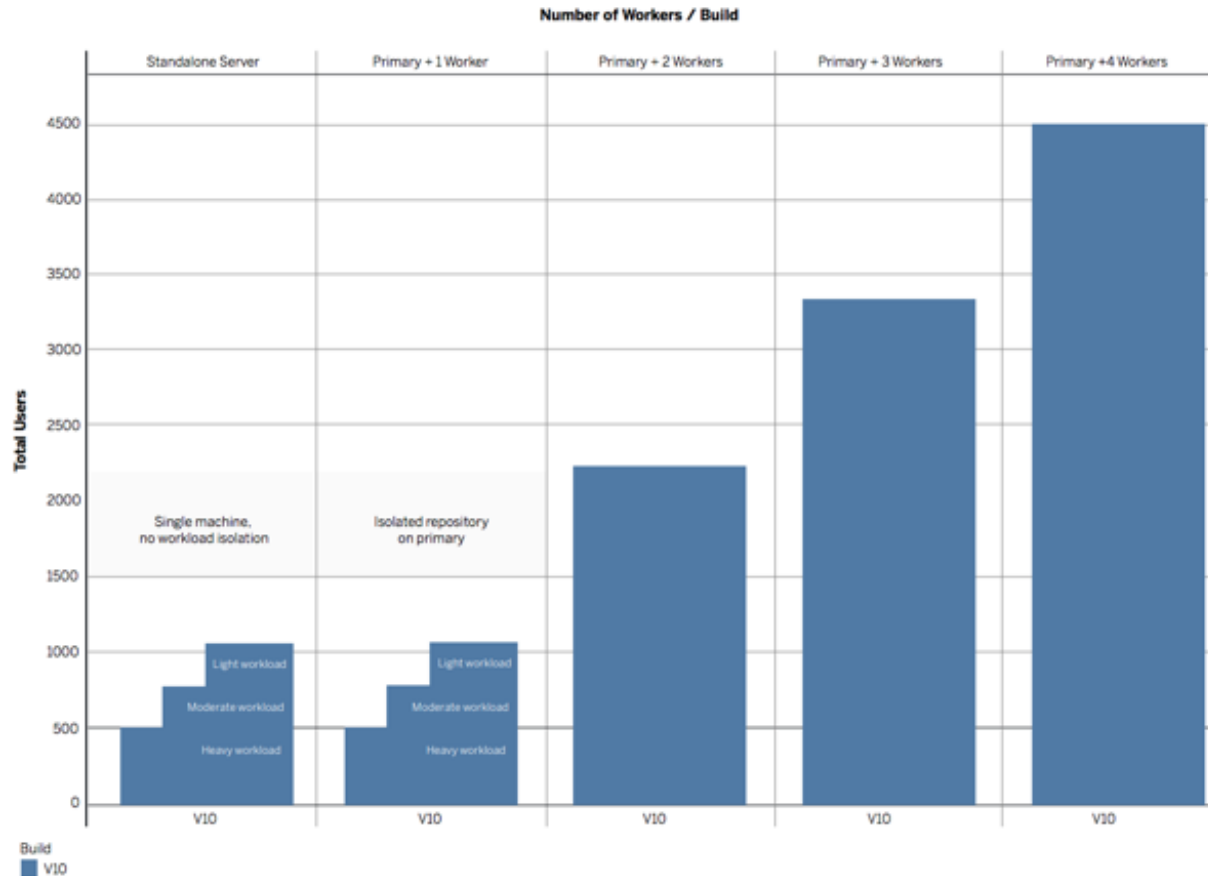


Figure 9: Tableau Server scalability (total users) scales linearly with more workers.

Comparisons

Scaling up

- Lower cost
- Less maintenance
- Simple configuration

Scaling out

- Additional cost for servers and licenses
- Distribute load
- Dedicated workers
- Failover/high availability



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CLOUD-BASED OPTIONS

Cloud Options

Tableau Online

- Now runs on AWS
- Turnkey
- Auto upgrade
- No access to file system
- Limited on-prem access
- 100 GB limit



DIY cloud

- AWS, Azure, Google
- Maintain updates and software
- Full feature set
- Need to setup network access to on-prem data and authentication



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ADDITIONAL RESOURCES

Tableau Server Optimization Assessment

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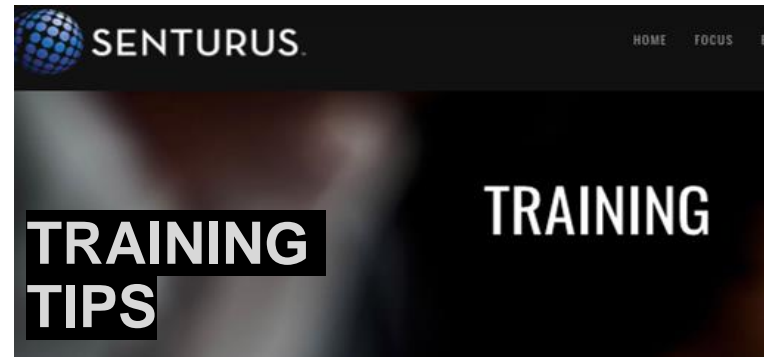
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A DEEP-DIVE INTO THE TABLEAU DASHBOARD STARTERS
FOR SALESFORCE

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TABLEAU	10	DESKTOP	INTERMEDIATE DATA VISUALIZATION AND DASHBOARDING	JUN 19	→
TABLEAU	10	DESKTOP	ADVANCED DATA VISUALIZATION AND DASHBOARDING	JUN 20 - JUN 21	→
IBM COGNOS	10.2	REPORT STUDIO	BEGINNING AND INTERMEDIATE AUTHORIZING	JUN 26 - JUN 27	→

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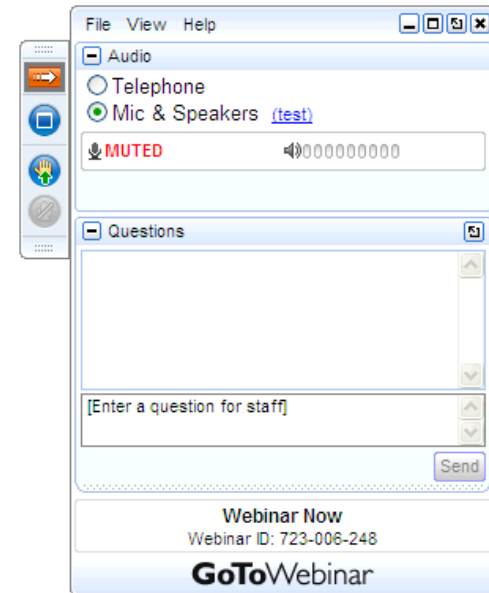
- COURSE SCHEDULE**
- FLEXIBLE LEARNING
- CHOOSING A COGNOS CLASS
- CHOOSING A TABLEAU CLASS
- LOGISTICS AND FAQ

ADDITIONAL HELP

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Q&A

If your business analytics question or issue is broader than what can be answered today, contact us at info@senturus.com for a free consultation.



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