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Performance Tuning 201: Troubleshooting & Optimizing ServiceNow

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Diagnostics Overview

Scheduled/Background Jobs

Investigating Slow SQL Statements

Quotas & Home Page Optimization

Text Indexing & Event Queue Monitoring

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Diagnostics Overview

General Instance Status

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Diagnostics Overview

/stats.do

- General application node statistics
- Not holistic - shows per app node data
- Quick and easy way to check for:
  - Semaphore availability
  - Active, long-running user and background transactions
  - Memory
  - Response Time Averages
  - Instance up

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Diagnostics Overview

System Diagnostics -> Diagnostics Page

- Detailed Status
  - Users logged in per app node
  - UP Time
  - Scheduler running & queue length
  - Memory Usage
  - Transactions
  - Errors
  - Garbage collection details
  - Email status (disabled/enabled, sent/received, queue…)

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Diagnostics Overview

/xmlstats.do

- All the statistics available in the system returned in XML format
- Great way to monitor internal processes within the system
- Relies on many SQL statements on the backend – use for monitoring with caution
- Results can be limited via:
  - /xmlstats.do?include=memory,semaphores,servlet,scheduler,database,instance,ha,queues,status

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Diagnostics Overview

ServiceNow Performance Page

- Many graphs that detailed information:
  - Business Rules
  - OS stats CPU/DB/Network/Disk
  - Database inserts/updates/deletes/selects
  - Error Logging Rate
  - Response Time
  - Events Logged
  - Semaphore Usage

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Lab 1 Exercise - Diagnose Current Instance Status

- Utilize /stats.do to investigate current system status
- Check System Diagnostics
- View /xmlstats.do data
- Gain familiarity with the ServiceNow Performance Graphs

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Scheduled Jobs

Background Transactions

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Scheduled Jobs

Overview

- Scheduled Jobs are used for a number of important tasks within the system:
  - Send/Receive Email
  - LDAP
  - Text Search Processing
  - Performance system maintenance tasks (table rotation, table cleaning, GC, etc)
  - Etc.
- There about around ~120 OOB
- Scheduler health is critical
- Default schedules are not always ideal

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Scheduled Jobs

System Logs -> Transactions (Background)

- Great overview of what's running with important details
  - Response Time
  - SQL Count
  - SQL Time
  - Business Rule Count
  - Job URL

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Scheduled Jobs

Schedules

- Understand the most resource intensive jobs
- Ensure the optimal schedule for these jobs
- Deleting or disabling system maintenance jobs can create problems
  - i.e. Clean Temp Files will ensure your disk system doesn't fill up over time

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Scheduled Jobs

Takeaways

- Default schedules may not be ideal
- Table rotation should happen in a low traffic period
- Spread out impacting jobs evenly
- Know what performances poorly

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Lab 2 Exercise – Identifying Impacting Scheduled Jobs

- View Scheduled Jobs
- Search the transaction logs for bad performing jobs
- Disable a scheduled job

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Investigating Slow SQL Statements

Using the Slow Queries Module

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Slow Queries

Why they are important

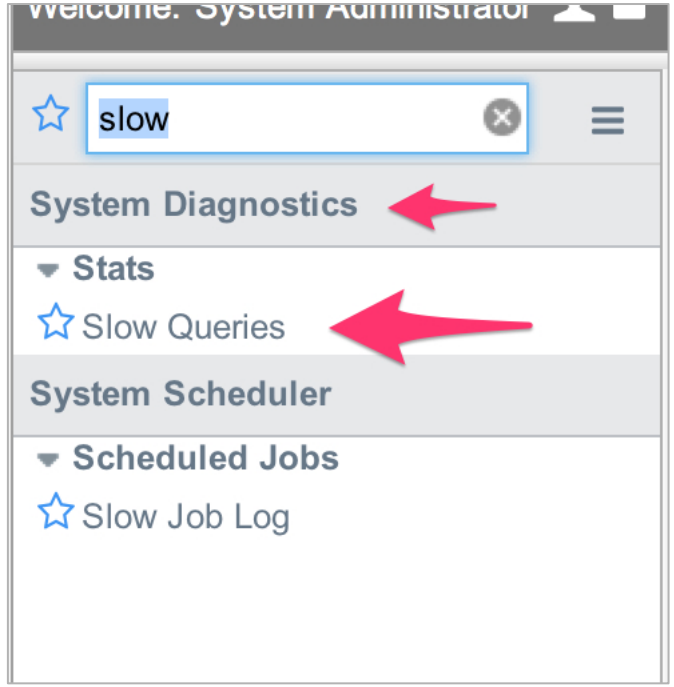
- ServiceNow is a highly customizable application
- No rigid data model – limited guard rails
- Performance problems are almost always database related
- Inefficient SQL can quickly overwhelm even the best hardware available
- Queries that may have performed fine when the database was small or under low concurrency, can have disastrous effects in production

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Slow Queries

System Diagnostics -> Stats -> Slow Queries

- Introduced in Calgary
- Great Database Insight
  - Avg Execution Time
  - Total Execution Time
  - Execution Count
  - First Sighting
  - Updated
  - Example URL & Stack Trace



- Very powerful way to identify what's generating the most load on the DB

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Slow Queries

System Diagnostics -> Stats -> Slow Queries

- How do we fix poorly performing queries?
  - Eliminate
  - Re-work the query if possible
  - Add an index
  - Ask support for help, providing specific details will improve the quality of your response

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Database Growth Optimization

Best practices for high performance

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Database Growth Optimization

Strategies

- Ensure database growth is necessary
  - Less data = faster performance
  - Find any potential data leaks (bugs, integrations…)
- Table Rotation / Cleaning
  - Use whenever possible
  - Rotations are generally preferred to table cleaning
- Avoid Table Extensions
  - Data is partitioned but UNION's will join all data if queried

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Database Growth Optimization

Strategies

- Proper indexing
  - Queries may perform well without proper indexes when data is small and become very problematic as the table grows
- Archiving Module
  - Pulls data into a separate table
  - Helps keep most relevant data in smaller table sizes for better performance

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Lab 3 Exercise – Investing Slow SQL Queries

- Use the Slow Queries module to identify performance impacting statements
- http://wiki.servicenow.com/index.php?title=Logs_and_Queues_Best_Practices#Diagnosing_Problems_With_Slow_SQL_Statements

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Transaction Quotas & Home Page Optimization

Setting Quotas & Home Page Debugging

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Transaction Quotas

System Definition -> Quota Rules

- Ensure poorly performing queries don't overload the system
- High concurrency of "bad" SQL can make the system unusable
- Customizable protection based on your criteria
- 3 Definitions Out of Box
  - Reference Completer – 15 seconds
  - HomePage Widgets – 30 Seconds
  - UI Transactions – 298 Seconds

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Transaction Quotas

System Definition -> Quota Rules

- Homepages are a great use case for quotas
- Homepage Widgets can produce a lot of concurrent SQL
- Users don’t always want/need this data
- By killing the SQL query, we potentially could avoid a bad scenario

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Homepage Optimization

Overview

- Reports and Gauge rendering take up Cycles
- Auto-refresh of homepage * 500+ users….it adds up quickly!
  - Auto-refresh only reloads when the instance is standing on the homepage for longer than this value, otherwise, homepage is re-rendered on every load
- Always ensure that reports and gauges on a homepage perform properly
- Enable caching and aggressive caching if possible

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Homepage Optimization

System Diagnostics -> Session Debug -> Debug Homepage Render

- Enables debugging on the homepage for your session
- Displays render time for each particular widget
- Best way to identify which widgets are performance impacting

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Homepage Optimization

Homepage Admin -> Properties

- Enable homepage render cache
- Increasing render cache time will help performance significantly
- Enable aggressive caching if possible
- Disable automatic homepage refreshing if possible

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Lab 4 Exercise – Quotas & Homepage Debugging

- View Scheduled Jobs
- Search the transaction logs for bad performing jobs
- Disable a scheduled job

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Text Indexing Optimization

Understanding Text Search

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Text Indexing Optimization

Overview

- Text search indexing requires cycles
- Initial indexing/reindexing is very resource intensive (many hours/days)
- Tables are indexed by default
- Text search indexes also take up disk space
- Many keywords occur so frequently that they aren't useful in searches (e.g. incident)
- Auto-stop words tell the text indexer to avoid indexing, saving significant time and disk space
- Fear the reaper (prior to Calgary)

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Text Indexing Optimization

Autostop Words

- Certain keywords are useless in search (the, a, with, I, that, etc.)
- These keywords are referred to as “Text Index Stop Words”
- By default, we include 67 stop words out of the box
- Autostop words are discovered dynamically based on a threshold of occurrence
- By default, this is 250,000 – which is fairly high depending on how many records you have
- This can be adjusted based on your particular needs

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Text Indexing Optimization

Generating Text Indexes

- ServiceNow will initially a generate a full index of a table
- Inserts, updates, and deletes are processing in real time (Calgary+)
- The initial build of the text search indexes can be very resource intensive for large tables and take many hours
- Rebuilding text indexes for the entire application can take days (based on DB size)

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Text Indexing Optimization

Index but do not Query

- Populated autostop words will default to “Index but do not Query”
- This means, they aren’t searchable but the system will still index them
- This increases text index generation and processing time (mainly for very large tables)
- You can change this setting to “Neither Index nor Query” to save disk space and speed up the full regeneration process

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Text Indexing Optimization

Text Indexing Modifications

- Autostop threshold changes & setting

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Lab 5 - Text Indexing Exercise

- Adjust autostop word threshold
- Set indexing to “Neither Index nor Query”
- Disable text indexing on a table

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Event Monitoring

Understanding Event Performance

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Event Monitoring

Overview

- 3 Separate Queues
  - Text_index
  - Metric_update
  - NULL – Everything Else
- Slow events will be apparent based on their processing duration
- Certain events such as text index regeneration will always be slow
- Understand what's backing up in your queue with the Filter "Processed is empty"

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Event Monitoring

Important Notes

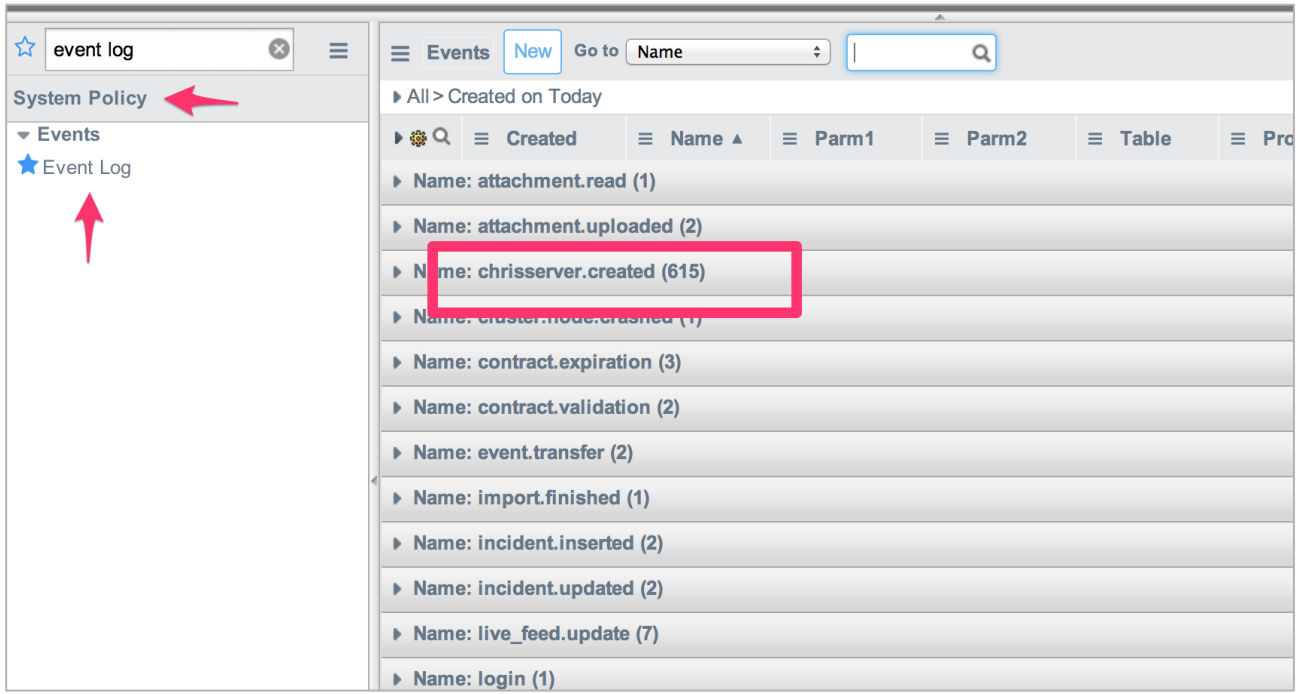
- If the event queue is high, confirm that events are actually being processed at all
- Queue lag issues can quickly become critical
- Contact Support if in doubt
- Query the Events table using the “Created” column. This is a rotated table that will take quite a while to return results without this key index

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Slow Events – Event log

Understanding Performance

- Which events are taking the longest to process (the processing duration is listed in milliseconds).
- Use judgment here – email notification events are quick, so if you see one taking a few seconds, something is wrong.
- Check processed column with is empty filter to determine if there is an issue with the backlog.
- Group by name to see which scripts are firing the most and disable if they are not doing anything.
- Example – showing the above topics.



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Lab 6 – Monitoring the Event Queue

- Review Event performance
- http://wiki.servicenow.com/index.php?title=Logs_and_Queues_Best_Practices#Reviewing_Event_Logs

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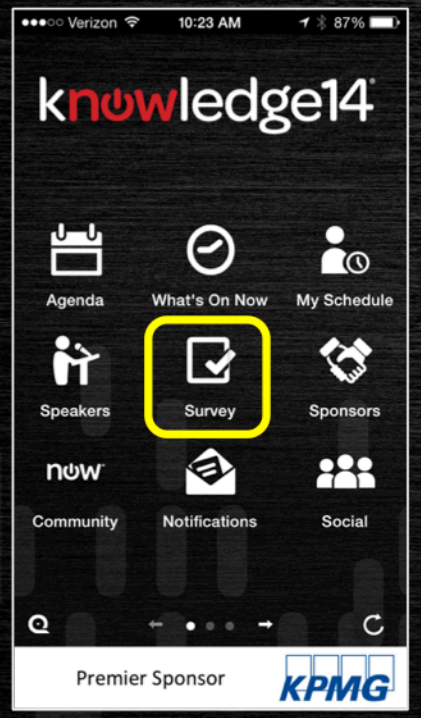
Conclusion

Takeaways

- Understand your system performance
- Know the impact of Background Jobs
- Investigate Slow SQL Statements
- Enable Quotas & ensure efficient homepages
- Understanding text indexing
- Monitor your events

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