

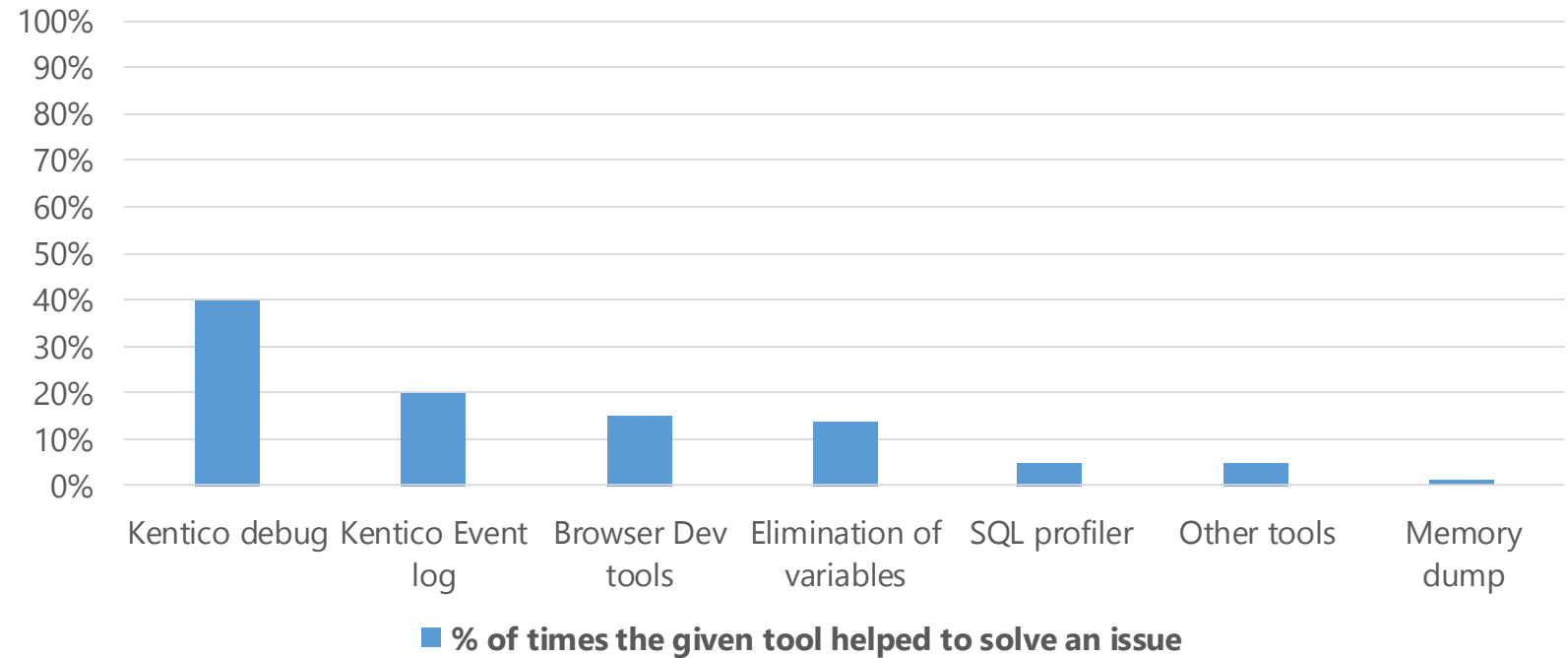
Optimization and Performance

Bryan Soltis
Kentico Technical Evangelist

Why is my site slow?

Pinpointing the issue

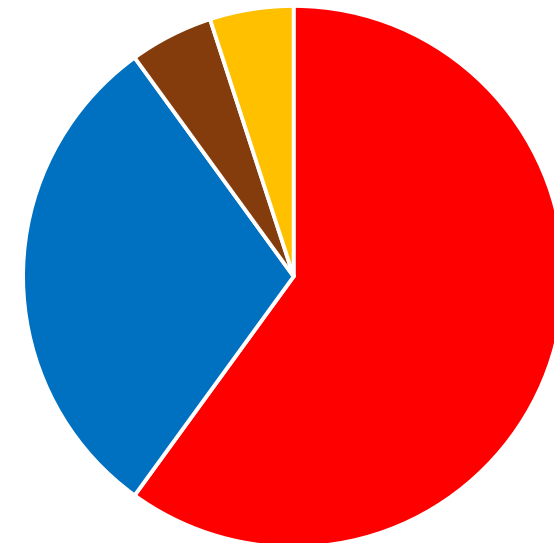
- Kentico Event log
- Kentico debugs
- Elimination of variables
- Windows event log
- Visual Studio debug
- Memory dump
- SQL profiler



Performance issue categories

- **SQL**
 - Too many SQL queries
 - Too much data retrieved from the SQL server
- **Page content**
 - Too many requests on a page
 - Too much data on a page
- **Configuration/Architecture**
 - Too much content in the content tree
 - Too much data in the database
- **Code**
 - Inefficient code

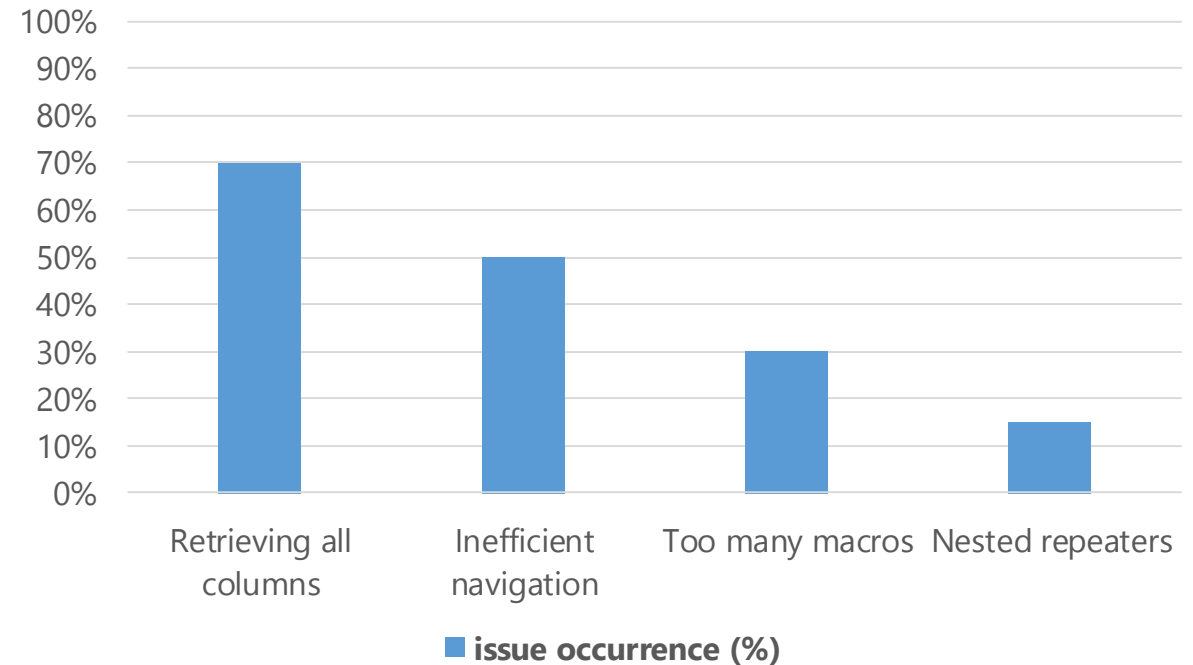
Issue related to



■ SQL ■ Page content ■ Code ■ Configuration

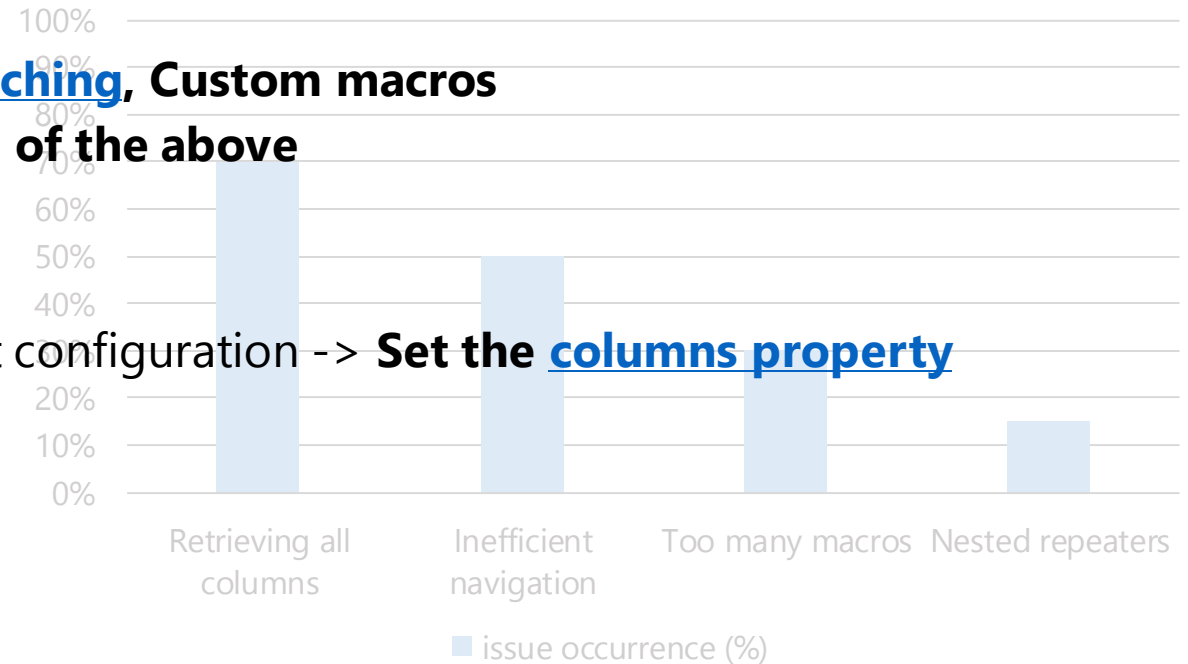
Category: SQL

- Too many SQL queries
 - Nested repeaters
 - Multiple macros in transformations
 - Inefficient mega menu implementation
- Too much data retrieved from the SQL server
 - Retrieving all columns in code or via web part configuration



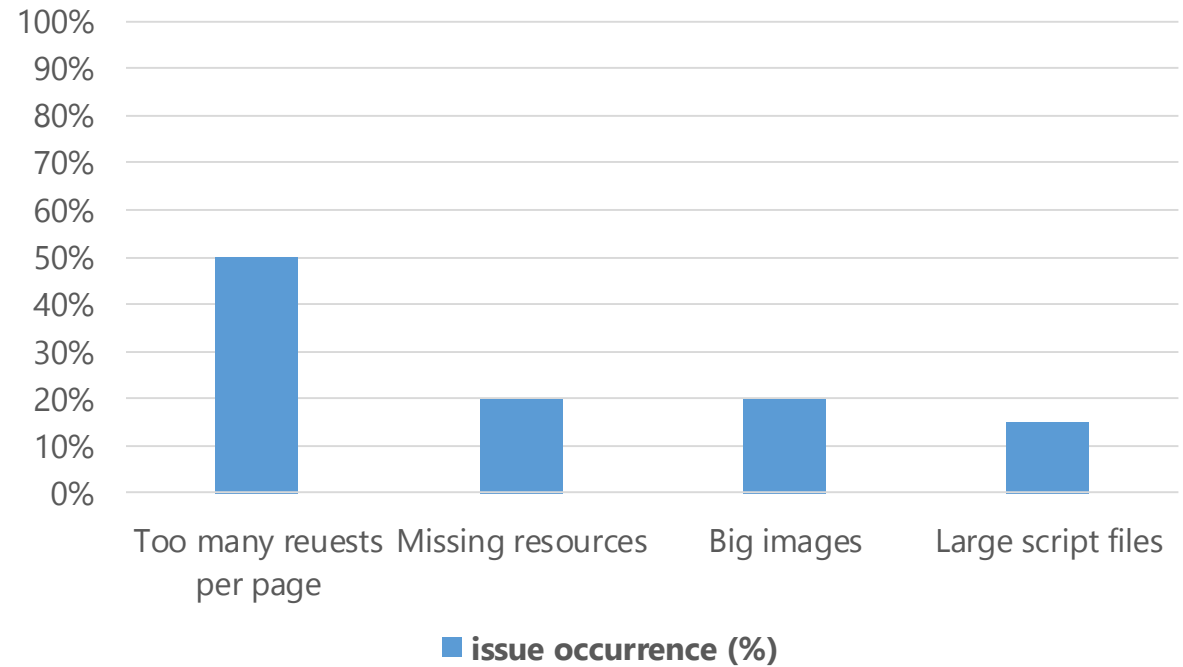
Tips: SQL

- Too many SQL queries
 - Nested repeaters -> [Hierarchical viewers](#)
 - Multiple macros in transformations -> [Use caching, Custom macros](#)
 - Inefficient mega menu implementation -> **All of the above**
- Too much data retrieved from the SQL server
 - Retrieving all columns in code or via web part configuration -> **Set the [columns property](#)**



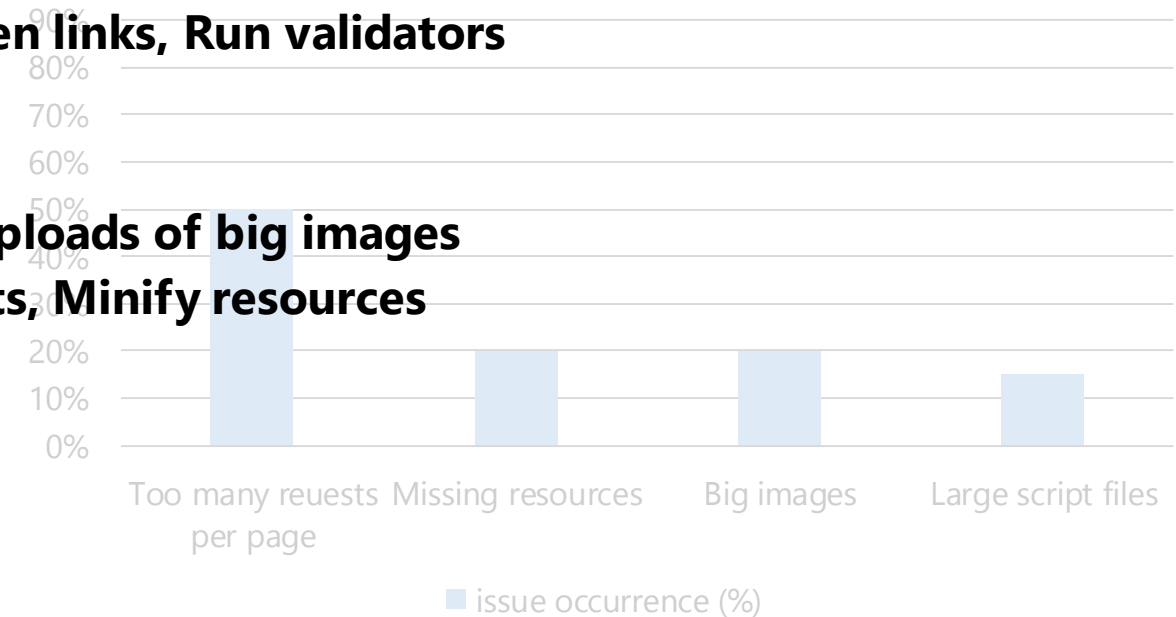
Category: Page content

- Too many requests on a page
 - 150+ requests per page
 - Missing resources (404 errors)
- Too much data on a page
 - Big images
 - Large script files



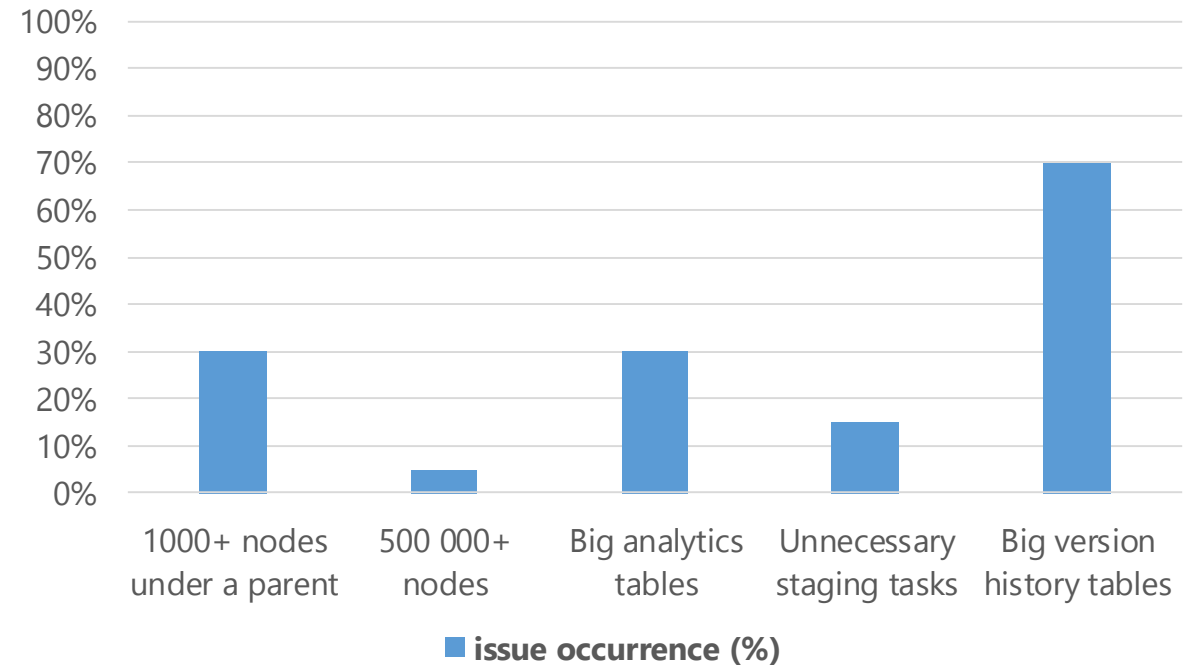
Tips: Page content

- Too many requests on a page
 - 150+ requests per page -> **Combine resources, Host them on different domains**
 - Missing resources (404 errors) -> **Remove broken links, Run validators**
- Too much data on a page
 - Big images -> **Optimize images, Don't allow uploads of big images**
 - Large script files -> **Remove unnecessary scripts, Minify resources**



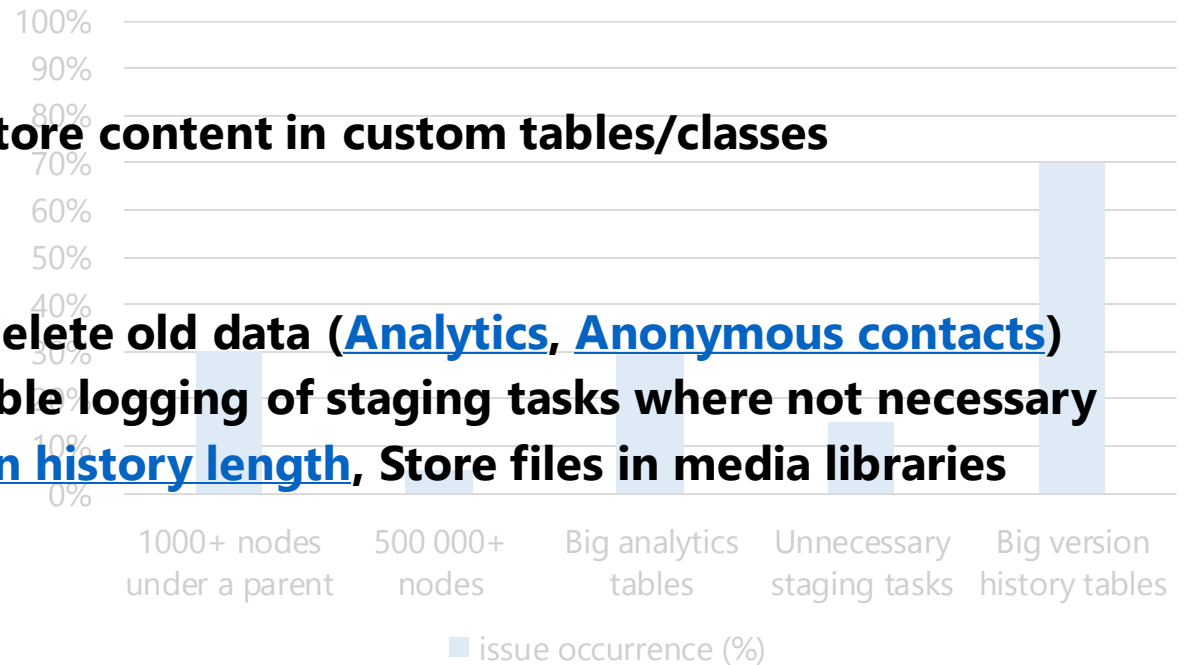
Category: Configuration/Architecture

- Too much content in the content tree
 - 1000+ nodes under a parent
 - 500 000+ documents in the content tree
- Too much data in the database
 - Big analytics tables
 - Unnecessary logging of staging tasks
 - Big version history tables



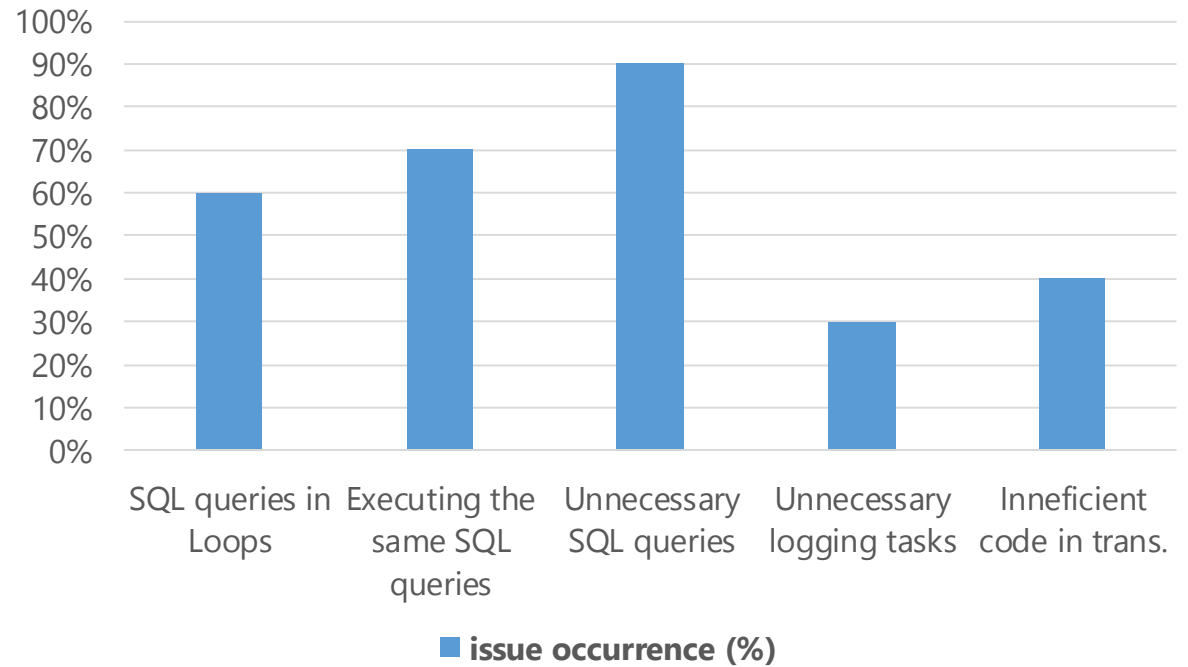
Tips: Configuration/Architecture

- Too much content in the content tree
 - 1000+ nodes under a parent -> **Set up content business rules**
 - 500 000+ documents in the content tree -> **Store content in custom tables/classes**
- Too much data in the database
 - Big analytics tables -> **Allow the system to delete old data ([Analytics](#), [Anonymous contacts](#))**
 - Unnecessary logging of staging tasks -> **Disable logging of staging tasks where not necessary**
 - Big version history tables -> **Limit the [version history length](#), Store files in media libraries**



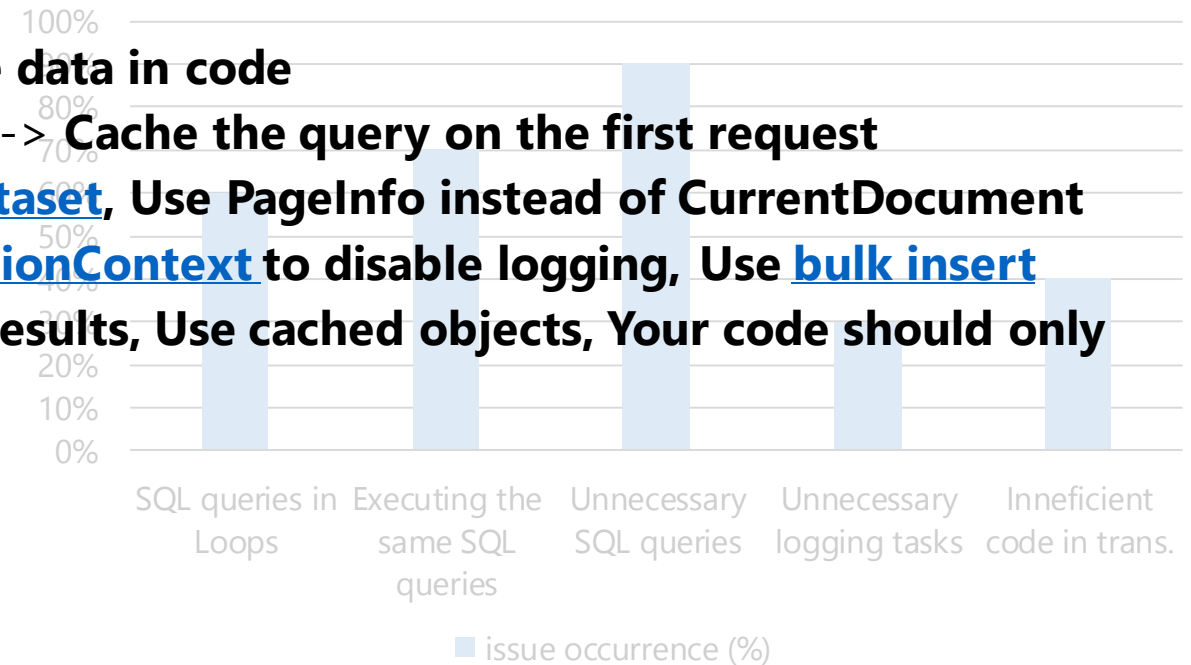
Category: Code

- Inefficient code
 - Executing SQL queries in loops
 - Executing the same SQL query multiple times
 - Unnecessary SQL queries
 - Unnecessary logging of tasks
 - Inefficient code in transformations



Tips: Code

- Inefficient code
 - Executing SQL queries in loops -> **Retrieve the data at once and loop thru the data in code**
 - Executing the same SQL query multiple times -> **Cache the query on the first request**
 - Unnecessary SQL queries -> **Use a shared dataset, Use PageInfo instead of CurrentDocument**
 - Unnecessary logging of tasks -> **Use CMSActionContext to disable logging, Use bulk insert**
 - Inefficient code in transformations -> **Cache results, Use cached objects, Your code should only be executed once (scalability)**



How to prevent most common issues?

- Know the best practices ([Deliver Now Methodology](#))
- Ask support/consulting/the community
- Caching (shared dataset, output cache, caching in custom code)
- Evaluate/Test your implementation
- Master page optimization
- Use the [Roslyn compiler](#)
- Common sense

Example 1:

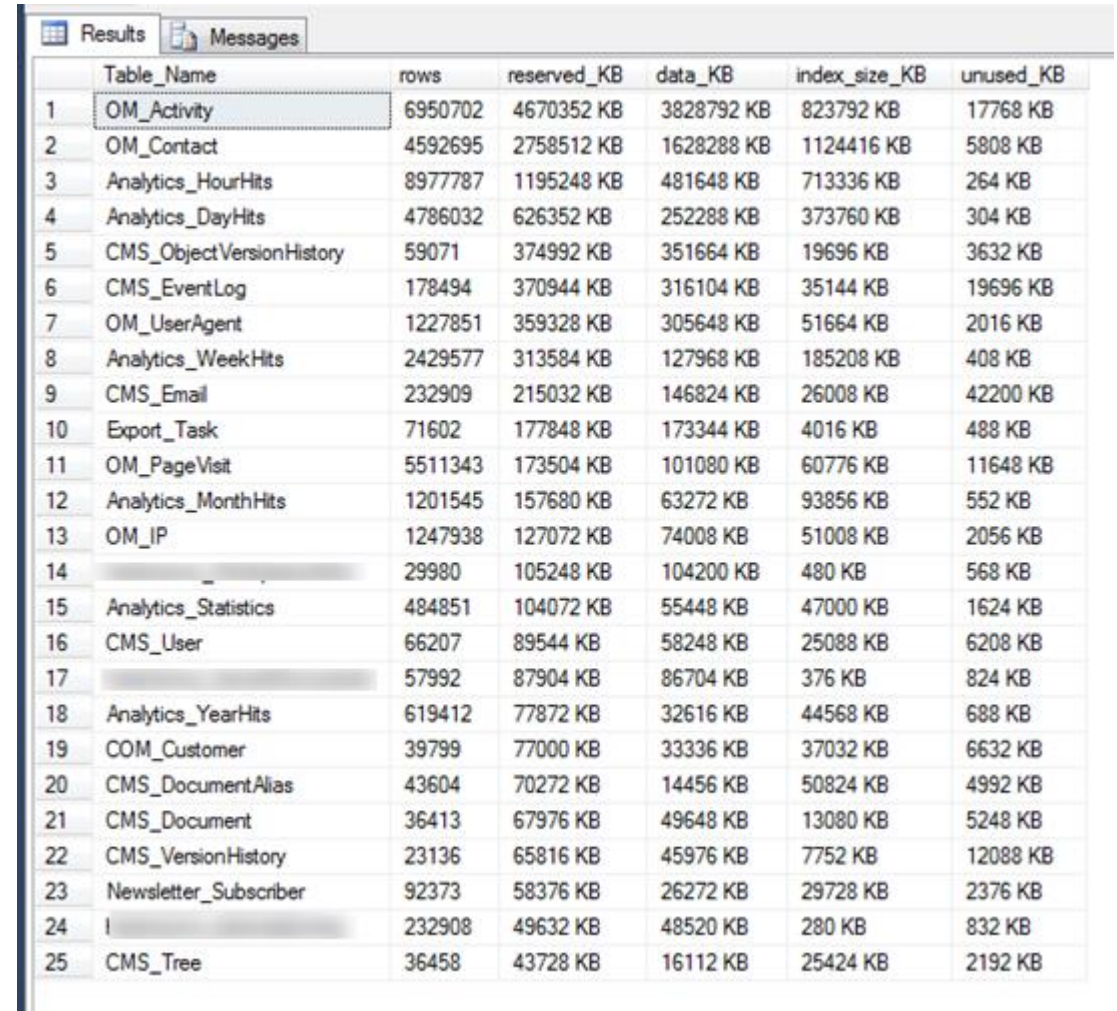
- **Issue**
 - Slow products listing page
- **Tool(s) used**
 - Kentico debug
 - Kentico Event log
- **Research result(s)**
 - 500+ SQL queries,
 - Some SQL queries retrieving 17MB+ data
 - Over 15 000 page not found errors in the event log, most of them caused by a missing robots.txt file and missing apple-touch-icon files
- **Solution**
 - Adding missing files and removing broken links
 - Setting the columns property
 - Caching requests and implementing the menu more efficiently

Page Not Found

```
5863x - /robots.txt - Dec 14 2014 6:33PM
2636x - /payroll/tax/undefined - May 17 2015 5:44PM
2479x - /apple-touch-icon.png - Dec 15 2014 10:40AM
1777x - /apple-touch-icon-precomposed.png - Dec 15 2014 10:40AM
1196x - /[REDACTED]/Images/anchor.gif
960x - /images/spacer.gif - May 13 2015 8:52AM
933x - /[REDACTED]/CMSModules/Membership/Pages/Users/PIE.htc - Se
783x - /[REDACTED]/JavaScript/libs/floatbox/languages/C.js - Feb
706x - /browserconfig.xml - Aug 27 2014 11:05AM
672x - /www.googletagmanager.com/ns.html?id=[REDACTED] - Sep 15 201
650x - /nocookie/search/results.asp - May 13 2015 8:50AM
```

Example 2:

- **Issue**
 - Slow website, slow page load times
- **Tool(s) used**
 - Kentico debug
 - SQL Management Studio
 - Kinspector
- **Research result(s)**
 - 3.8GB of Activities data (6.9 million activities)
 - 1.6 GB of Contacts data (4.5 million contacts)
- **Solution**
 - Setting up analytics cleanup settings
 - Setting up automate deletion of anonymous contacts



	Table_Name	rows	reserved_KB	data_KB	index_size_KB	unused_KB
1	OM_Activity	6950702	4670352 KB	3828792 KB	823792 KB	17768 KB
2	OM_Contact	4592695	2758512 KB	1628288 KB	1124416 KB	5808 KB
3	Analytics_HourHits	8977787	1195248 KB	481648 KB	713336 KB	264 KB
4	Analytics_DayHits	4786032	626352 KB	252288 KB	373760 KB	304 KB
5	CMS_ObjectVersionHistory	59071	374992 KB	351664 KB	19696 KB	3632 KB
6	CMS_EventLog	178494	370944 KB	316104 KB	35144 KB	19696 KB
7	OM_UserAgent	1227851	359328 KB	305648 KB	51664 KB	2016 KB
8	Analytics_WeekHits	2429577	313584 KB	127968 KB	185208 KB	408 KB
9	CMS_Email	232909	215032 KB	146824 KB	26008 KB	42200 KB
10	Export_Task	71602	177848 KB	173344 KB	4016 KB	488 KB
11	OM_PageVisit	5511343	173504 KB	101080 KB	60776 KB	11648 KB
12	Analytics_MonthHits	1201545	157680 KB	63272 KB	93856 KB	552 KB
13	OM_IP	1247938	127072 KB	74008 KB	51008 KB	2056 KB
14		29980	105248 KB	104200 KB	480 KB	568 KB
15	Analytics_Statistics	484851	104072 KB	55448 KB	47000 KB	1624 KB
16	CMS_User	66207	89544 KB	58248 KB	25088 KB	6208 KB
17		57992	87904 KB	86704 KB	376 KB	824 KB
18	Analytics_YearHits	619412	77872 KB	32616 KB	44568 KB	688 KB
19	COM_Customer	39799	77000 KB	33336 KB	37032 KB	6632 KB
20	CMS_DocumentAlias	43604	70272 KB	14456 KB	50824 KB	4992 KB
21	CMS_Document	36413	67976 KB	49648 KB	13080 KB	5248 KB
22	CMS_VersionHistory	23136	65816 KB	45976 KB	7752 KB	12088 KB
23	Newsletter_Subscriber	92373	58376 KB	26272 KB	29728 KB	2376 KB
24		232908	49632 KB	48520 KB	280 KB	832 KB
25	CMS_Tree	36458	43728 KB	16112 KB	25424 KB	2192 KB

Example 3:

- **Issue**

- Slow website, slow page load times

- **Tool(s) used**

- Kentico debug
- Kinspector

- **Research result(s)**

- 87000+ unprocessed search and 74000+ unprocessed staging tasks in the database
- The system trying to process the tasks on every request fails

- **Solution**

- Removing tasks from the database
- Disabling the logging of staging tasks
- Fixing the smart search issue causing the tasks not to be processed

Table name	Rows	Size [MB]	Bytes/Row
Media_File	119402	33.757812	296
Analytics_HourHits	92881	6.132812	69
CMS_SearchTask	87662	12.632812	151
Staging_Synchronization	74007	3.132812	44
Staging_Task	74007	857.648437	12151

Example 5:

- **Issue**
 - Slow page load times
- **Tool(s) used**
 - Kentico debug
- **Research result(s)**
 - Inefficient transformation code
- **Solution**
 - Caching the result on the first execution

Transformation name:

Transformation type: [Available transformation methods](#)

```
<#@ Control Language="C#" AutoEventWireup="true" Inherits="CMS.Controls.CMSAbstractTransformation" %>
<#@ Register TagPrefix="cc1" Namespace="CMS.Controls" Assembly="CMS.Controls" %>

<li>
  <a href="#GetDocumentUrl()"><#Eval("DocumentName")%></a>
  <# CMS.DocumentEngine.TreeHelper.SelectNodes(ValidationHelper.GetString(Eval("NodeAliasPath"), "")+"/%", true, "CMS.MenuItem",
    "DocumentMenuItemHideInNavigation=0" , "", 1, true).Items.Count > 0 ? "<ul>" : "" %>
  <cms:SubLevelPlaceHolder runat="server" ID="plcSub" />
  <# CMS.DocumentEngine.TreeHelper.SelectNodes(ValidationHelper.GetString(Eval("NodeAliasPath"), "")+"/%", true, "CMS.MenuItem",
    "DocumentMenuItemHideInNavigation=0" , "", 1, true).Items.Count > 0 ? "</ul>" : "" %>
</li>
```

After Code Updates?

- Upgrade network
- CDNs
- Web farms
- Cloud
 - Scale Up
 - Scale Out
- Memory dump → Kentico Support / Consulting

Detection & Prevention

- Health monitoring services
- Event log error email notifications
- Custom reports subscriptions
- 3rd party services
- [Regular Maintenance](#)

Learn More

- [Maintenance in Kentico \(http://devnet.kentico.com/articles/maintenance-in-kentico\)](http://devnet.kentico.com/articles/maintenance-in-kentico)
- [Kentico Deliver now! Methodology \(http://download.kentico.com/Kentico_DeliverNow_Methodology.pdf\)](http://download.kentico.com/Kentico_DeliverNow_Methodology.pdf)
- [Performance optimization tips \(https://docs.kentico.com/display/K8/Optimizing+website+performance\)](https://docs.kentico.com/display/K8/Optimizing+website+performance)
- [Using caching in custom code \(https://docs.kentico.com/display/K8/Caching+in+custom+code\)](https://docs.kentico.com/display/K8/Caching+in+custom+code)
- [Register performance counters \(https://docs.kentico.com/display/K8/Registering+performance+counters\)](https://docs.kentico.com/display/K8/Registering+performance+counters)
- [Customization best practices \(https://docs.kentico.com/display/K82/Best+practices+for+customization\)](https://docs.kentico.com/display/K82/Best+practices+for+customization)
- [Kinspector \(https://github.com/Kentico/KInspector\)](https://github.com/Kentico/KInspector)
- [Performance Optimization tips \(https://docs.kentico.com/display/K9/Optimizing+website+performance\)](https://docs.kentico.com/display/K9/Optimizing+website+performance)

Bryan Soltis

E-mail: bryans@kentico.com

Skype: kentico_bryans

Twitter: bryan_soltis

devnet.kentico.com

facebook.com/KenticoCMS

twitter.com/kentico

linkedin.com/company/kentico-software