

# SharePoint 2010 Monitoring and Troubleshooting

STRATEGY ■ CONSULTING ■ **SUPPORT**

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# Agenda

- Introduction
- Monitoring SharePoint 2010
  - Inbuilt monitoring features
  - External monitoring
- Useful Tools
  - SharePoint Diagnostic Studio 2010
  - Performance Analysis of Logs
- Putting It Together

# Introduction

# Why are we here?

- Performance is “king” to many SharePoint customers
- Stability issues can be seemingly random and mysterious
- Need ways of detecting and diagnosing performance and stability issues
- SharePoint has many components to monitor
- SharePoint can generate a lot of “noise”, even when healthy
- Need to understand what “normal” looks like

# Common Causes of Poor Performance

An Engineer's perspective

- Inadequate hardware
- Bad topology
- Large and/or wide list views
- Poorly written custom components
- iFilters
- Overlapping timer jobs

# Common Causes of Instability

An Engineer's perspective

- Poorly written applications/workflows
- Mismatched DLLs (improved in 2010)
- Content deployment
- External problems (IIS, Network)



# Pareto Principle applies to SharePoint CritSits

Why customers call Microsoft Support (the 80/20 rule)

- Poor performance in SharePoint
- Updates
- Related but external sources misbehaving (IIS, SQL, AD)
- Customisation gone bad
- Content deployment
- Indexing/searching
- Bugs and design limitations
- The remaining 100s of problems typically don't break SharePoint

# Becoming a SharePoint “Whisperer”

## Knowing your environment

- Ongoing monitoring is key
  - Must establish clear baselines for performance and stability
  - “Noise” is a major obstacle to troubleshooting a non-baselined environment
  - Without ongoing monitoring, some problems may be missed
- SharePoint exposes a lot of information by itself, you just need to know where to look
- Sometimes external tools are required to get the full picture



# When Whispering Turns to Shouting

## Preparing to call Microsoft Support

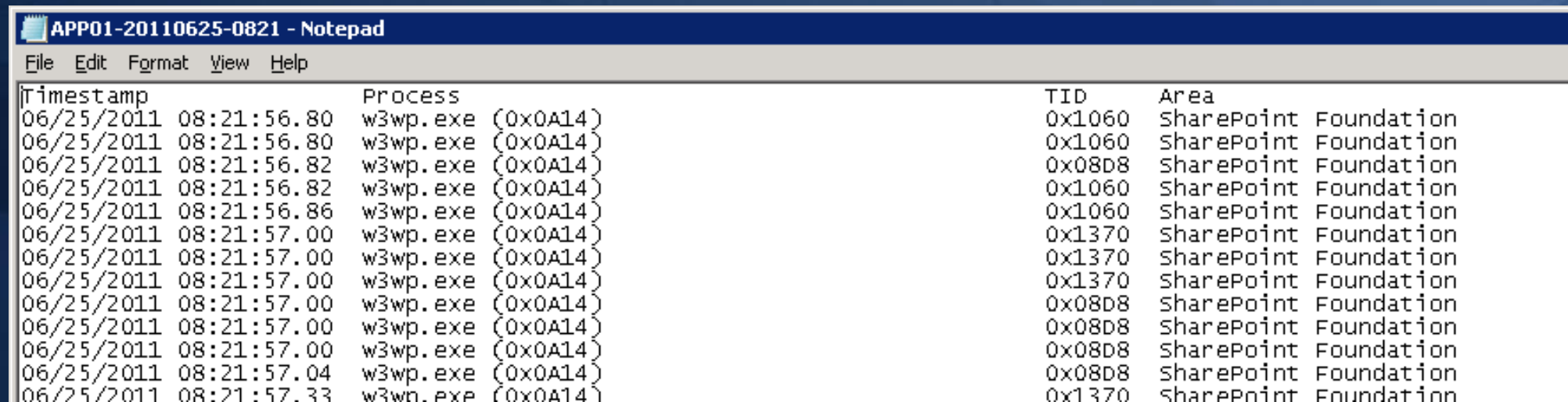
- If you need help from Microsoft Support, be ready to supply the following:
  - Diagnostic reports
  - ULS trace logs
  - Performance counters
  - Web.config files
  - Dump files (in some situations)
- Even better if you can provide earlier versions of these from when the environment was stable

# Monitoring

Inbuilt monitoring features

# Diagnostic Logging

- Unified Logging Service (ULS)
- Enhanced since MOSS 2007
- By default, trace logs are located in C:\Program Files\Common Files\Microsoft Shared\Web Server Extensions\14\LOGS



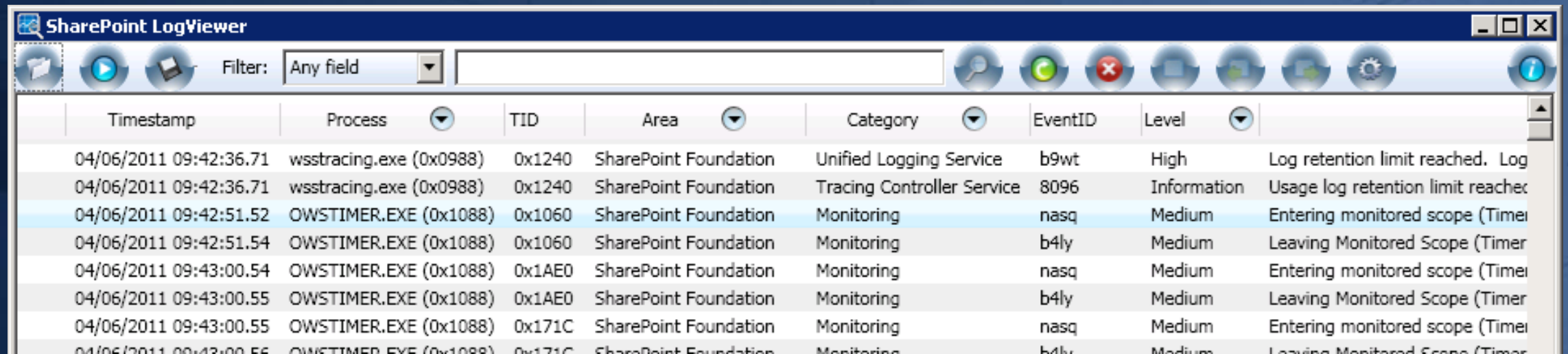
The screenshot shows a Notepad window titled 'APP01-20110625-0821 - Notepad'. The window contains a table of log data with the following columns: Timestamp, Process, TID, and Area. The data is as follows:

Timestamp	Process	TID	Area
06/25/2011 08:21:56.80	w3wp.exe (0x0A14)	0x1060	SharePoint Foundation
06/25/2011 08:21:56.80	w3wp.exe (0x0A14)	0x1060	SharePoint Foundation
06/25/2011 08:21:56.82	w3wp.exe (0x0A14)	0x08D8	SharePoint Foundation
06/25/2011 08:21:56.82	w3wp.exe (0x0A14)	0x1060	SharePoint Foundation
06/25/2011 08:21:56.86	w3wp.exe (0x0A14)	0x1060	SharePoint Foundation
06/25/2011 08:21:57.00	w3wp.exe (0x0A14)	0x1370	SharePoint Foundation
06/25/2011 08:21:57.00	w3wp.exe (0x0A14)	0x1370	SharePoint Foundation
06/25/2011 08:21:57.00	w3wp.exe (0x0A14)	0x1370	SharePoint Foundation
06/25/2011 08:21:57.00	w3wp.exe (0x0A14)	0x08D8	SharePoint Foundation
06/25/2011 08:21:57.00	w3wp.exe (0x0A14)	0x08D8	SharePoint Foundation
06/25/2011 08:21:57.00	w3wp.exe (0x0A14)	0x08D8	SharePoint Foundation
06/25/2011 08:21:57.04	w3wp.exe (0x0A14)	0x08D8	SharePoint Foundation
06/25/2011 08:21:57.33	w3wp.exe (0x0A14)	0x1370	SharePoint Foundation

# Diagnostic Logging

## Log Viewers

- Microsoft doesn't provide a convenient ULS trace log viewer
- Several available in the wild:
  - <http://sharepointlogviewer.codeplex.com/>
  - <http://ulsvviewer.codeplex.com/>



Timestamp	Process	TID	Area	Category	EventID	Level	
04/06/2011 09:42:36.71	wsstracing.exe (0x0988)	0x1240	SharePoint Foundation	Unified Logging Service	b9wt	High	Log retention limit reached. Log
04/06/2011 09:42:36.71	wsstracing.exe (0x0988)	0x1240	SharePoint Foundation	Tracing Controller Service	8096	Information	Usage log retention limit reached
04/06/2011 09:42:51.52	OWSTIMER.EXE (0x1088)	0x1060	SharePoint Foundation	Monitoring	nasq	Medium	Entering monitored scope (Timer
04/06/2011 09:42:51.54	OWSTIMER.EXE (0x1088)	0x1060	SharePoint Foundation	Monitoring	b4ly	Medium	Leaving Monitored Scope (Timer
04/06/2011 09:43:00.54	OWSTIMER.EXE (0x1088)	0x1AE0	SharePoint Foundation	Monitoring	nasq	Medium	Entering monitored scope (Timer
04/06/2011 09:43:00.55	OWSTIMER.EXE (0x1088)	0x1AE0	SharePoint Foundation	Monitoring	b4ly	Medium	Leaving Monitored Scope (Timer
04/06/2011 09:43:00.55	OWSTIMER.EXE (0x1088)	0x171C	SharePoint Foundation	Monitoring	nasq	Medium	Entering monitored scope (Timer
04/06/2011 09:43:00.56	OWSTIMER.EXE (0x1088)	0x171C	SharePoint Foundation	Monitoring	b4ly	Medium	Leaving Monitored Scope (Timer

# Diagnostic Logging

## Event throttling

- Enables the control of the types of events that are logged
- Divided into two sections:
  - Category
  - Destination (Event log vs Trace log)
- One way of handling information overload
- Throttling too aggressively can “hide” issues from administrators and external monitoring tools

Select a category

	Category
<input type="checkbox"/>	All Categories
<input type="checkbox"/>	Access Services
<input type="checkbox"/>	Business Connectivity Services
<input type="checkbox"/>	Document Conversions
<input type="checkbox"/>	Document Management Server
<input type="checkbox"/>	eApproval
<input type="checkbox"/>	Excel Services Application
<input type="checkbox"/>	Extended Diagnostic Providers
<input type="checkbox"/>	InfoPath Forms Services
<input type="checkbox"/>	PerformancePoint Service
<input type="checkbox"/>	Secure Store Service
<input type="checkbox"/>	SharePoint Foundation
<input type="checkbox"/>	SharePoint Foundation Search
<input type="checkbox"/>	SharePoint Portal Server
<input type="checkbox"/>	SharePoint Server
<input type="checkbox"/>	SharePoint Server Search
<input type="checkbox"/>	SQL Server Reporting Services
<input type="checkbox"/>	Visio Graphics Service
<input type="checkbox"/>	Web Analytics Services
<input type="checkbox"/>	Web Content Management
<input type="checkbox"/>	Word Automation Services

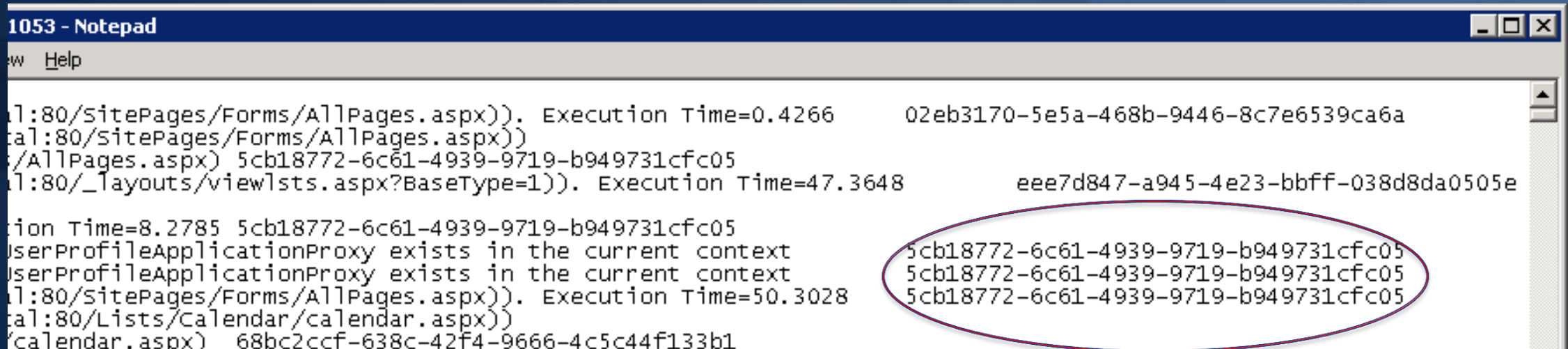
Least critical event to report to the event log

Least critical event to report to the trace log

# Diagnostic Logging

## Correlation ID

- GUIDs that are assigned to events which occur during the lifecycle of a request
- Isolates a specific request in the ULS trace logs, logging database etc.
- Correlation IDs span machine boundaries



The screenshot shows a Notepad window titled "1053 - Notepad" with a menu bar containing "File", "Edit", and "Help". The text content represents ULS trace logs. It includes several lines of log entries, each with a path, execution time, and a GUID. The GUIDs are: 02eb3170-5e5a-468b-9446-8c7e6539ca6a, 5cb18772-6c61-4939-9719-b949731cfc05, and eee7d847-a945-4e23-bbff-038d8da0505e. The GUID 5cb18772-6c61-4939-9719-b949731cfc05 is repeated three times and is circled in red.

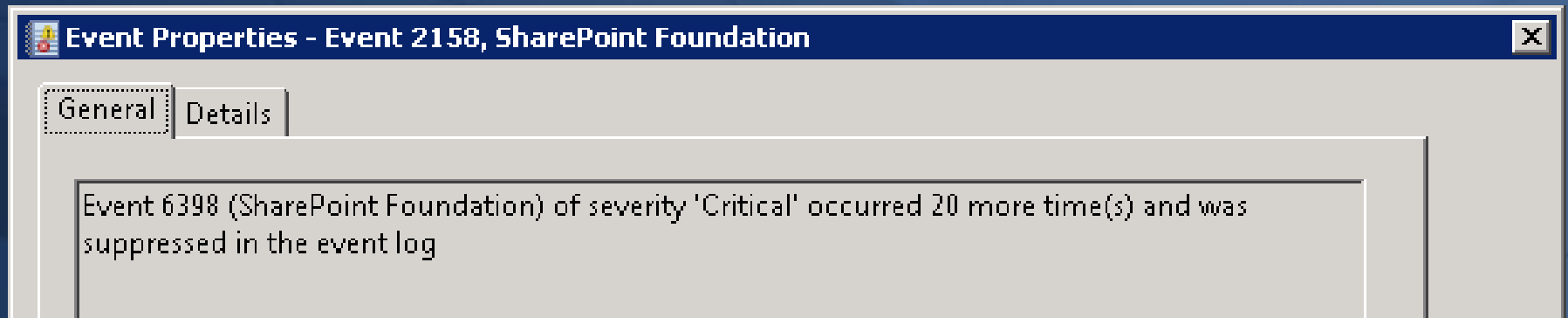
```
al:80/sitePages/Forms/AllPages.aspx)). Execution Time=0.4266      02eb3170-5e5a-468b-9446-8c7e6539ca6a
al:80/sitePages/Forms/AllPages.aspx))
s/AllPages.aspx) 5cb18772-6c61-4939-9719-b949731cfc05
al:80/_layouts/viewlists.aspx?BaseType=1)). Execution Time=47.3648      eee7d847-a945-4e23-bbff-038d8da0505e
ion Time=8.2785 5cb18772-6c61-4939-9719-b949731cfc05
UserProfileApplicationProxy exists in the current context      5cb18772-6c61-4939-9719-b949731cfc05
UserProfileApplicationProxy exists in the current context      5cb18772-6c61-4939-9719-b949731cfc05
al:80/sitePages/Forms/AllPages.aspx)). Execution Time=50.3028      5cb18772-6c61-4939-9719-b949731cfc05
al:80/Lists/Calendar/calendar.aspx))
/calendar.aspx) 68bc2ccf-638c-42f4-9666-4c5c44f133b1
```



# Diagnostic Logging

## Event log flood protection

- Prevents the “Event Log” from being overwhelmed by repetitive events
- Enabled by default
- Trims events after the same event is logged 5 times within 2 minutes
- Throws a summary event after 2 minutes
- Thresholds are configurable



# Diagnostic Logging

## Trace log management

- Set the number of days that log files should be kept (default is 14)
- Limit the overall disk space that can be used
- Don't place the logs on the System partition!

### Trace Log

When tracing is enabled you may want the trace log to go to a certain location. Note: The location you specify must exist on all servers in the farm.

Additionally, you may set the maximum number of days to store log files and restrict the maximum amount of storage to use for logging. [Learn about using the trace log.](#)

Path  
  
Example: C:\Program Files\Common Files\Microsoft Shared\Web Server Extensions\14\LOGS

Number of days to store log files

Restrict Trace Log disk space usage  
☐ Restrict Trace Log disk space usage

Maximum storage space for Trace Logs (GB)

# Usage & Health Data Collection

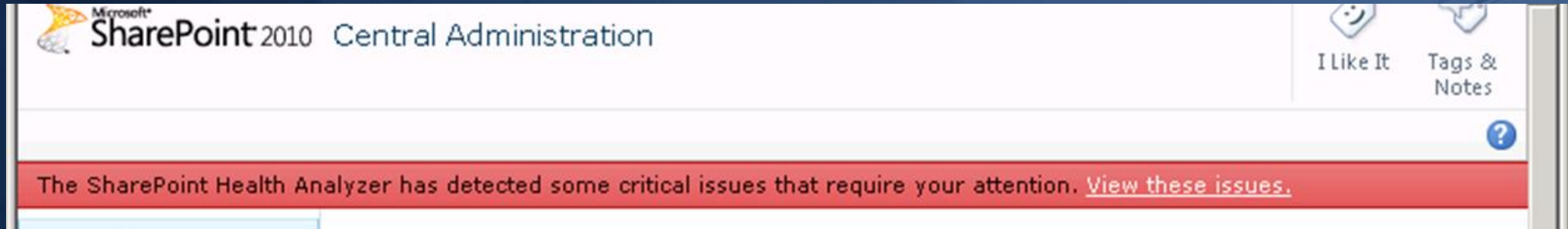
- SharePoint stores usage and health information in files and a database
- Consumes disk space and has a performance overhead
- Needs to be managed:
  - Health Data Collection – Many timer jobs
  - Log Collection – Timer job to copy events from files into the database

The screenshot shows the 'Usage and Health Data Collection' configuration page in SharePoint. It is divided into several sections:

- Enable usage data collection:** A checkbox that is checked.
- Events to log:** A list of events with checkboxes, all of which are checked:
  - Content Import Usage
  - Content Export Usage
  - Page Requests
  - Feature Use
  - Search Query Usage
  - Site Inventory Usage
  - Timer Jobs
  - Rating Usage
- Log file location:** A text box containing 'C:\UsageAnalysis'.
- Maximum log file size:** A text box containing '5' followed by 'GB'.
- Enable health data collection:** A checkbox that is checked.
- Health Logging Schedule:** A link labeled 'Health Logging Schedule'.
- Log Collection Schedule:** A link labeled 'Log Collection Schedule'.
- Database Server:** A text box containing 'sp2010-sql'.
- Database Name:** A text box that is empty.

At the bottom right, there is a status bar showing 'Trusted sites | Protected Mode: Off' with a green checkmark.

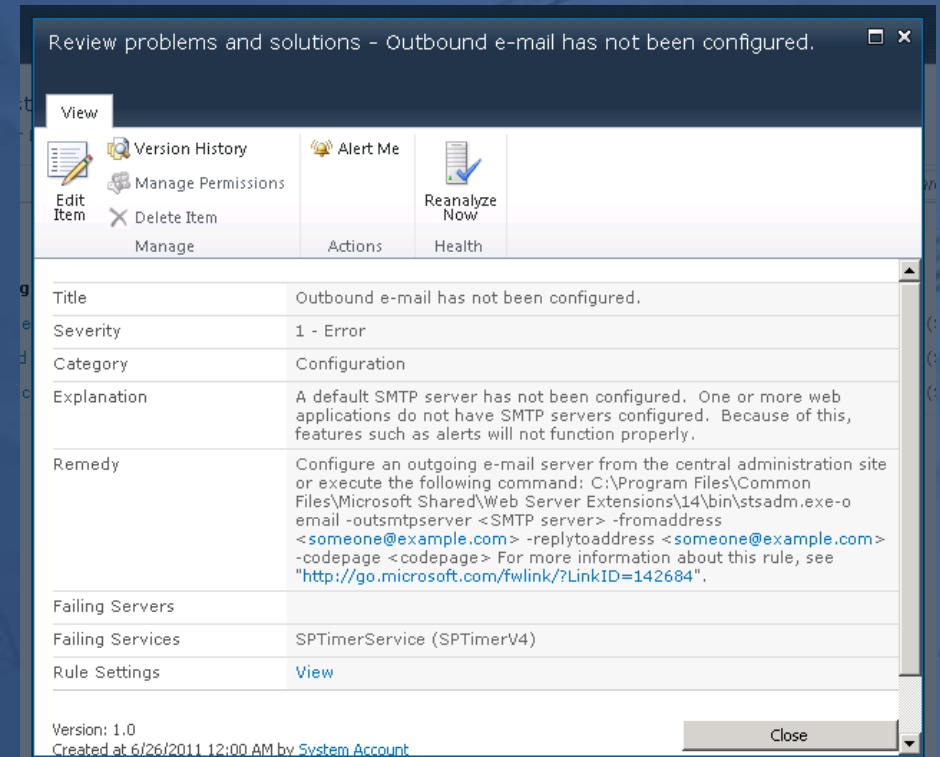
# Health Analyzer



- Aggregates statistical and health data
- Identifies possible problems
- Proactively looks for, and recommends solutions
- Solutions include "Repair Now" and online help
- Applies a set of rules, which can be extended

# Health Analyzer (cont.)

- Rules are applied across a number of categories
  - Security
  - Performance
  - Configuration
  - Availability
- Uses timer jobs to perform monitoring tasks and collect monitoring data
- Has suffered from some well-known false positives



# SharePoint Developer Dashboard

- Don't be put off by the name
- Debugging page level performance problems
- Troubleshoot issues with the rendering of pages
- Three modes:
  - Off – Not displayed
  - On – Rendered on each page
  - OnDemand – Hides until manually clicking the Developer Dashboard icon
- Provides granular control on visibility – Users with customization permissions by default
- Custom code can be monitored **if** developers use SPMonitoredScope



# SharePoint Developer Dashboard

## Report

- There are 6 report sections which together display events, execution times etc.

The screenshot displays the SharePoint Developer Dashboard report for a specific request. The report is divided into several sections:

- Request Details:** A tree view showing the execution flow of the request (GET: http://portal.virtual.local:80/SitePages/Home.aspx) with various sub-events and their execution times.
- Web Server:** A table showing server-related information.
- Asserts and Critical Events:** A list of warnings and critical events.
- Database Queries:** A table showing the execution of various database queries.

Web Server	
Execution Time	19954.03 ms
Current User	i:\0#.w\virtual\administrator
Page Checkout Level	Published
Current SharePoint Operations	1
Log Correlation Id	f84a7105-2bbf-42f6-9288-811ed664abc5

Asserts and Critical Events	
7362	Warning Publishing Cache
7363	Critical Publishing Cache
7043	Critical Web Controls

Database Queries	
dbo.proc_getObjectsByClass	17.45 ms
dbo.proc_getObjectsByBaseClass	3.37 ms
proc_FetchDocForHttpGet	1779.20 ms
dbo.proc_getObjectsByBaseClass	58.00 ms
dbo.proc_getObjectsByBaseClass	5.85 ms
dbo.proc_getObjectsByBaseClass	31.96 ms
dbo.proc_getObjectsByClass	2.21 ms
dbo.proc_getDependentObjectsByBaseClass	2.71 ms
dbo.proc_getObjectsByClass	2.32 ms
dbo.proc_getObjectsByClass	1.39 ms

# SharePoint Developer Dashboard

## Enabling

- Can use PowerShell but stsadm is much easier...

```
STSADM -o setproperty -pn developer-dashboard -pv OnDemand
```

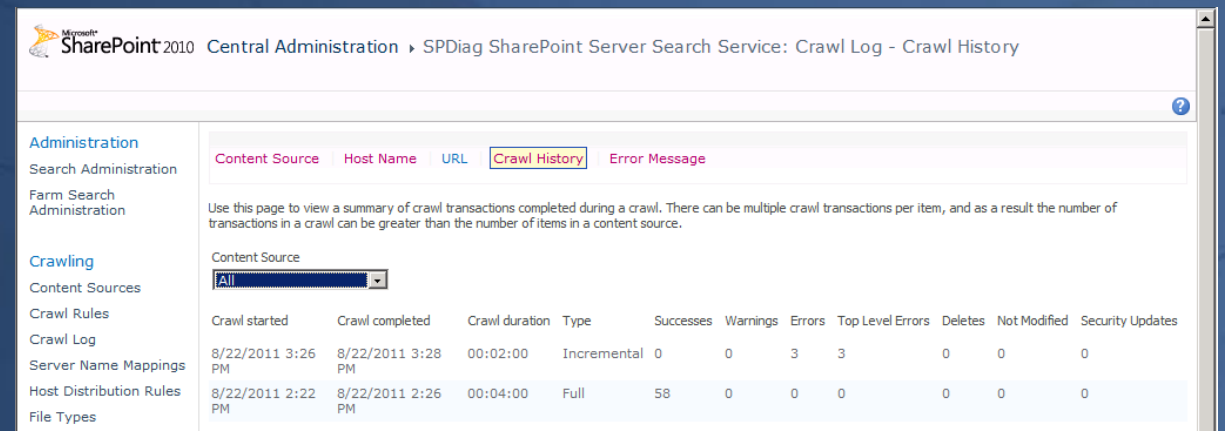
```
STSADM -o setproperty -pn developer-dashboard -pv On
```

```
STSADM -o setproperty -pn developer-dashboard -pv Off
```

- Need to be a Farm Administrator to run this command

# Crawl Logs

- Unfortunately crawl logs are only visible from within CA
- Relies on "Crawl Log Report for Search Application <Search Service Application name>" timer job
- Review regularly to detect content access and other issues
- Pay particular attention to "Top Level Errors"
  - Top-level documents, including start addresses
  - Virtual servers
  - Content databases



Microsoft SharePoint 2010 Central Administration > SPDiag SharePoint Server Search Service: Crawl Log - Crawl History

Administration  
Search Administration  
Farm Search Administration

Crawling  
Content Sources  
Crawl Rules  
Crawl Log  
Server Name Mappings  
Host Distribution Rules  
File Types

Content Source Host Name URL **Crawl History** Error Message

Use this page to view a summary of crawl transactions completed during a crawl. There can be multiple crawl transactions per item, and as a result the number of transactions in a crawl can be greater than the number of items in a content source.

Content Source: All

Crawl started	Crawl completed	Crawl duration	Type	Successes	Warnings	Errors	Top Level Errors	Deletes	Not Modified	Security Updates
8/22/2011 3:26 PM	8/22/2011 3:28 PM	00:02:00	Incremental	0	0	3	3	0	0	0
8/22/2011 2:22 PM	8/22/2011 2:26 PM	00:04:00	Full	58	0	0	0	0	0	0

# Monitoring

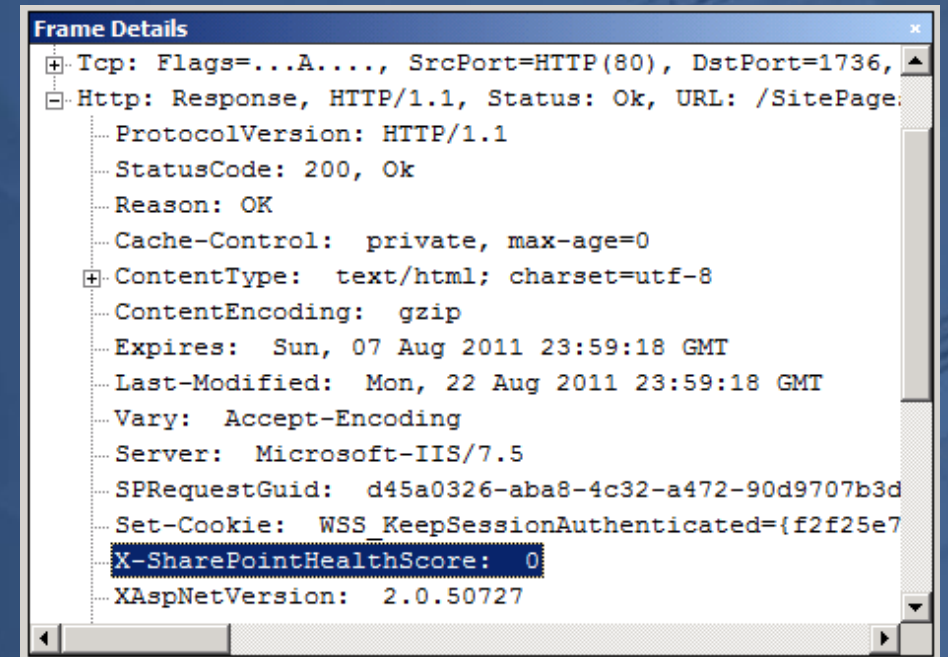
External Monitoring

# Is SharePoint Alive?

- HTTP “Ping” is not good enough
- SharePoint implements custom error messages
- Standard HTTP response codes (404, 401) can be hidden
- Consider developing a page that checks key SharePoint services and returns a specific response
- Alternatively, an HTTP Monitor can parse pages for certain strings

# HTTP Request Monitoring and Throttling

- Protects the server during peak load
- Relies on performance counters
- Server health is scored on a scale of 0 to 10
- A server is throttled only when the health score reaches 10
- Health score is sent in the **X-SharePointHealthScore** HTTP header
- Applications can react to a health score and throttle themselves e.g. SharePoint Workspace
- Monitoring tools can also use HTTP headers to monitor server health
- The start and stop of throttling is logged with Event IDs 8032 and 8062





# Object Disposal

- Incorrect object management by custom applications is common
- Undisposed objects result in memory leaks which lead to downtime and instability
- Governance is required to ensure custom code is written correctly



# Object Disposal

## Detecting Memory Leaks

- Review ULS trace logs
  - Potential issues are logged as follows:

*"An SPRequest object was not disposed before the end of this thread. To avoid wasting system resources, dispose of this object or its parent (such as a SPSite or SPWeb) as soon as you are done using it. This object will now be disposed"*
  - Look for large numbers of these errors or a change in frequency
- Application Pool Recycles – Intermittent, particularly in peak times
- Database Connectivity Issues

# Object Disposal

## Checking for Memory Leaks

- SharePoint Dispose Checker Tool  
(<http://go.microsoft.com/fwlink/?LinkId=203138>)
- Quickly identifies issues with the disposal of SharePoint objects
- Does not require source code to work
- Should be integrated into the developers' build process

# Monitoring with SCOM 2007 R2

- The Microsoft SharePoint 2010 Products Management Pack:
  - Monitors the Health of SharePoint Server 2010, Search Server 2010, and Office Web Apps
  - Monitors Events and Services and alerts when service outages are detected
  - Monitors Performance and warns users when SharePoint performance is at risk
  - Directs users to up-to-date TechNet knowledge articles

# Tools

SPDiag 3.0

# SPDiag 3.0 Overview

- SharePoint Diagnostic Studio 2010 (SPDiag 3.0)
- Gathers, displays and exports farm information for troubleshooting purposes
- Part of the “SharePoint 2010 Administration Toolkit”
  - Load Testing Kit
  - User Profile Replication Engine
  - Security Configuration Wizard (SCW) manifest
  - Content Management Interoperability Services (CMIS) connector
  - **SharePoint Diagnostic Studio 2010 (SPDiag 3.0)**



# What's New in SPDiag 3.0

- Preconfigured reports – Aggregate data from the SharePoint farm for troubleshooting
- Snapshots – Aggregate report images, farm topology information, Unified Logging Service (ULS) logs, and usage database data
- Improved integration with SharePoint Server – Enhanced data collection from more sources

# Working with Projects

- A project is required for each farm being analysed
- Project metadata is stored in a .ttfarm file on the local computer
- Several tables are created in the farm's usage database
- A project can be saved indefinitely
- Project data can be exported in several ways for archival or to share with others

# Demo

SPDiag 3.0

# SPDiag 3.0 “Challenges”

- Reports do not work when the OS locale is not en-US (1033)
- Requires the **remotesigned** execution policy to be enabled on the farm server
- SQL aliases are a problem
- SQL Server performance counters are not provisioned
  - Documentation says farm account needs “sysadmin or sqladmin privileges”
  - Actually need to be member of “Performance Monitor Users”
- Update conflicts can occur when creating projects
- Current version has stability issues

# Requirements

- Can install on a farm server or on a remote computer that is not part of the farm
- Farm administrative privileges
- .NET Framework 3.5
- Microsoft Chart Controls for the Microsoft .NET Framework 3
- Must enable PowerShell remoting (if installing on a remote client)
- Must configure “Usage and Health Data Collection” on the target farm

# Enable PowerShell Remoting

## Farm

- Run the following cmdlets on the target (farm) server:  
**Enable-PSRemoting -force**  
**Enable-WSManCredSSP -role Server -force**  
**Set-Item WSMan:\localhost\Shell\MaxMemoryPerShellMB 1000**

# Enable PowerShell Remoting

## Client

- Run the following cmdlets on the client (remote) computer:  
**Enable-PSRemoting -force**  
**Enable-WSManCredSSP -role Client -DelegateComputer**  
**“<target\_computer>” -force**



# Taking Snapshots

- Not as easy as it should be
- **All** servers that are part of the farm need to be configured for PowerShell remoting
  - Including SQL and SMTP
- The client needs **all** servers to be added as PowerShell remoting targets
- Snapshots will fail if using SQL aliases
- May need to “unconfigure” e-mail if mail server is not running on Win2k08 or later

# Tools

PAL

# PAL Overview

- Performance Analysis of Logs (PAL)
- Reads in a Performance Monitor counter log and analyses it using known thresholds
- Can export Performance Monitor templates to gather the “right” counters
- Available from <http://pal.codeplex.com/>

# Features

- Threshold files for most of the major Microsoft products
- An easy to use GUI interface
- A GUI editor for creating or editing threshold files
- Creates HTML based reports for ease of transfer to other applications
- Supports varying thresholds based on a computer's role or hardware specs

# Demo

PAL 2.1.0

# Basic Counters and Thresholds

- Processor Utilisation (< 80%, ideally < 50%)
- Available Memory (> 10%)
- Disk Latency (< 25ms, ideally < 15ms)
  - Especially important for SQL Server!
- PAL reports on these and other counters
- Don't read any one counter in isolation
- Attend the "Vital Signs" Premier Workshop to learn more

# Requirements

- PowerShell v2.0 or greater
- Microsoft .NET Framework 3.5 with Service Pack 1
- Microsoft Chart Controls for Microsoft .NET Framework 3.5
- A version of Windows that supports the above (e.g. Win7, Win2k08, Win2k08 R2)
- Must be run under an en-US locale
  - Although generally seems to work on other locales



# Tools

Debug Diagnostic Tool v1.2

# DebugDiag Overview

- Debug Diagnostic Tool (DebugDiag)
- Assists in troubleshooting issues such as hangs, slow performance, memory leaks or memory fragmentation, and crashes in any user-mode process
- Includes additional debugging scripts focused on IIS, SharePoint etc.
- Available from <http://www.microsoft.com/download/en/details.aspx?id=26798>
- Instructions (FAST PUBLISH) <http://support.microsoft.com/kb/2580960>

# What's New in DebugDiag 1.2

- Analysis
  - .NET 2.0 and higher analysis integrated to the Crash Hang analysis
  - SharePoint Analysis Script
  - Performance Analysis Script
  - .NET memory analysis script (beta)
- Collection
  - Generate series of Userdumps
  - Performance Rule
  - IIS ETW hang detection
  - .NET CLR 4.0 support
  - Managed Breakpoint Support

# Requirements

- Windows Server 2003/XP and above

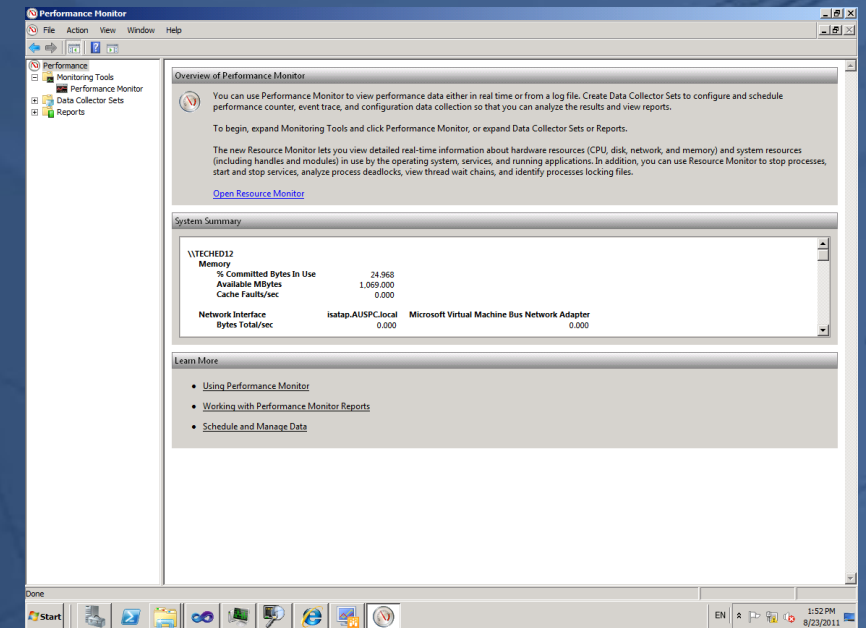
# Putting It Together

# Putting It Together

- Diagnose problems one step at a time
  - Look at the Server
  - Look at SharePoint/IIS
  - Look at the Network
  - Look at the Client/Browser
- Remember that you may have more than one problem

# Putting It Together Server

- SharePoint is only as good as the platform it's running on
- Start with the Windows Application Log
- When troubleshooting performance issues:
  - Performance Monitor
  - PAL
- Remember to look at SQL Server
- Don't underestimate the significance of inadequate hardware

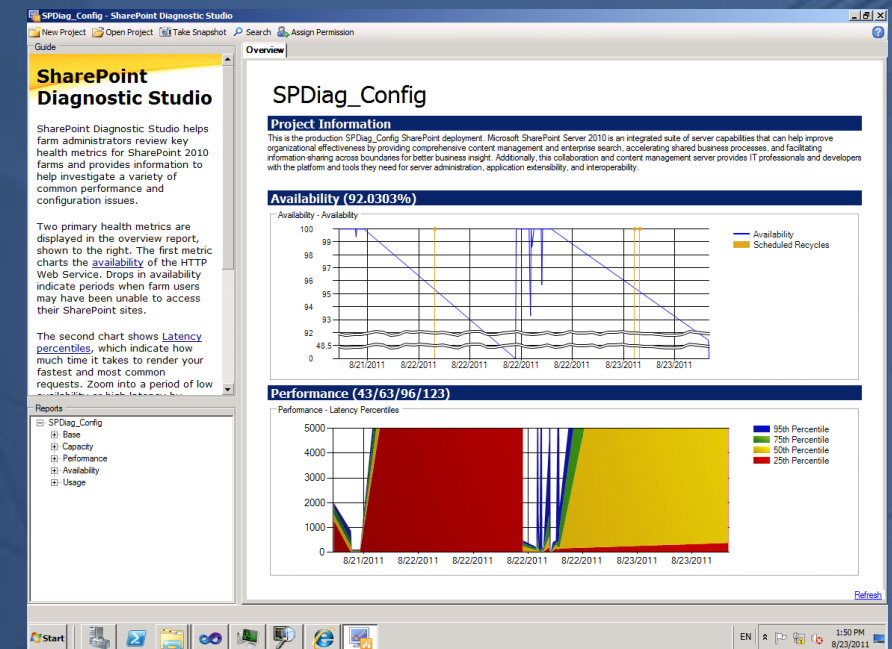




# Putting It Together

## SharePoint/IIS

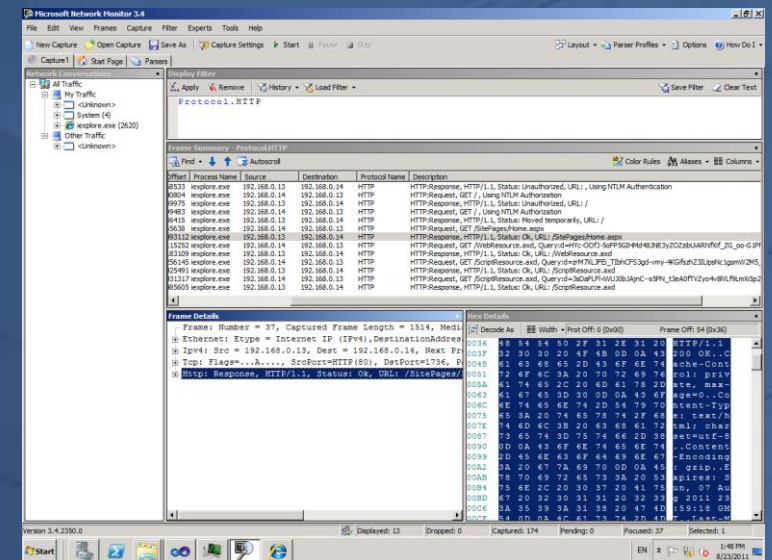
- Start with the “timetaken” value in the IIS logs
- Fast on the server, but slow on the client – It’s not SharePoint!
- Move on to the other tools
  - Diagnostic Logging
  - SPDiag



# Putting It Together

## Network

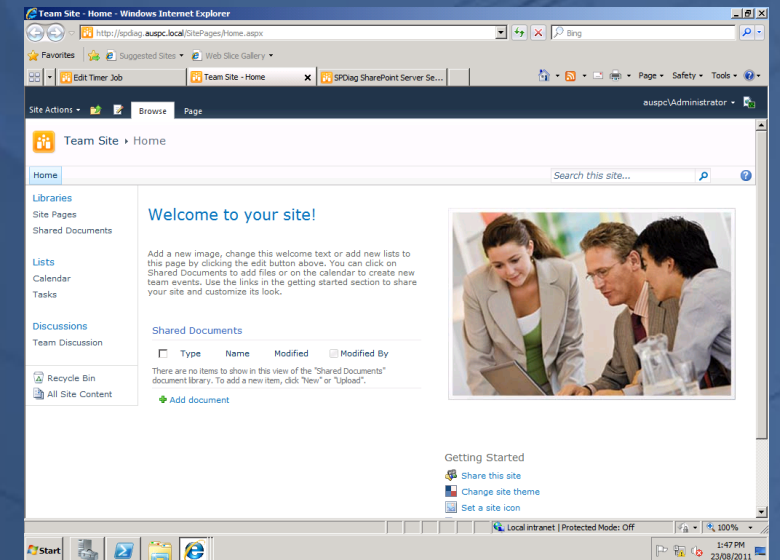
- Fast on server, but slow on client – Look at the network
- Slow only for “remote” clients – Look at the network
- Slow on the server – Could still be network e.g. SQL Server communication
- Many network monitoring tools available
  - Microsoft Network Monitor 3.4
  - Wireshark



# Putting It Together

## Client/Browser

- Is the issue happening with one/some/all clients?
- SharePoint relies on a lot of JavaScript!
- Older browsers can deliver a poor user experience
  - IE9 has significantly faster JavaScript rendering than IE8
  - If using FireFox, go for Version 5 or later



# Wrap up

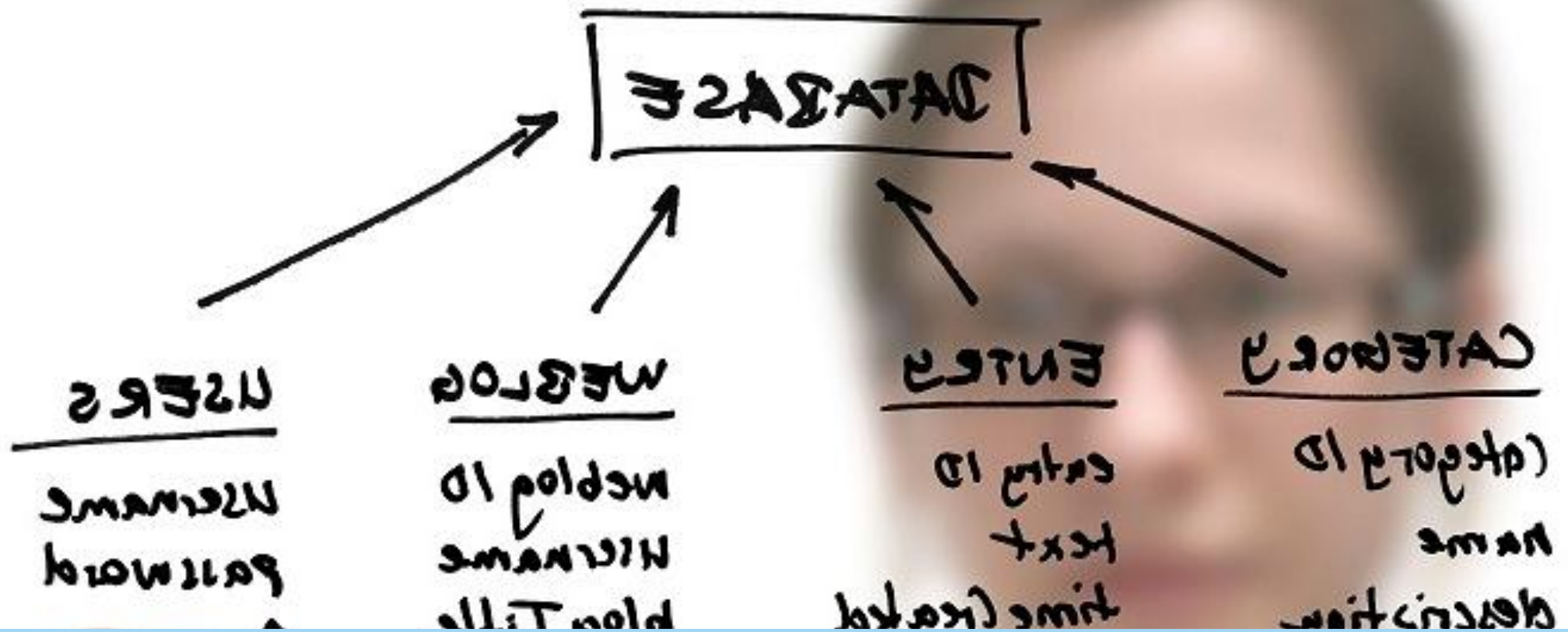
# Wrap Up

- Troubleshooting begins with knowing your environment
  - Performance and stability baselines help to detect issues and eliminate “noise”
  - Ongoing monitoring is key
- Monitoring SharePoint 2010
  - Significant improvement to inbuilt monitoring since MOSS 2007
  - Some tasks should be handled externally
- Tools
  - SPDiag 3.0 – Troubleshoot SharePoint 2010
  - PAL 2.1.0 – Investigate server health
  - DebugDiag 1.3 – Troubleshoot hangs, slow performance, memory leaks etc
- Diagnose issues one step at a time

# Social Networking

- Canberra PFE Blog  
(<http://blogs.msdn.com/b/canberrapfe>)
- Microsoft Premier and PFE Australia on Linked-in  
(<http://www.linkedin.com/groups?gid=3684549>)





Questions?



# References

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