Microsoft | Services

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

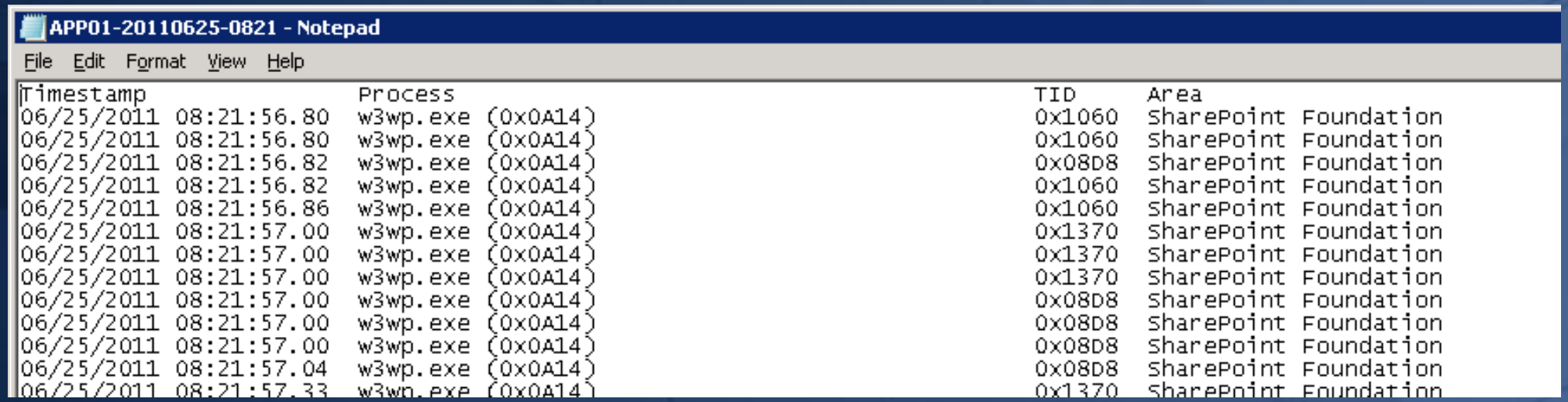
- If you need help from Microsoft Support, be ready to supply the following:
  - Diagnostic reports
  - ULS trace logs
  - Performance counters
  - Web.config files
  - Dump files (in some situations)
- Even better if you can provide earlier versions of these from when the environment was stable

Monitoring

Inbuilt monitoring features

Diagnostic Logging

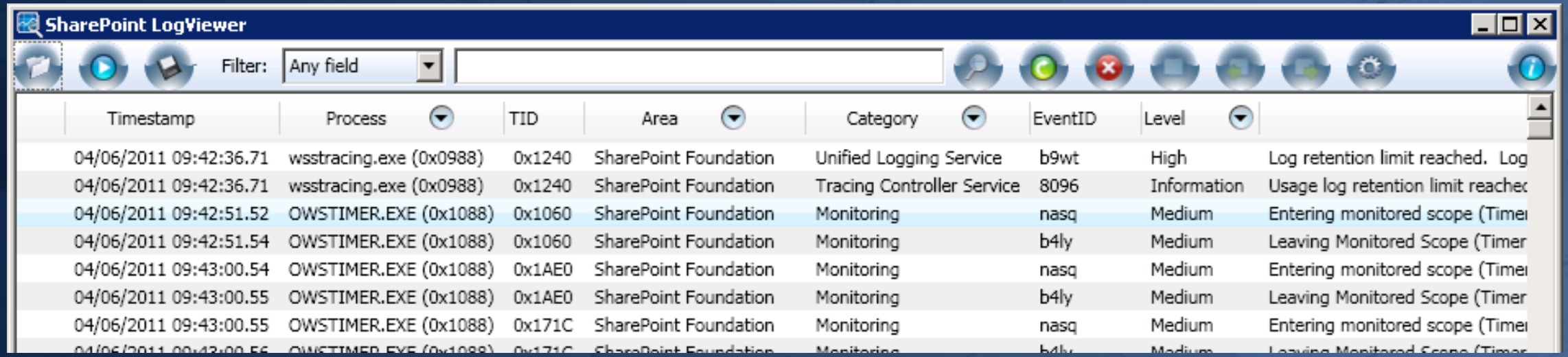
- Unified Logging Service (ULS)
- Enhanced since MOSS 2007
- By default, trace logs are located in C:\Program Files\Common Files\Microsoft Shared\Web Server Extensions\14\LOGS



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://ulsviewer.codeplex.com/

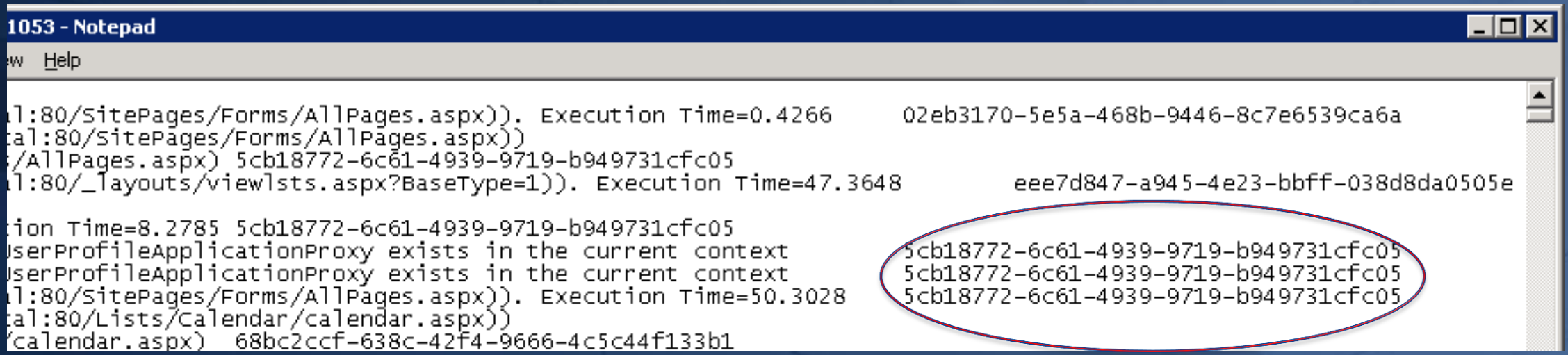


Diagnostic Logging
Event throttling

- 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

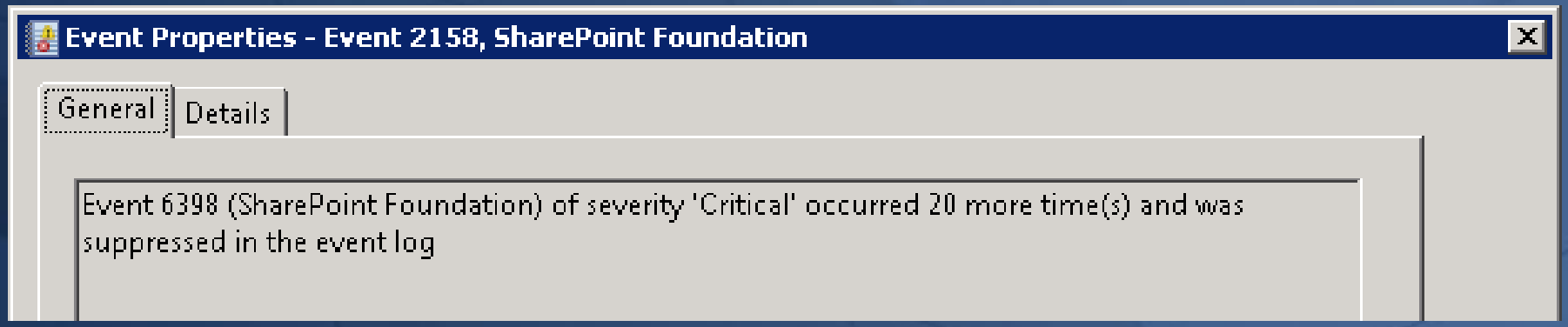
Diagnostic Logging
Correlation ID

- 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



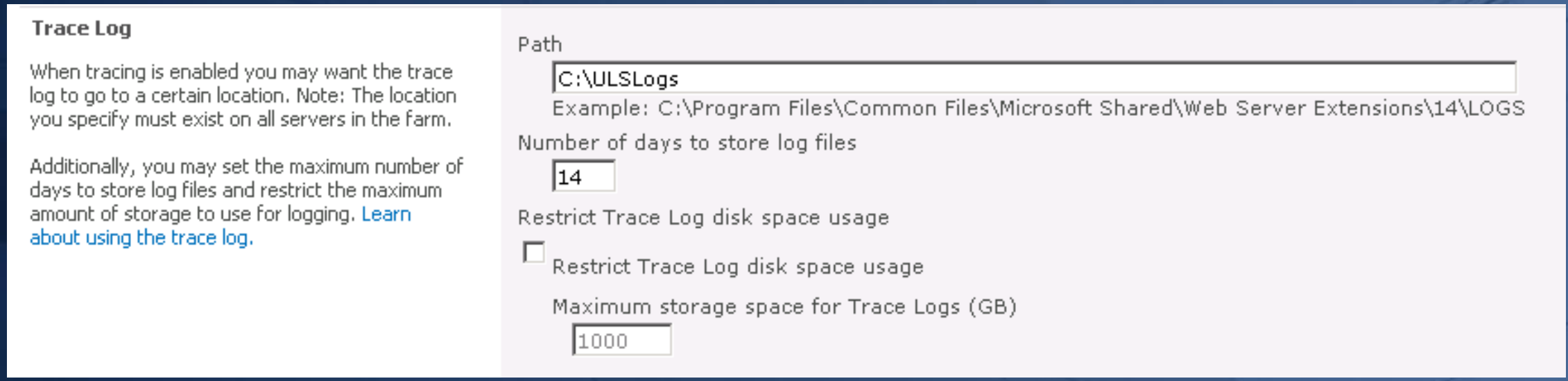
Diagnostic Logging
Event log flood protection

- 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



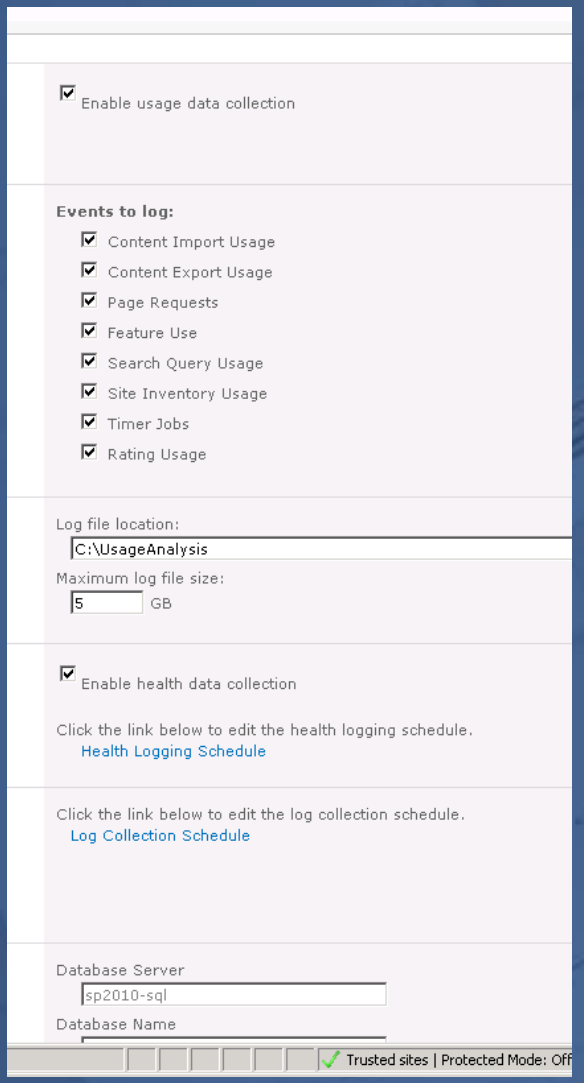
Diagnostic Logging
Trace log management

- 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!



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

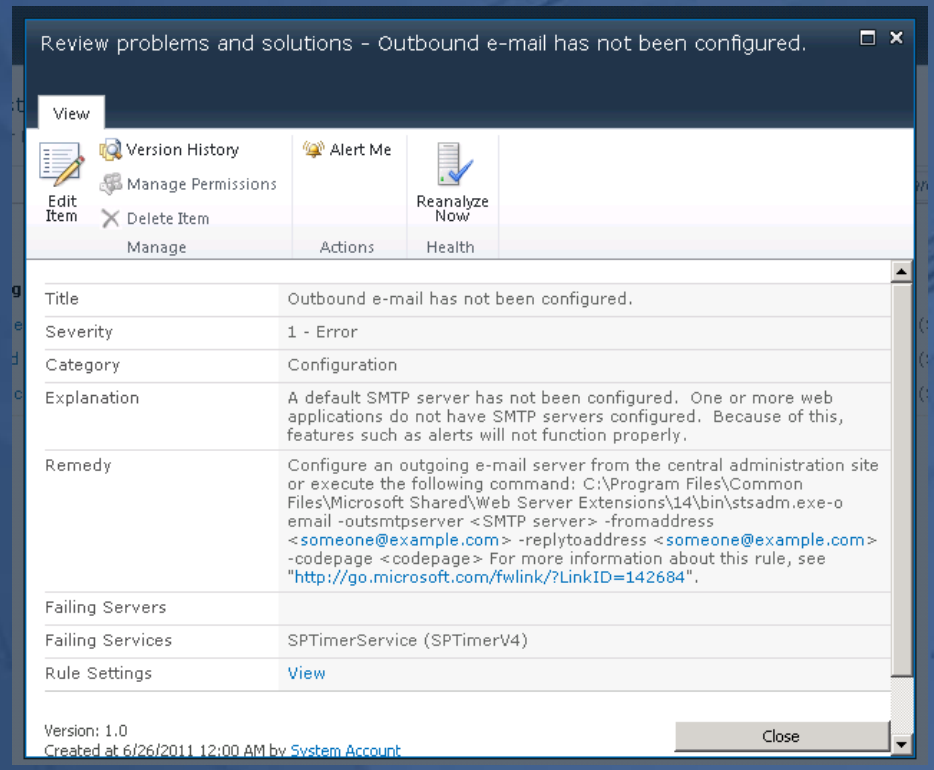


Health Analyzer

- 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



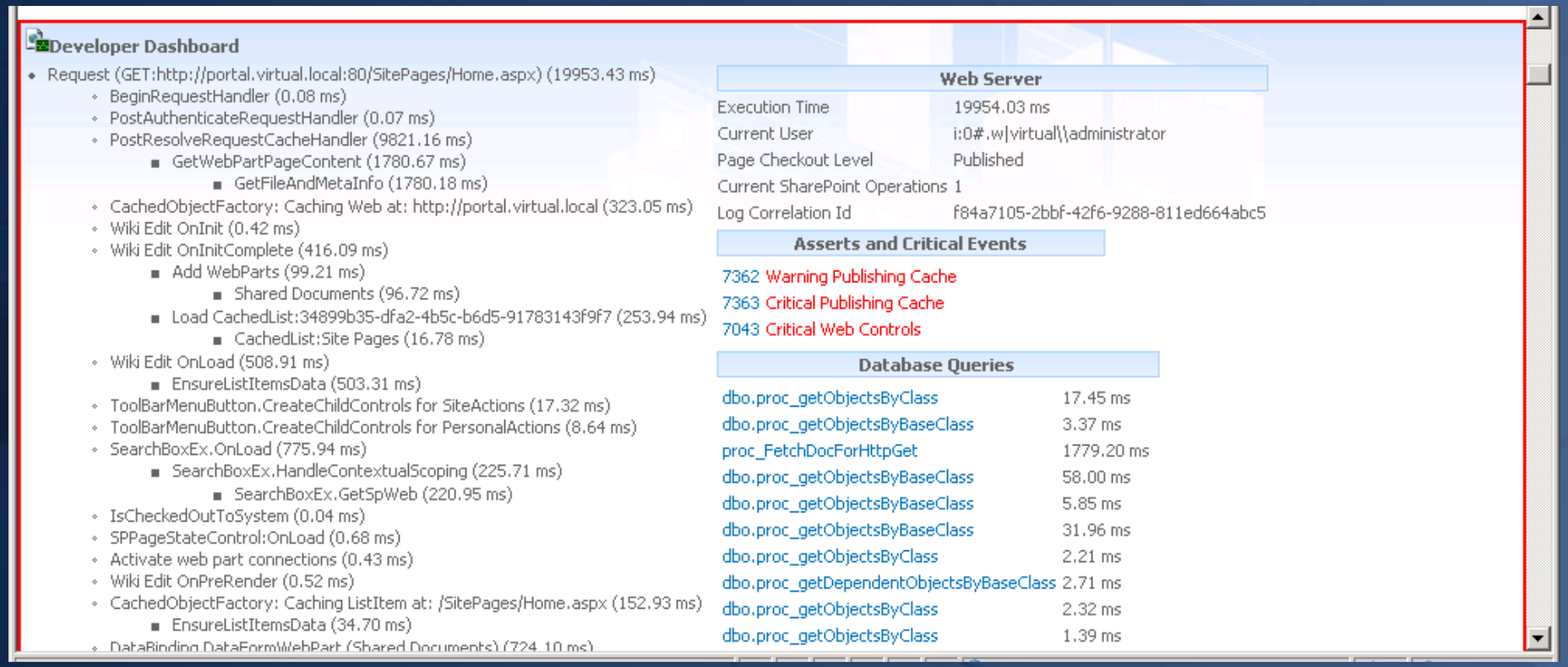
SharePoint Developer Dashboard

- 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.



SharePoint Developer Dashboard
Enabling

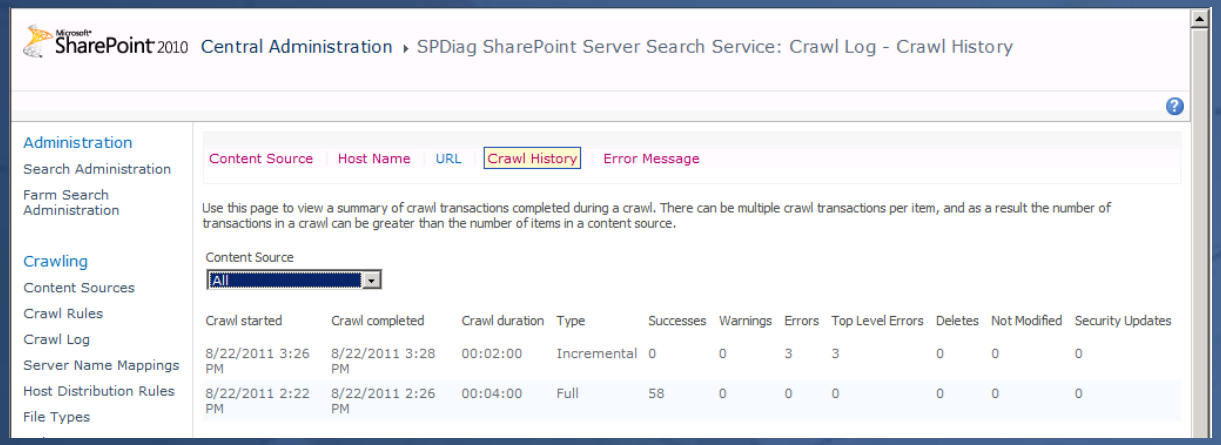
- Can use PowerShell but stsadm is much easier…

```
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



Monitoring

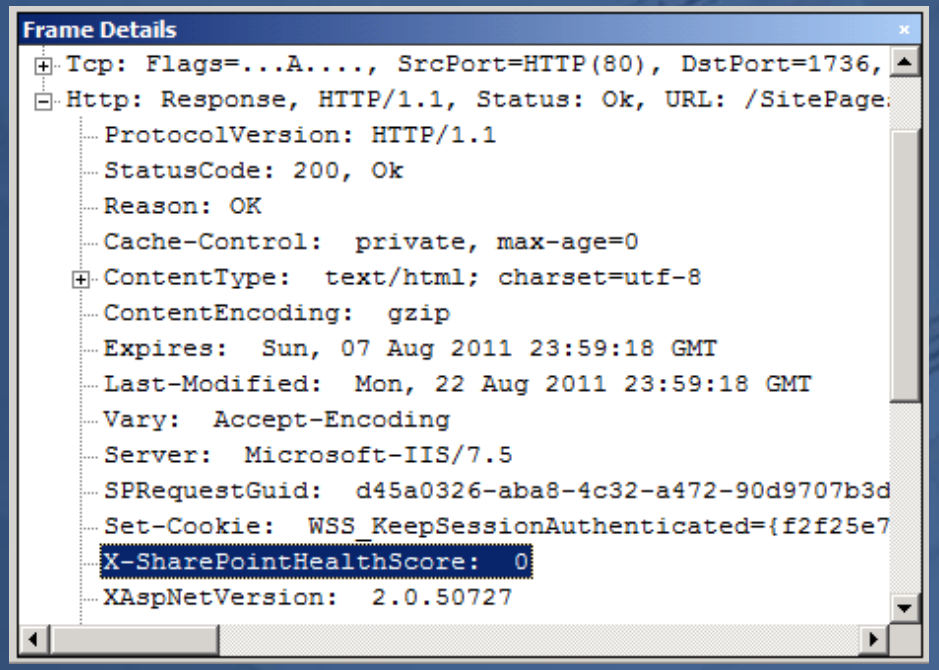
External Monitoring

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

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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

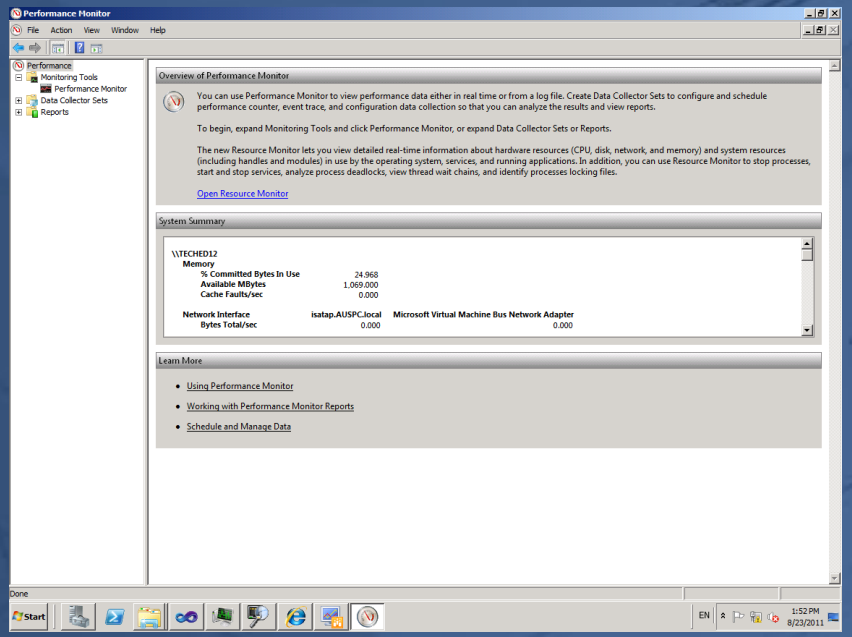
Putting It Together

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/Brower
- Remember that you may have more than one problem

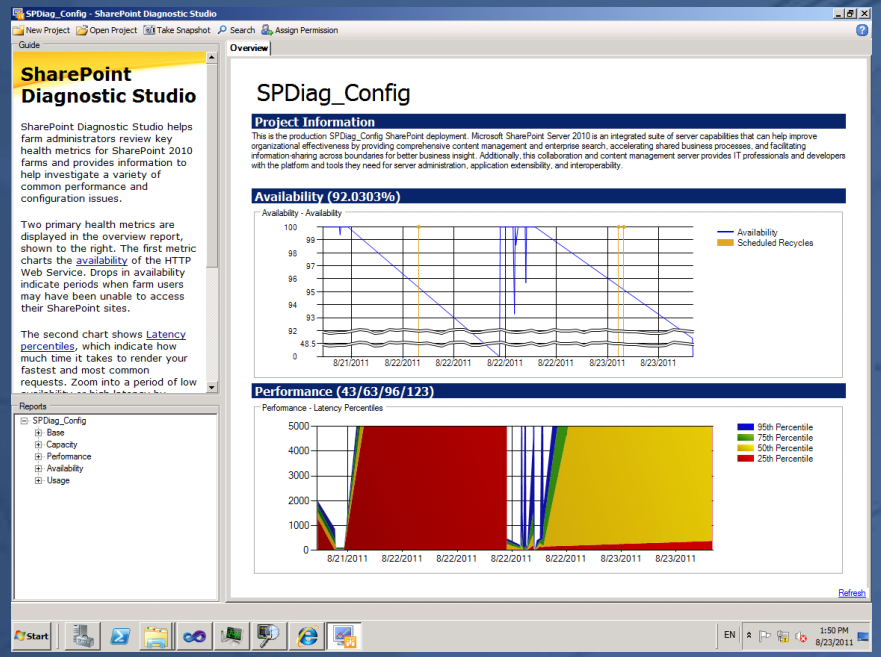
Putting It Together
Server

- 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



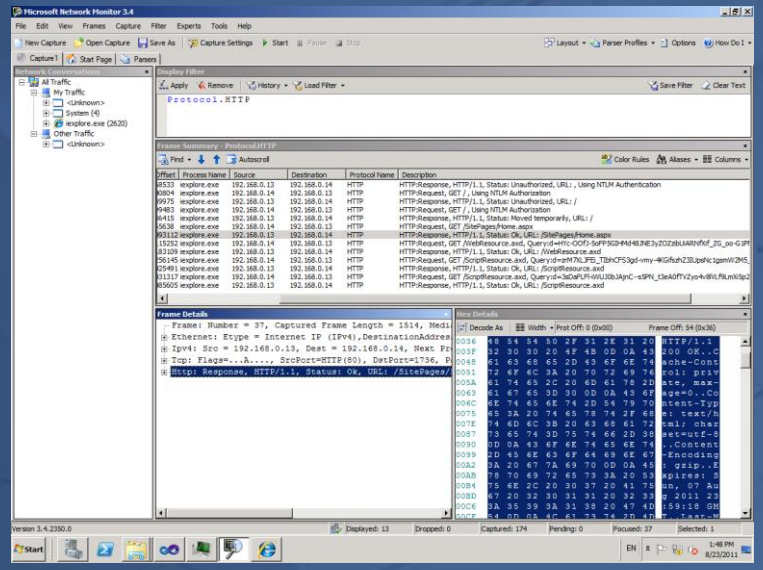
Putting It Together
SharePoint/IIS

- 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



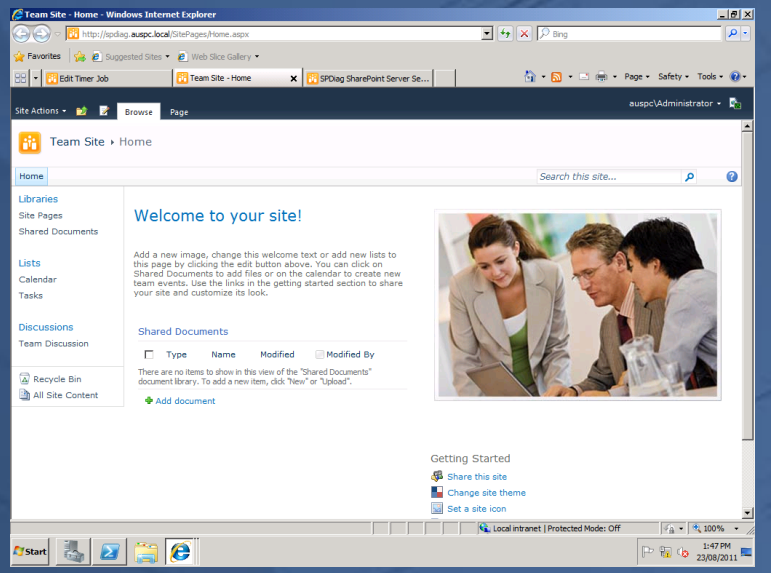
Putting It Together
Network

- 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

- SharePoint Server 2010: Operations Framework and Checklists (http://technet.microsoft.com/en-us/library/gg277248)
- Management Pack and Guides (http://go.microsoft.com/fwlink/?LinkId=203252)
- SharePoint 2010 Administration Toolkit (http://technet.microsoft.com/en-us/library/cc508851.aspx)
- SharePoint Diagnostic Studio 2010 (http://technet.microsoft.com/en-us/library/hh144782.aspx)
- Performance Analysis of Logs (http://pal.codeplex.com)
- Best practices for using crawl logs (SharePoint Server 2010) (http://technet.microsoft.com/en-us/library/ff621096.aspx)