

Microsoft® Office

Deutsche SharePoint® Konferenz 2008

19. – 21. Feb. 2008
Frankfurt am Main

Connect. Collaborate. Share.



SharePoint, Workflow und Visual Studio 2008

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Trainer & Berater
Combined Knowledge

Agenda

- Erstellen eines Workflows
- Kommunikation mit Sharepoint
- Architektur einer skalierbaren Sharepoint Farm

WSS v3 Workflow

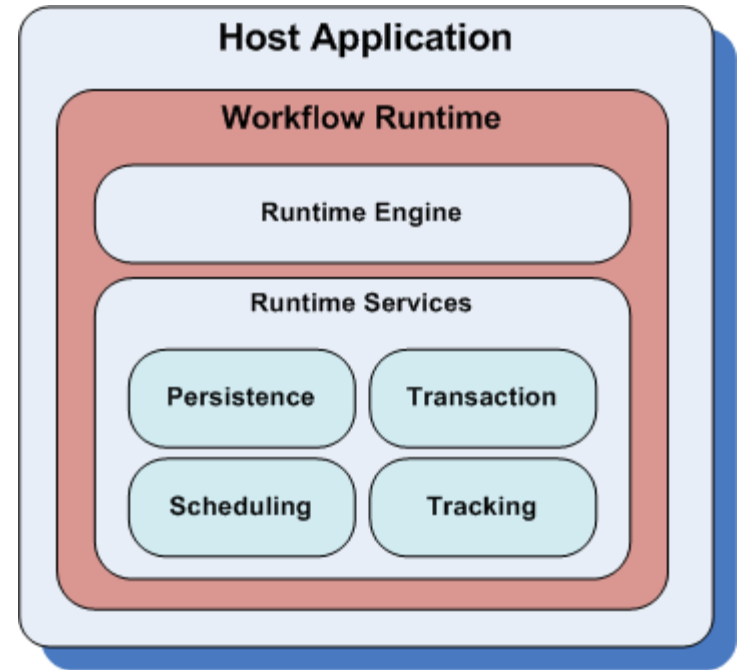
Developer's Guide to WSS v3 Platform Services

Agenda

- Workflow Foundation and WSS v3
- Comparison of Workflow creation methods
- Creating workflows in SharePoint Designer
- Creating workflows in Visual Studio 2005
- Debugging

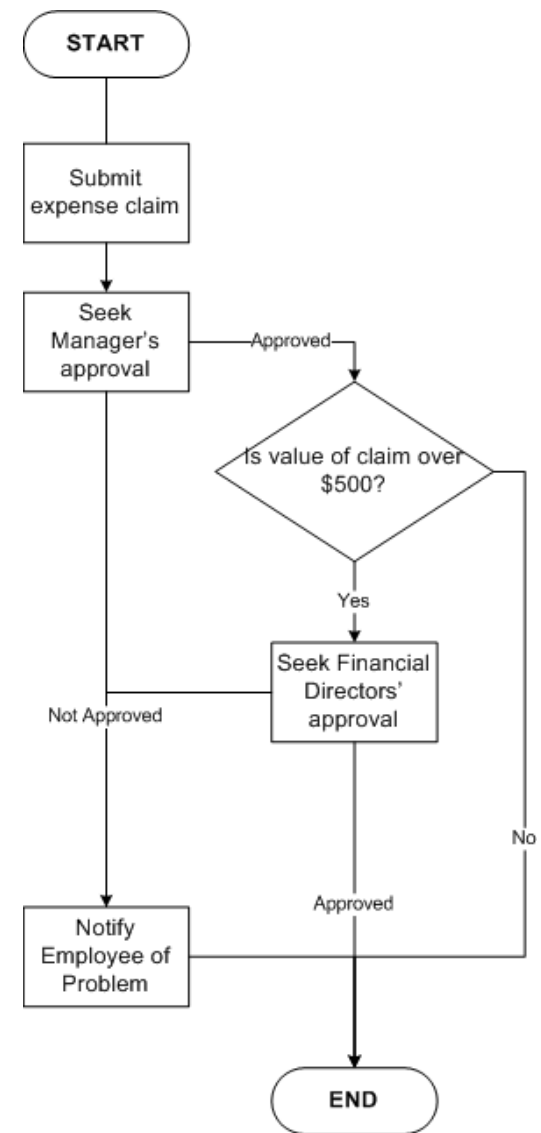
Workflow Foundation Core Concepts

- WF is not:
 - A server or an application
- WF is:
 - A framework
- Key components:
 - A runtime engine
 - A series of plug-in services providing specific features (persistence, tracking,...)
- WF must be hosted inside another .NET process, it has no executables of its own.



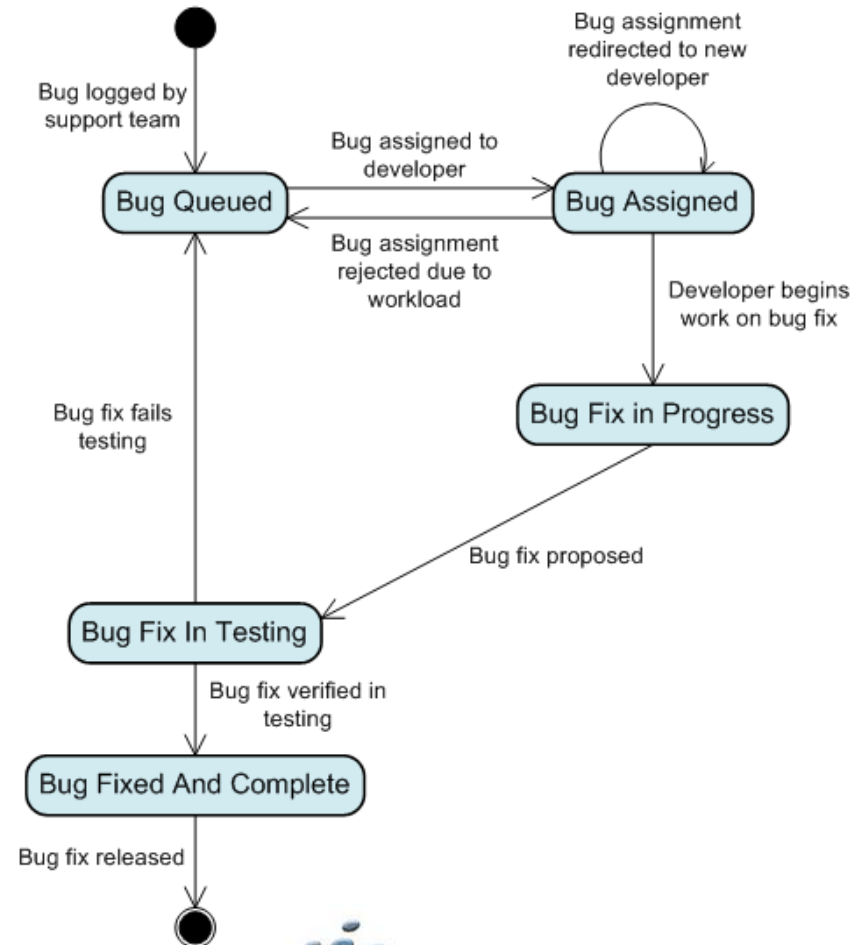
Breakdown of a WF Workflow

- OOB, Workflow's come in two types, **Sequential** (right) and **State Machine** (next slide)
- Workflow's are composed of building blocks called **Activities**.
- Activities result in a sequence of actions.



Breakdown of a WF Workflow (cont.)

- The essence of the workflow is how these blocks relate to one another, the order in which they execute, and how data moves through this structure.
- A good number of standard activities are provided as part of WF.



WSS v3 implementation of WF

- WSS v3 provides the WF host process
- Also provides the custom services
- WSS v3 is people-centric and therefore workflows will often be waiting for interaction, therefore WSS v3 includes an aggressive Persistence service
- Multiple Workflows can be attached to document libraries, lists, and Content Types



Comparison of Workflow Creation Methods

SharePoint Designer	Visual Studio 2005
Code-free editor	Full development experience
Sequential workflows only	Sequential or State Machine
Only pre-defined activities marked as safe are available to use	Any activity available, including custom activities included as part of the project
Bound to a specific list at design time	Site/List independent and can be used any number of times
Custom forms auto generated as ASPX, but may be customized	Any forms technology compatible with Windows Workflow is allowed
No opportunity to debug	Runtime debugging available
Automatically deployed	Must be packaged as a Sharepoint feature and deployed by an administrator
Stored un-compiled, and must be compiled just-in-time	Pre-compiled before deployment so the permission for custom assemblies must be deployed on the server.

Creating workflows using SPD

- Four Key Steps
 - Create the workflow and define it's basic properties
 - Add any requirements for initiation data
 - Define workflow steps, including...
 - Conditions and actions associated with each set of conditions
 - Conditional If Then Else blocks
 - Finish the workflow and deploy it using SPD



WSS v3 Workflow Object Model

Microsoft.Sharepoint.Workflow Namespace:

- Workflow Management
 - SPWorkflowManager to control the workflow instances running on the WSS v3 farm
- Workflow Activities
 - OnWorkflowActivated activity is the most important. Must appear at the beginning of any WSS v3 workflow. Sets up the context.
 - Task Related activities are there to assist with creating and assigning SharePoint tasks to human workflow participants.



Creating workflows using VS.NET 2005

- Five Key Steps
 - Author the workflow
 - Design and publish any forms required for the workflow
 - Author the workflow and feature definition files
 - Compile the necessary assemblies
 - Package and deploy as a WSS v3 feature



Without VSTO 15 Steps

- Create workflow in Visual Studio 2005
- Author the feature definition file
 - Add GUID
 - Add title
 - Add description
 - Add manifest location
- Author workflow template definition file
 - Add GUID
 - Add name
 - Add description
- Compile the workflow files into a .NET assembly
- Sign the assembly
 - Add key file
- Design the actual workflow, add code etc. (This is the “real” developer task)
- Install assembly into the Global Assembly Cache
- Extract public key token
- Add key token to workflow template definition file
- Deploy feature definition file to SharePoint file system
- Deploy workflow definition file to SharePoint file system
- Reset Internet Information Services
- Press F5
- Attach to WPW3.exe process
- Associate workflow with document library



A background image of a city skyline at night, with various skyscrapers and buildings illuminated. The image is overlaid with a semi-transparent orange-to-yellow gradient that is darker at the top and lighter at the bottom.

Demo

Protocols

SharePoint Developer Track

Agenda

- Protocols overview
- FrontPage RPC
- Lab 1: calling FrontPage RPC methods
- SharePoint RPC
- Lab 2: calling SharePoint RPC methods
- Ajax and Atlas
- Lab 3: building Ajax-style applications
- Questions & Discussion



Non-web service remote communication

- FrontPage and SharePoint RPC architecture
- When to use FrontPage and SharePoint RPC protocols?



FrontPage RPC – HTTP POST request

```
POST /[Site]/_vti_bin/_vti_adm/admin.dll  
HTTP/1.1
```

```
X-Vermeer-Content-Type: application/x-www-  
form-urlencoded
```

```
Content-Type: application/x-www-form-  
-urlencoded
```

```
Authorization: Negotiate TlRMT...AP
```

```
Host: [server]
```

```
Content-Length: 69
```

```
Expect: 100-continue
```

```
method=get
```

```
manifest:12.0.0.3820&service_name=/[Site]
```

```
&options=everything
```



Agenda

- Availability (throughput, scale and latency)
- Suggested limits
- Hardware
- Topology
- Troubleshooting and testing



Session Goals

- Provide framework for capacity planning
- Highlight top watch-outs and warnings
- Identify and demonstrate available tools for validating capacity decisions in your environment



Questions Often Heard

- How much hardware do I need?
- Do I need a server farm?
- Do I need SQL Server?
- How much data can I store?
- How many people can I support?
- How many sites can I run on my servers?
- How do I validate it?



Users and Throughput

- User load: Typical versus Peak
 - Typical = Average requests over standard unit of time (work day)
 - Peak = concurrency (versus user type); plan for peak
- Usage profile: user's behavior
 - Distribution of requests across content
 - Mine your IIS Logs
- Usage Rule of Thumb; assuming 10% concurrency

Profile	Expected Rate (RPH)	Concurrent users	Total users
Light	20	180	1,800
Typical	36	100	1,000
Heavy	60	60	600
Extreme	120	30	300

- 1 RPS =

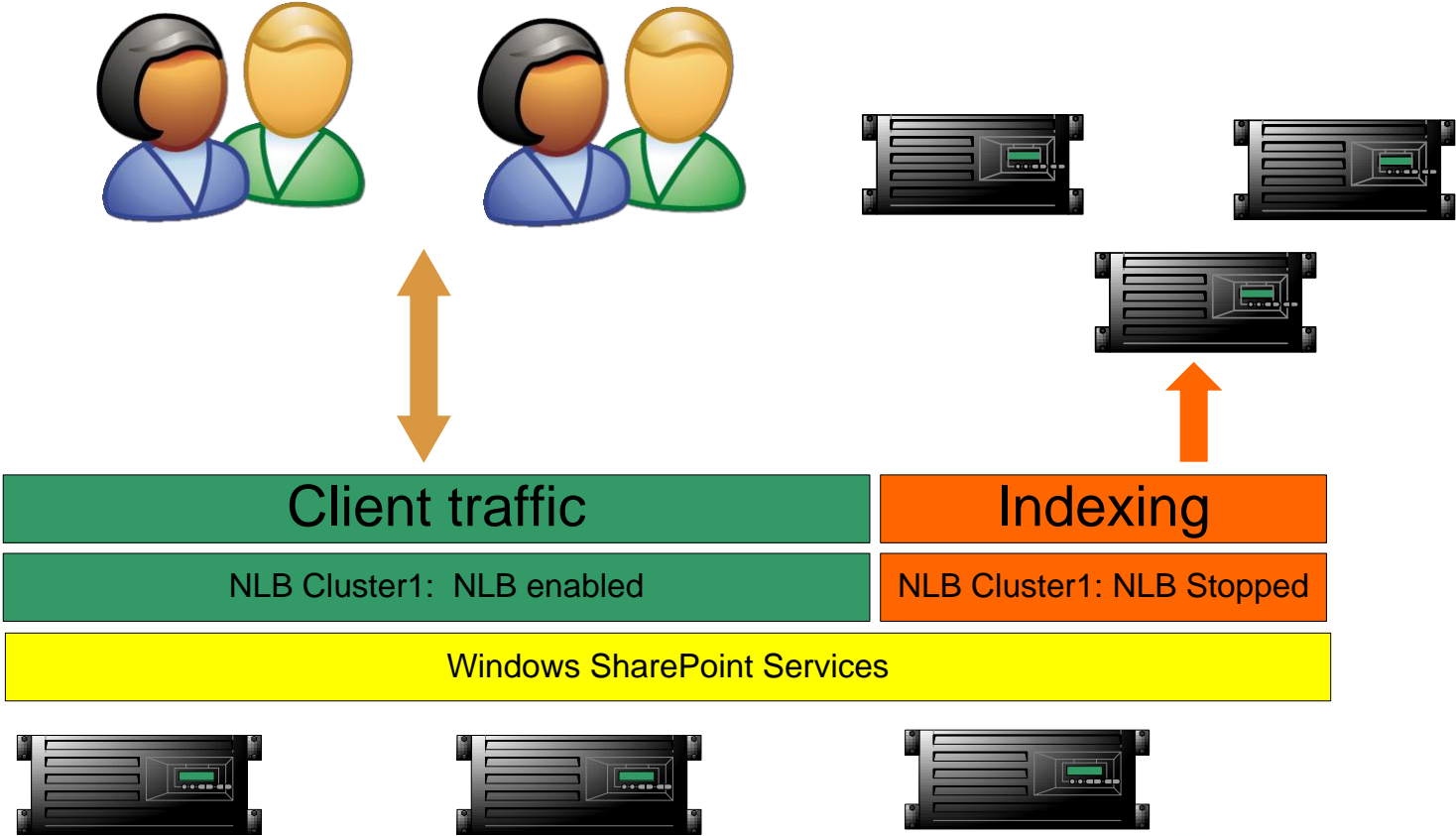


Customization affecting performance

- Event handlers
- Workflows
- Web Parts
 - Badly coded
 - Too many SQL round trips
 - Content by Query limited to 1,000 lists by default – fails if more.
- Field Controls
- Authentication and Role Providers
 - Anonymous - Fastest
 - Kerberos
 - NTLM
 - Basic
 - Forms - Slowest
- iFilters and Protocol handlers



Growth and Capacity Planning



Latency

- Latency components
 - Server processing
 - SQL processing, # SQL round trips, AJAX processing, security trimming
 - Client processing
 - JavaScript, CSS, AJAX requests, HTML load, Client machine specs
 - Wire transfer
 - Bandwidth, size of download
- Recommendations
 - #1 killer of latency = custom web parts / field controls
 - Watch for: SQL round trips, unnecessary data, excessive client side script
 - Re-use existing client code versus adding more
 - Design code for performance – e.g. HTML table definitions
 - Profile your solutions



Data – Scale

- How many objects?
 - Infrastructure: Portal sites, team sites, personal sites, document libraries, etc.
 - Data: documents, lists, profiles, etc.
- Recommendations
 - Carefully plan your site hierarchy and deployment
 - Minimize # web applications and application pools
 - Limit # of shared service providers
 - Plan for database growth
 - Follow data and feature best practices and suggested limits



Data – Suggested Limits (not hard coded)

Object	Scope	Guideline
Site collections	Database	50,000
Web sites	Site collection	250,000
(sub) Web sites	Web site	2,000
Lists	Web site	2,000
Items	List	10 M
Documents	Doc Library	2 M
Documents	Folder	2,000
Document size	File	2 GB
Indexed Documents (MOSS)	SSP	50 M
Search Scopes (MOSS)	Site Collection	1,000
# Profiles (MOSS)	SSP	5 M

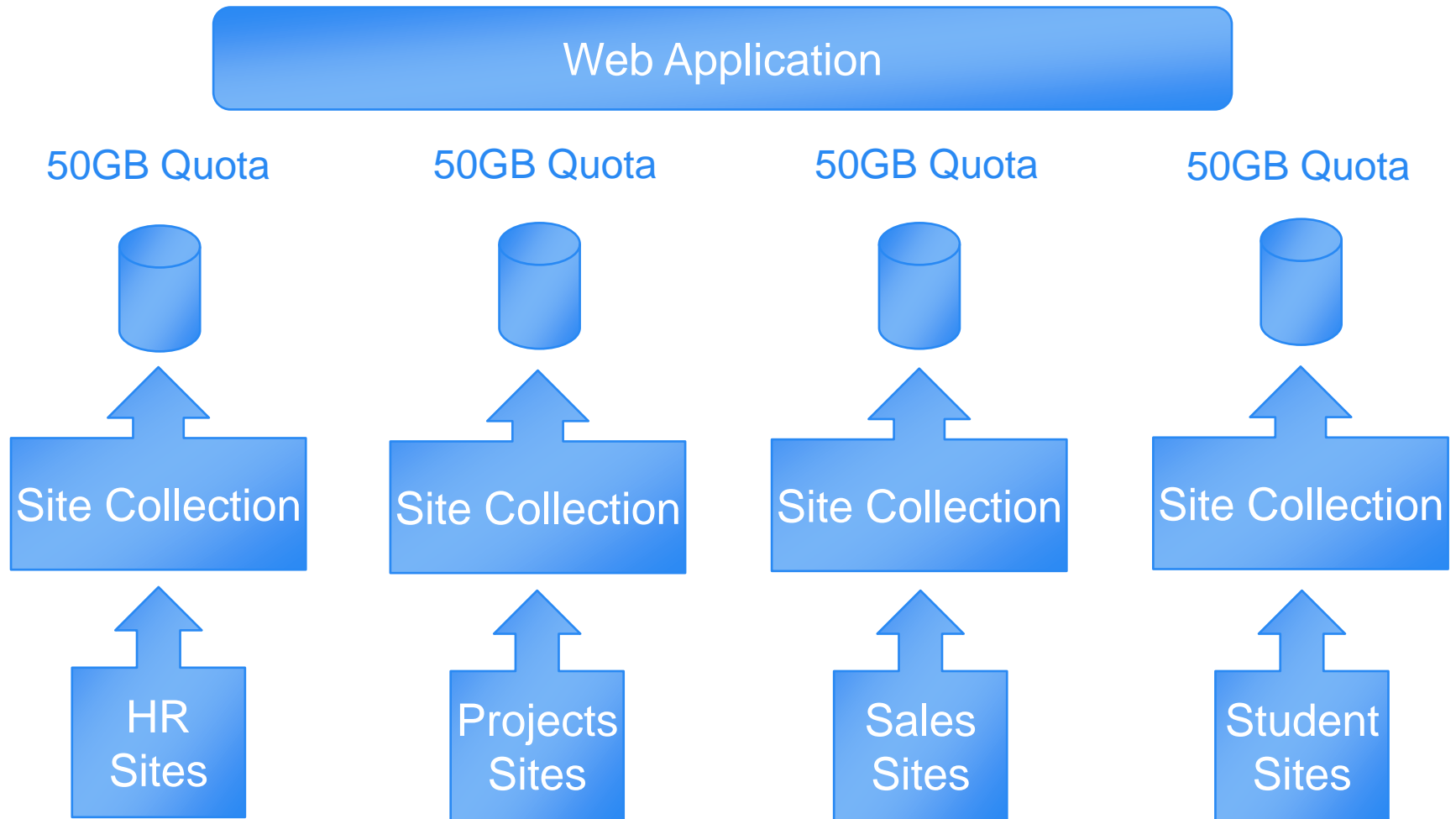


Physical Data Storage & Site Collections

- What about Content DBs?
 - Site Collections cannot span Content DBs
- But what if I want to keep my DBs manageable? (75 - 100GB)
 - Then you need multiple Site Collections
- But aren't there features that don't work across Site Collections?
 - Content Types
 - Shared Columns
 - Content by Query Web Part
 - Workflow
 - Information Management & Retention Policies
 - Document Link Fix Up
 - WSS v3 Search cannot span Site Collections
 - Quotas are at the Site Collection Level



Database file per site collection



Data – Storage Requirements

- Primary metric: Document storage
 - Plan for 1.2 – 1.5 x file system size for SQL Server
 - note:** metric is closely tied to RAID level used on SQL disks
- Secondary metric = Index
 - Index server: 10-15% of total size of all content indexed for single server
 - Query server: *same* size as Index server



Hardware – How SharePoint Scales?

- Designed to grow with organization needs

- Server resources: x32, x64, CPU, RAM, HDD

- Recommend 64 bit for back end services which can leverage additional addressable memory >4GB.

- SQL - Index – Excel – Search – Web

- Mixed 64 / 32 bit farms supported – Do not Mix Roles. All Webs 64 Bit
- SQL: HDD configuration critical

- Server Farm

- Topology restrictions removed
- WFE, query, index, excel calc, project, SQL

- Shared Services

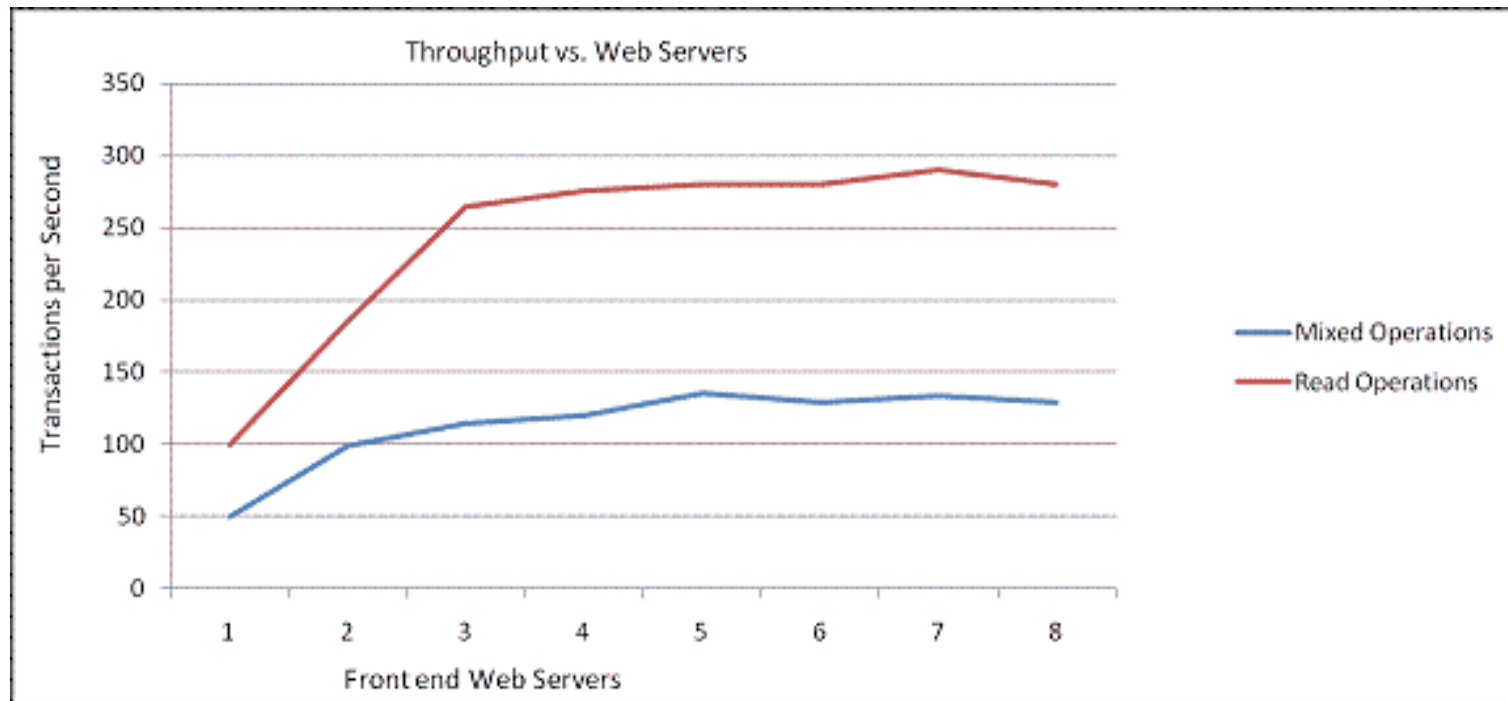
- On by default (up to 20/farm)

- Adopted WSS adage: content only limited by HW capability*

- Sites: Portals are "just another site"

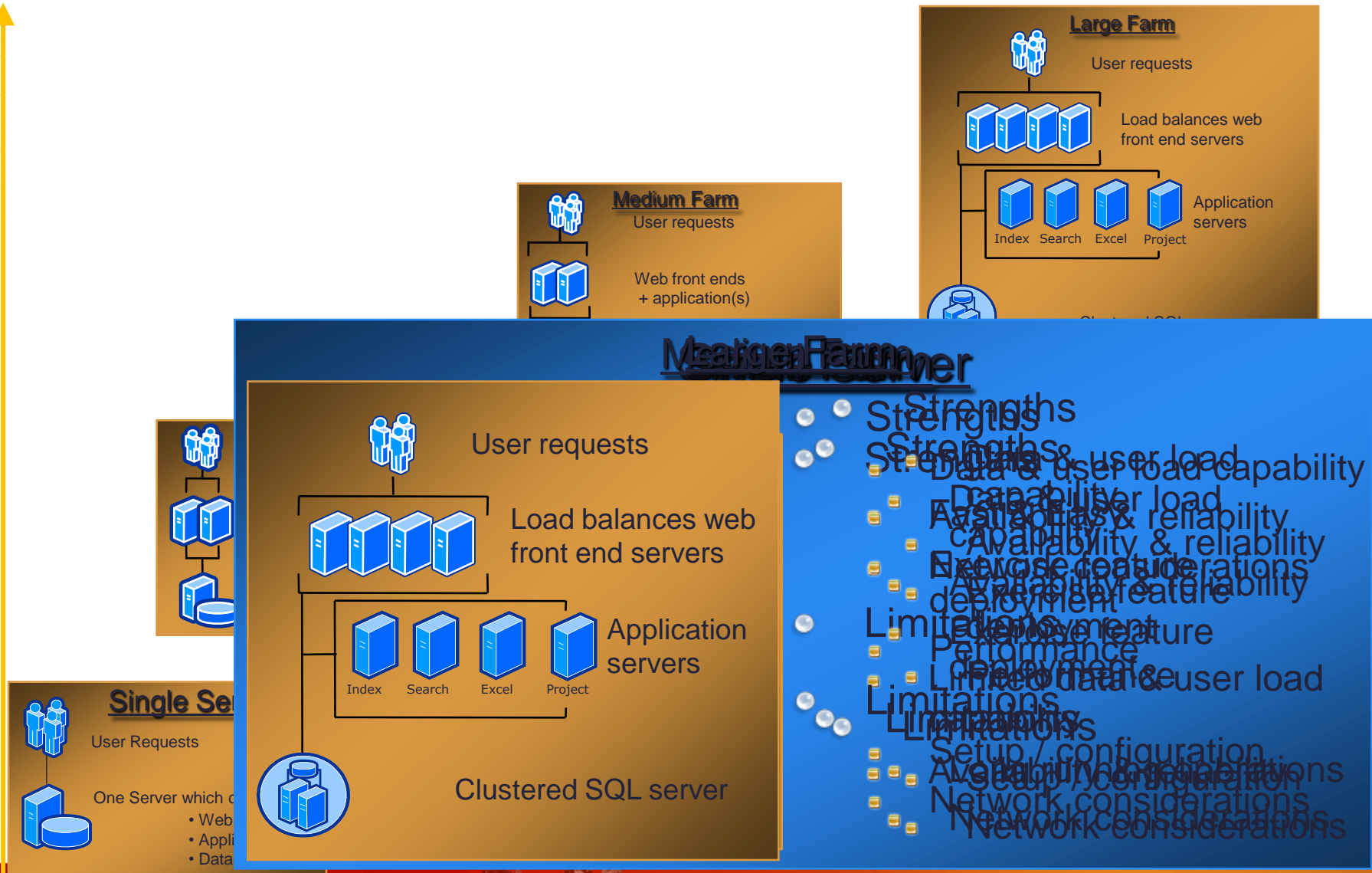


Hardware vs. Throughput




Picking Your Topology

Performance ↑



- Strengths**
- Scalability
 - High user load capability
 - Data & user load capability
 - Availability
 - High reliability
 - Availability & reliability
 - Exercise feature
 - Application & reliability
 - Deployment
- Limitations**
- Performance
 - Limited data & user load
 - Limited data & user load
 - Setup / configuration
 - Availability & configuration
 - Network considerations
 - Network considerations

Hardware – Single server



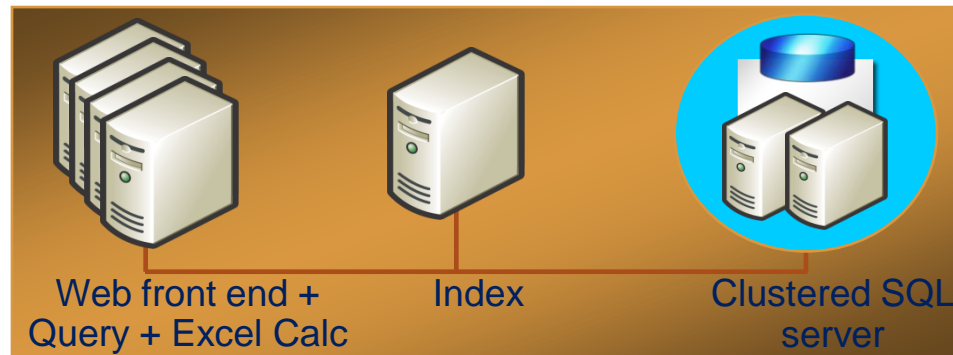
One Server containing

- Web front end
- Application
- Database

Server type	RAM	HDD	CPU
Single server	2 GB	100 GB	1 x 2.8 Ghz Pentium-4 (32bit)

- SQL Express appropriate for up to 500 (typical) users
- SQL appropriate up to 5,000 (typical) users
 - Host: 1,000 team, portal, and MySites
 - Store: 10,000 docs
 - Index: 100,000 docs (11 docs/sec)
 - 10 rps using “common” operations

Hardware – 4x1x1 farm



Server type	RAM	HDD	CPU
Front end servers	2 GB	200 GB	2 x 2.8 Ghz AMD 64bit
Index server	4 GB	200 GB	2 x 2.8 Ghz AMD 64bit
SQL Server computer	4 GB	200 GB	4 x 2.8 Ghz, dual core, AMD 64bit

Highly available

- Users: 100,000s of users
- Host: 10,000s of team, portal and MySites
- Store: 1,000,000s of documents
- Index: 1,000,000s of documents



"Right" Sizing Your Installation



Farm Type	# Users	Comments
Single server (SQL Express)	≤ 500	Does not meet "high availability" bar
Single server (SQL)	≤ 5,000	Does not meet "high availability" bar
Medium farm (2 x 1 x 2)	≤ 100,000	No single point of failure
Large farm (4 x 3 x 2)	≤ 500,000	No single point of failure



Caching

Use this type of caching...	At the...	Notes
Output caching and cache profiles	Individual page level	Ideal for heavily accessed Web sites that do not need to present new content frequently.
Object caching	Individual Web Part control, field control, and content level Set at Site collection , Site and page level.	Includes cross-list query caching and navigation caching 100MB by default
Disk-based caching for Binary Large Objects (BLOBs)	Individual BLOB level and caches images, sound, movies, and code Configured per Web App	Supports .gif, .jpg, .js, .css, and other image, sound, and code files that are stored as binary large objects 1GB Space used minimum



Troubleshooting

- Poor throughput
 - SQL – use SQL best practices for perf; especially disk perf
 - Asynchronous operations and timer job conflicts
 - Resource contention: # web apps, app pools, DBs, etc.
 - Check ANY custom code for SQL round trips and payload
 - Look for mis-configured network components (NICs, routers, etc.)
- Poor end user perceived latency
 - Page payload
 - OOB 1st page download ~ 200 KB; should not be significantly higher
 - Use page compression where possible
 - Caching strategy: Turn on BLOB and Output caching whenever possible
 - Client machine specs
 - Mis-configured network



Call To Action

Do

- Use the Framework
 - Use the rules to right-size your deployment
 - Use the tools to validate your environment
- Use the Documentation
 - Capacity planning - TechNet
 - High availability deployment



Ankündigung

Combined Knowledge Kurse Frankfurt/Main

- Entwickler Schulung 7.-11. April
- Administrator Schulung 26.-30. Mai



Resources

Combined Knowledge:

<http://www.combined-knowledge.com>

MindSharp:

<http://www.mindsharp.com>

My blog:

<http://www.software-smith.com>

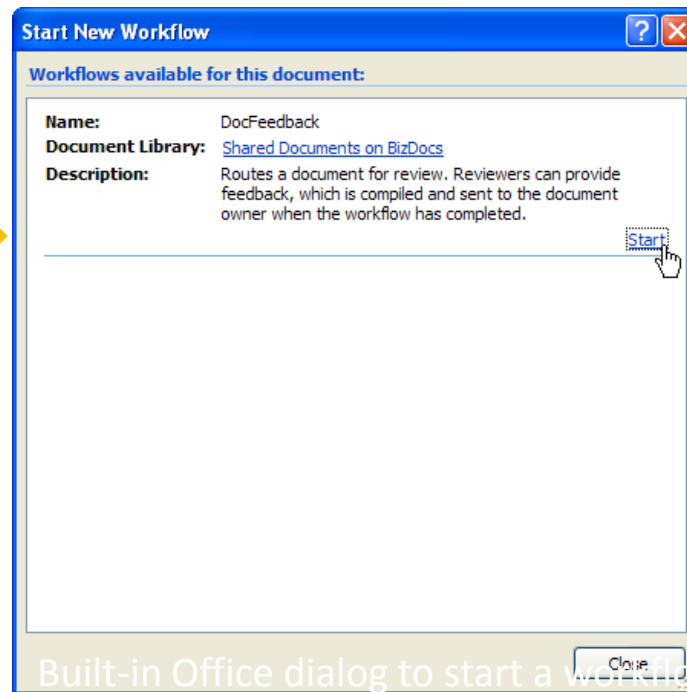
My video:

<http://msdn2.microsoft.com/en-us/vstudio/bb821247.aspx>

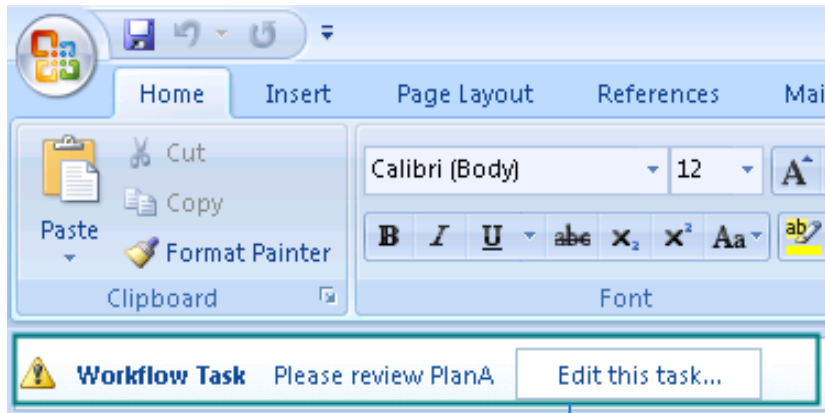


Starting the Workflow

- You can start the workflow from Office client applications or the Web browser
- Starting the workflow creates an instance of the workflow
- The workflow instance is tied to the document or item



Interacting in Office



The business bar

- Office “business bar”
 - Displays when workflow tasks are pending
 - Result of communication between Office and SharePoint
 - Is a launch point for further workflow interaction



Customizing the Workflow

- Visual Studio Tools for Office contains special templates and tools to make it easier for developers to build custom workflow solutions
- Developers can build workflow solutions by:
 - Creating a custom workflow layout
 - Adding custom code to the workflow
 - Adding tasks to workflow
 - Adding custom forms to the workflow



Workflow Solution

- Called a SharePoint “feature”
- Installed
 - As a feature template on the server and enabled
- Association
 - Must be associated with document library or list
- Initiation
 - New instance kicks off when item is created or changed
 - Can also be started manually by user
 - Instance “linked” to the document or list item



Association

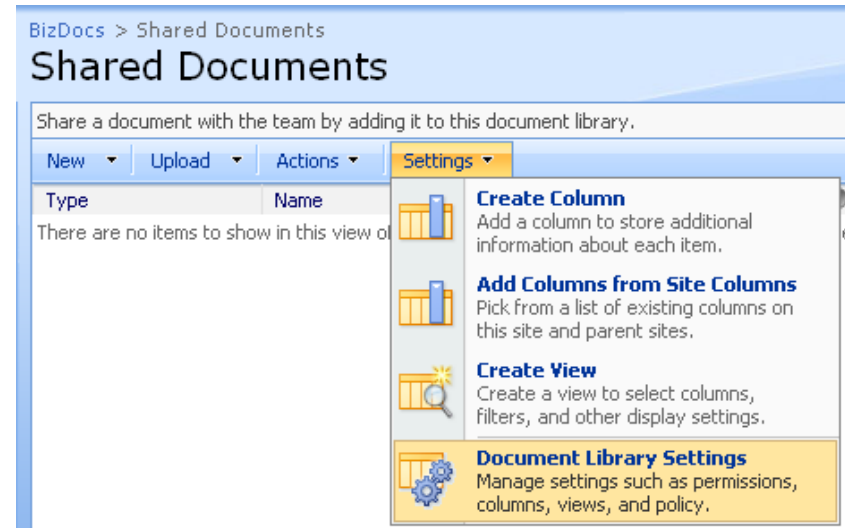
- All workflows have basic properties and settings
 - Name
 - Task list
 - History list
 - Start options
- Once the association is complete, new workflow instances can be created as activity occurs in the library or list

Name Type a name for this workflow. The name will be used to identify this workflow to users of this document library.	Type a unique name for this workflow: <input type="text" value="DocFeedback"/>
Task List Select a task list to use with this workflow. You can select an existing task list or request that a new task list be created.	Select a task list: <input type="text" value="Tasks"/> Description: Use the Tasks list to keep track of work that you or your team needs to complete.
History List Select a history list to use with this workflow. You can select an existing history list or request that a new history list be created.	Select a history list: <input type="text" value="Workflow History (new)"/> Description: A new history list will be created for use by this workflow.
Start Options Specify how this workflow can be started.	<input checked="" type="checkbox"/> Allow this workflow to be manually started by an authenticated user. Require these additional permissions to start the workflow. <ul style="list-style-type: none"><input checked="" type="checkbox"/> Edit Items<input type="checkbox"/> Manage Lists <input type="checkbox"/> Start this workflow to approve publishing a major version of an item. <input type="checkbox"/> Start this workflow when a new item is created. <input type="checkbox"/> Start this workflow when an item is changed.



Workflow and Library or List

- Site administrators associate a workflow with a library or list
- A single library or list can be associated with multiple workflows
- Association requires configuring the characteristics and behaviors of the workflow



The screenshot shows the 'Shared Documents' library settings page in SharePoint. The breadcrumb path is 'BizDocs > Shared Documents'. Below the title, there is a message: 'Share a document with the team by adding it to this document library.' The main navigation bar includes 'New', 'Upload', 'Actions', and 'Settings'. The 'Settings' dropdown menu is open, showing four options: 'Create Column' (Add a column to store additional information about each item.), 'Add Columns from Site Columns' (Pick from a list of existing columns on this site and parent sites.), 'Create View' (Create a view to select columns, filters, and other display settings.), and 'Document Library Settings' (Manage settings such as permissions, columns, views, and policy.).

Permissions and Policies

- [Permissions for this document library](#)
- [Workflow settings](#)
- [Information management policy settings](#)



VSTO Advantage

- Developers are enthusiastic about SharePoint workflow
- Developing custom SharePoint workflow solutions using the out-of-the-box (OOB) techniques is lengthy.
- Visual Studio Tools for Office "Orcas" reduces complexity and greatly speeds development



Tools Overview

- Two supported languages: Visual Basic .NET and Visual C# .NET
- Two built-in workflow template types for each language
- Leverages the same workflow designer used for non-SharePoint workflow applications
- Facilitates workflow debugging



Without VSTO 2008

- Creating a workflow in Visual Studio without Visual Studio Tools for Office is pain-staking
- A great deal of time is spent troubleshooting the development environment- not the customization itself
- Developers must read lengthy documentation and follow detailed steps to be successful
- The number of steps involved in a simple debugging session is excessive



VSTO Steps

- Create workflow in Visual Studio Tools for Office "Orcas"
- Design the actual workflow, add code etc. (This is the "real" developer task)
- Press F5



Workflow User Experience

- SharePoint workflow is about business process and information flow
- End-users can interact via the Web browser, Office client applications, or custom UI
- SharePoint ships with out-of-the-box workflows installed and activated

