

# "Caching-In" for SharePoint Performance

*@spmcDonough  
on Twitter  
for heckling  
purposes!*

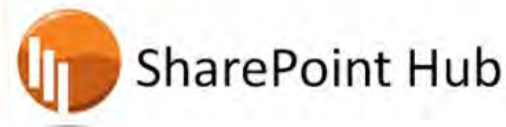


Sean P. McDonough  
Microsoft MVP (Office Development, Office Servers and Services)  
Chief Technology Officer  
PAIT Group





Technology Delivered



# Session Overview

- Caching 101
- Understanding each of SharePoint's platform caching options
- How to leverage and control caching
- Scenarios quiz
- Q & A

Why I care about caching

okay ...

Why I



catching

okay ...

Why I



caching

Formerly the architect for a Fortune 25 company's publicly facing SharePoint presence

okay ...

Why I



caching

Formerly the architect for a Fortune 25 company's publicly facing SharePoint presence

Highly trafficked environment with about 75,000 page views per hour (peak).

okay ...

Why I



caching

Formerly the architect for a Fortune 25 company's publicly facing SharePoint presence

Highly trafficked environment with about 75,000 page views per hour (peak).

Averaging (at peak) 1,000 requests/second into IIS



000 requests/second into IIS



Supported initially with just 2 web front ends (WFEs). Eventually moved to 4 WFEs for growth.

... and finally

... and finally



I got sick AND  
tired of hearing some  
people complain that  
SharePoint didn't scale!!!

So, what is caching?

Webster's  
New World<sup>™</sup>  
Dictionary



Third College Edition



**cacao butter** COCOA BUTTER

**cac·cia·to|re** (kā'chə tōr'ē) *adj.* [[It, lit., hunter < pp. of *cacciare*, to hunt, chase < VL \**captiare*, to CATCH]] cooked in a casserole with olive oil and tomatoes, onions, spices, wine, etc. [chicken *cacciatore*]

**cach|a·lot** (kash'ə lät', -lō') *n.* [[Fr < Sp *cachalote* < colloq. Port *cachola*, head]] SPERM WHALE

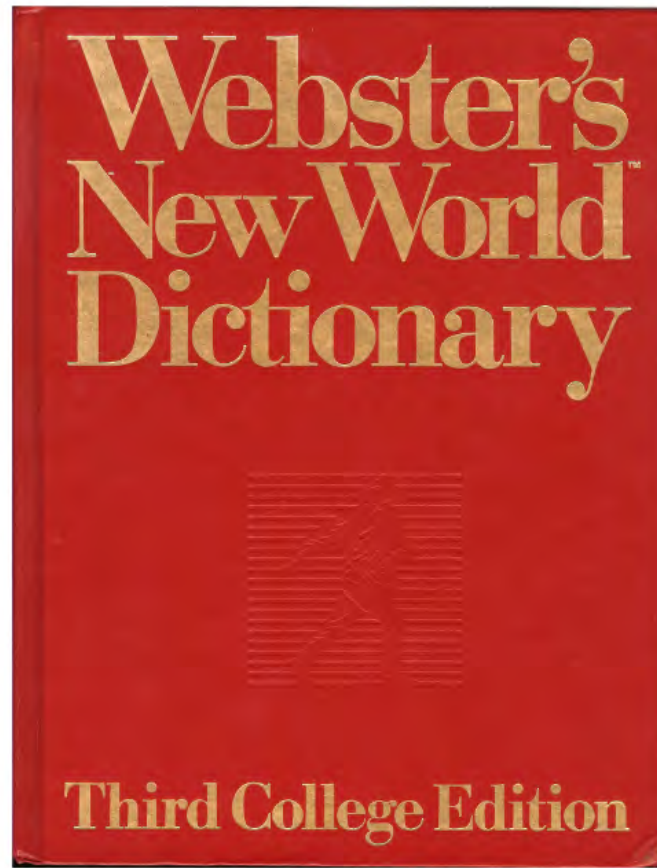
**cache** (kash) *n.* [[Fr < *cache*, conceal < VL \**coacticare*, store up, collect, compress < L *coactare*, constrain < *coactus*, pp. of *cogere*, to collect: see COGENT]]

1 a place in which stores of food, supplies, etc. are hidden, as by explorers or trappers 2 a safe place for hiding or storing things 3 anything stored or hidden in such a place —*vt.* **cached, cach'ing** to hide or store in a cache —*SYN.* HIDE<sup>1</sup>

**cache·pot** (kash'pät, -pō') *n.* [[Fr < *cache*, to hide (see prec.) + *pot*, POT<sup>1</sup>]] a decorative pot, jar, etc., used esp. for holding potted house plants Also **cache pot**

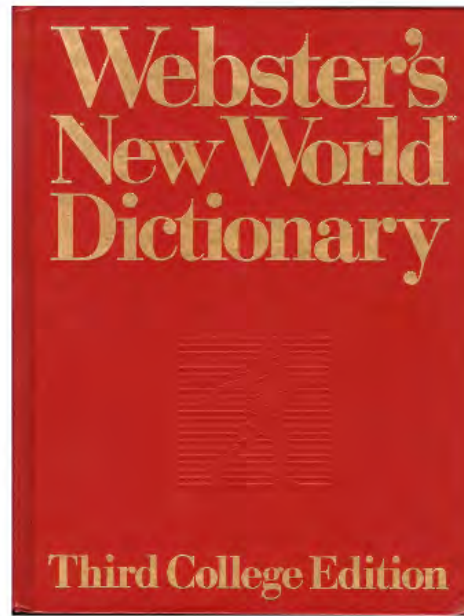
**cache·sexe** (kāsh'seks') *n.* [[Fr < *cache*, to hide (see CACHE) + *sexe*, sex]] a small cloth or band worn, as by an otherwise nude dancer, to conceal the genitals

**ca·chet** (ka shā', kash'ā) *n.* [[Fr < *cache*: see CACHE]] 1 a seal or stamp on an official letter or document: see also LETTRE DE CACHET 2 any sign of official approval 3 a) a mark or sign showing some



Ok, so this is the dictionary I took to college ... AND THAT WAS OVER 25 YEARS AGO.





Ok, so this is the dictionary  
I took to college ... AND THAT  
WAS OVER 25 YEARS AGO.

Clearly a more contextually  
appropriate definition is needed

Cache:  
what is it?

disk-based caching

in-memory cache

virtual memory

ICP

page output cache

Web Part  
caching

post-cache substitution

Cache:

what is it? App Fabric

HTCP

Distributed Cache CARP

browser cache

Office viewing service cache

buffer

cacheability headers

object cache

BLOB cache

fragment caching



A temporary storage area where data that is computationally expensive or slow to fetch can be placed for faster access



# Option 1: Place data on a faster medium





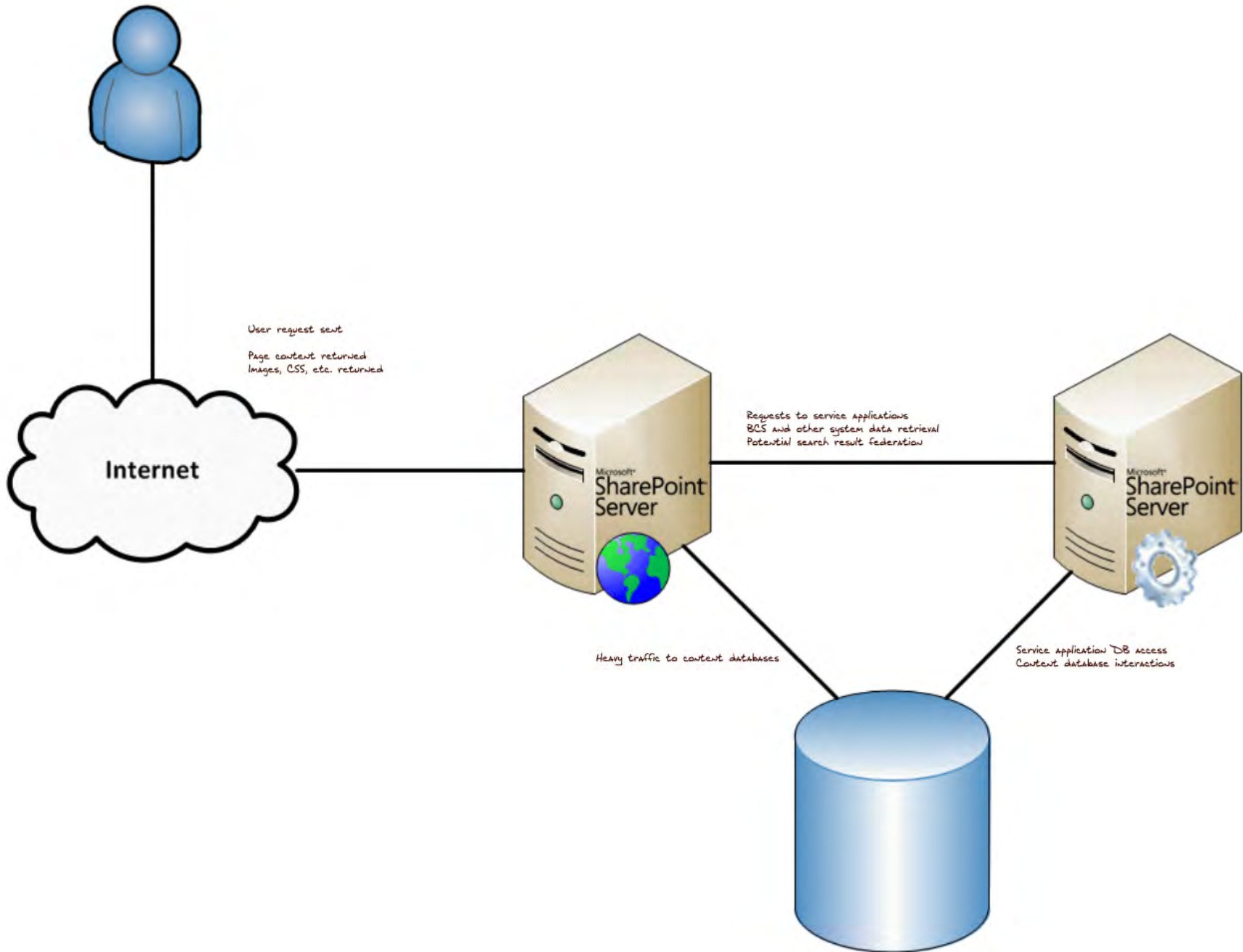
Option 2:  
place data  
closer to the  
point of usage



Why?

or at least "why for SharePoint?"





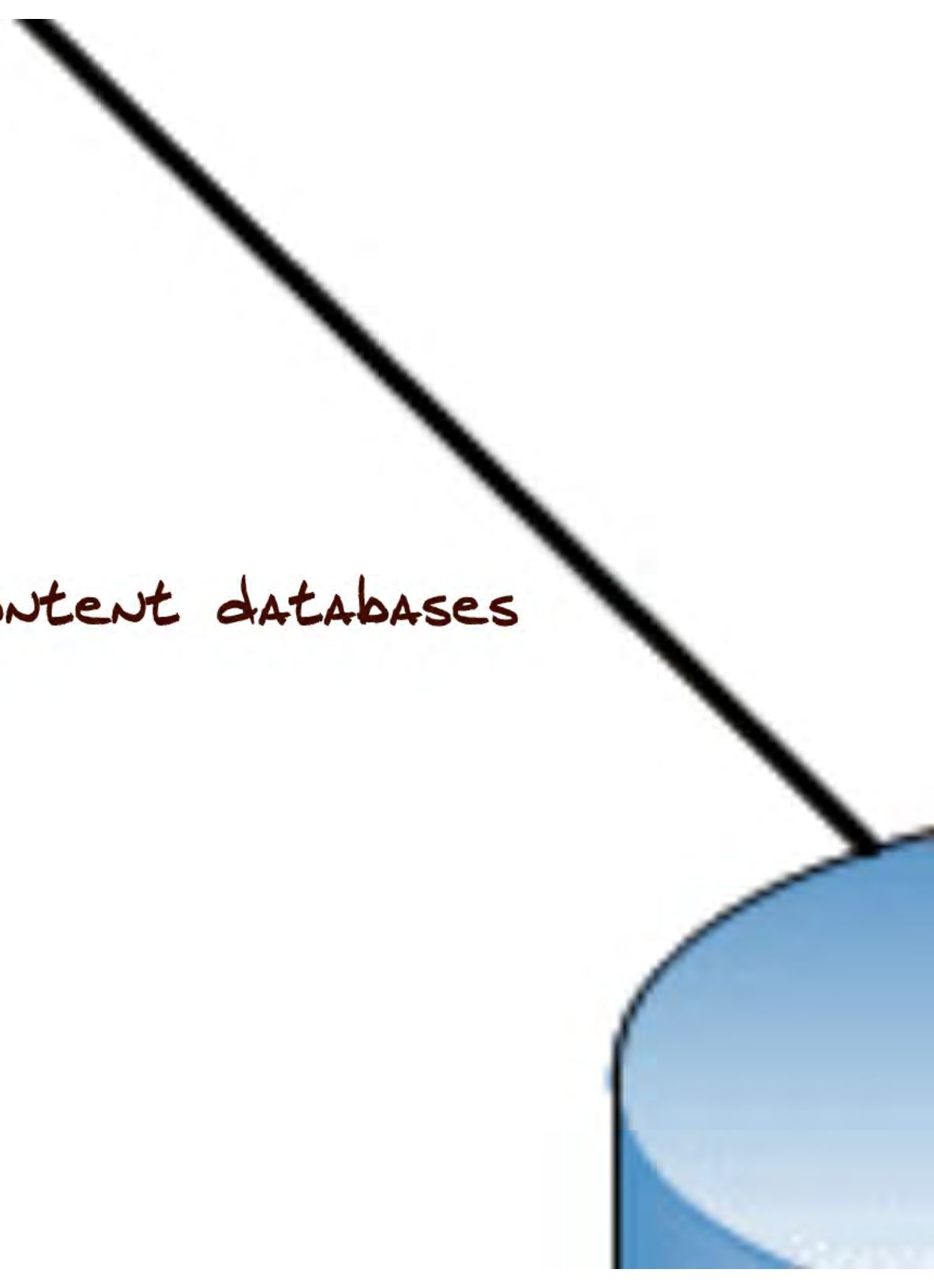


User request sent

Page content returned

Images, CSS, etc. returned

Internet



Heavy traffic to content databases



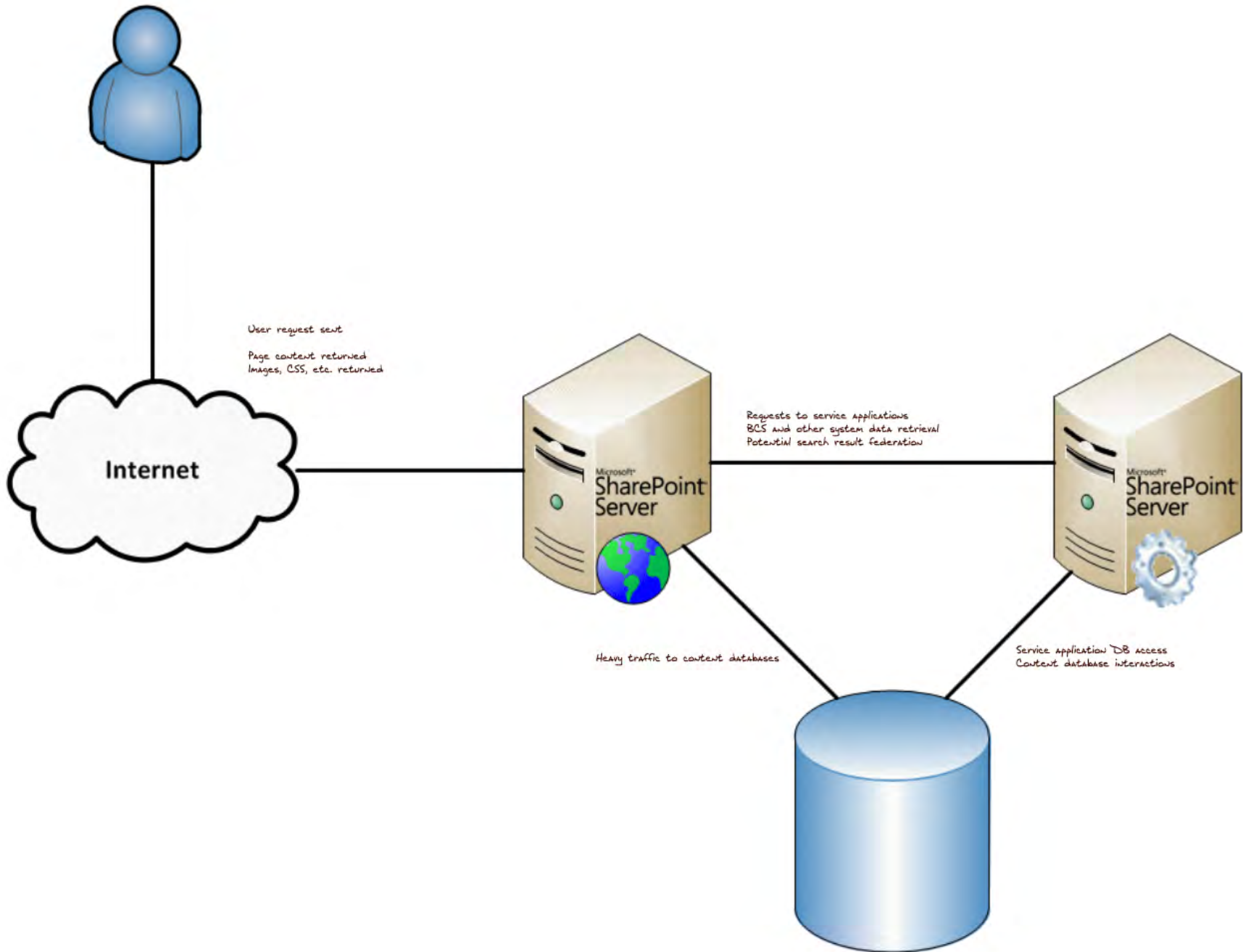
Requests to service applications  
BCS AND other system data retrieval  
Potential search result federation

---

int



Service application DB access  
Content database interactions

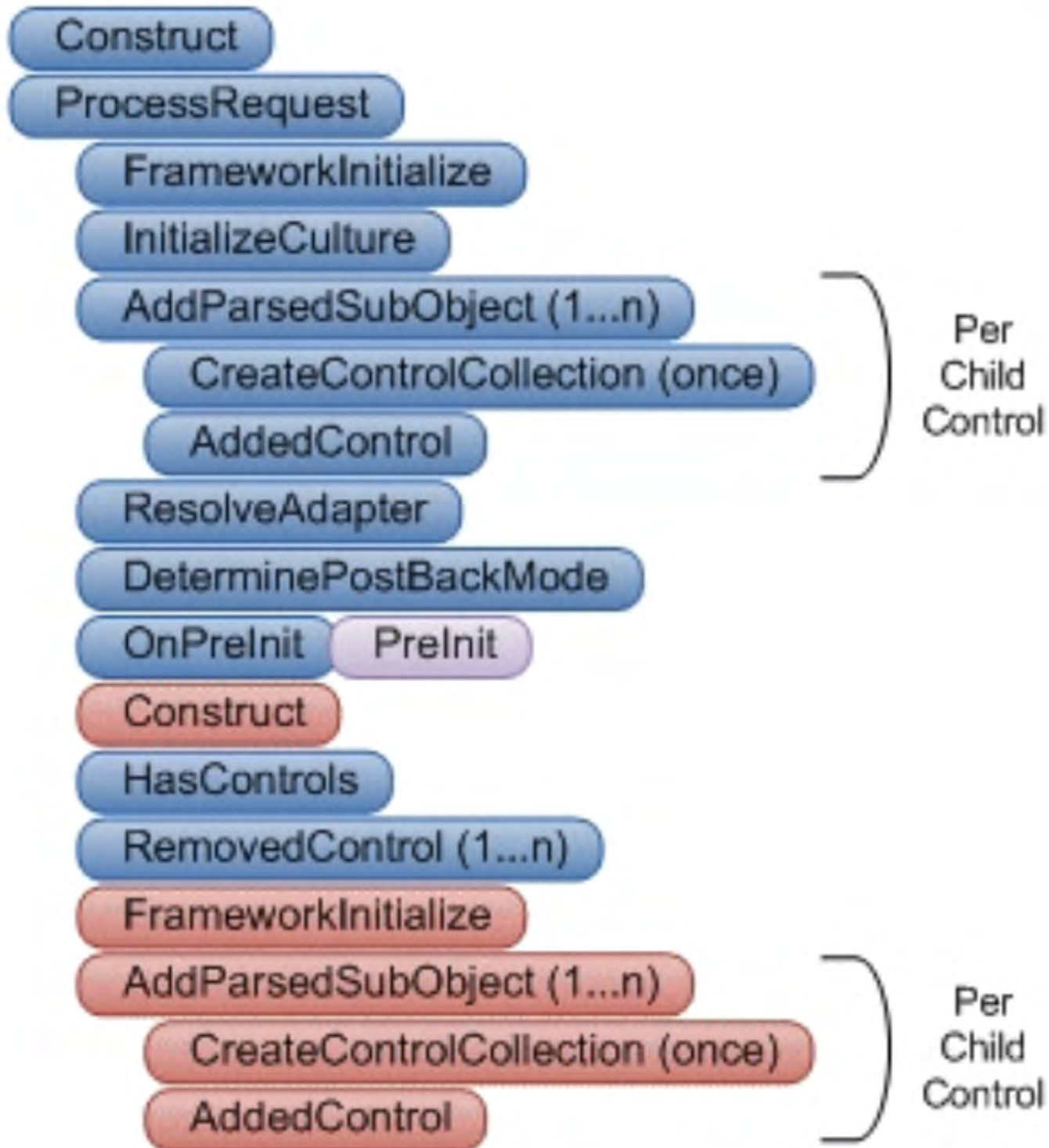




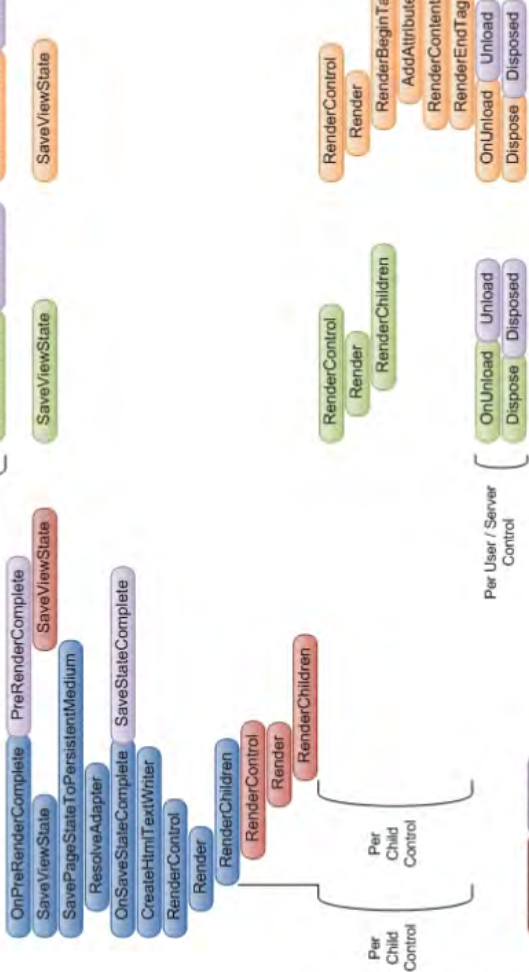
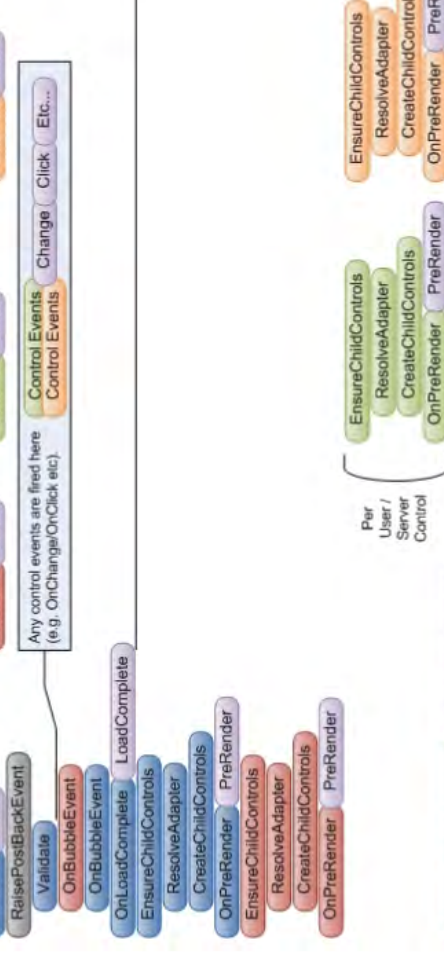
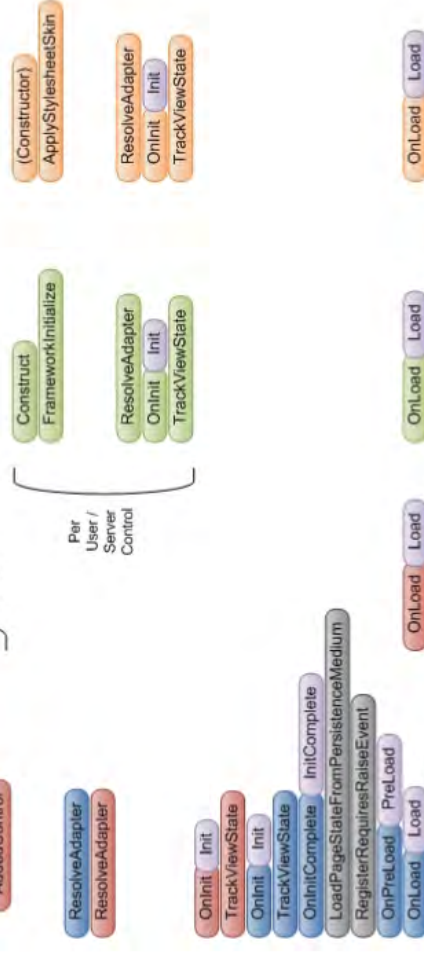
7  
8  
9

ASP.NET Page and Control Life Cycle





# ASP.NET Page and Control Life Cycle



EnsureChildControls/CreateChildControls can be called as early as just after "LoadPageStateFromPersistenceMedium" when doing a postback.

However - always call "EnsureChildControls" before accessing child controls prior to "OnPreRender"

thanks, Justin Stenning!

# The ultimate goal of caching



Better performing,  
more scalable sites  
which yield a better  
user experience

# SharePoint caching: whatcha got?

- Object caching
- BLOB caching
- Page output caching
- Office web applications cache
- Distributed Cache service

CHECKLIST



# SharePoint caching: whatcha got?

- Object caching
- BLOB caching
- Page output caching
- Office web applications cache
- Distributed Cache service

CHECKLIST



*Mentioned but not covered in depth: web part cache, ASP.NET cache, NaryByCustomHandler implementations, post-cache substitution, fragment caching, and other development topics/concerns*

Unless otherwise noted,  
we're talking about:



SharePoint

2013+



Microsoft®  
SharePoint® Server 2010



Microsoft®  
Office SharePoint®  
Server 2007

int

Also, I'll have the slides from this presentation  
available later on my blog

<http://SharePointInterface.com>

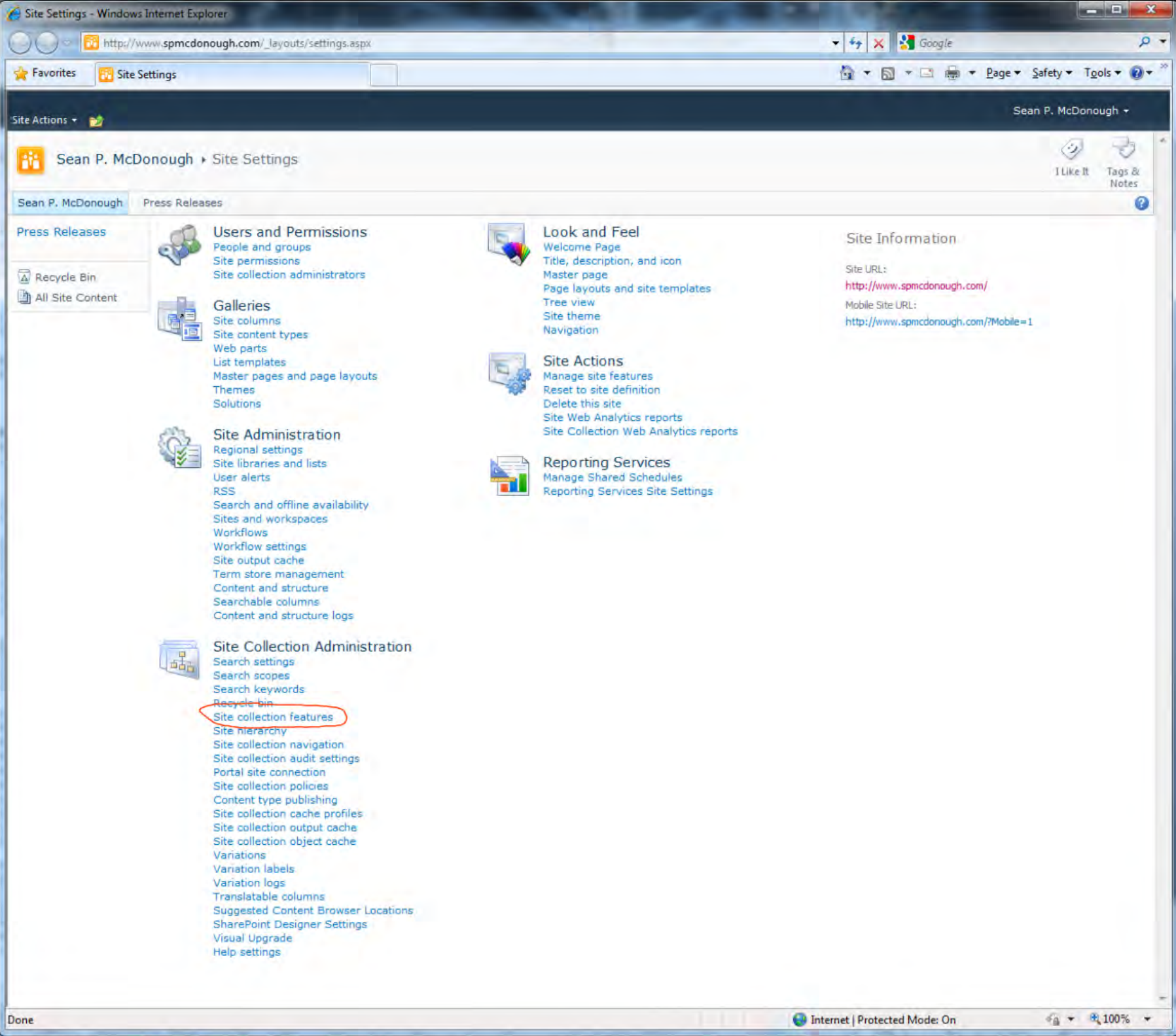
Short story  
time...



Short story  
time...



Where's the  
#\$@! "on" button?



Sean P. McDonough > Site Settings

Press Releases

- Recycle Bin
- All Site Content

**Users and Permissions**  
 People and groups  
 Site permissions  
 Site collection administrators

**Galleries**  
 Site columns  
 Site content types  
 Web parts  
 List templates  
 Master pages and page layouts  
 Themes  
 Solutions

**Site Administration**  
 Regional settings  
 Site libraries and lists  
 User alerts  
 RSS  
 Search and offline availability  
 Sites and workspaces  
 Workflows  
 Workflow settings  
 Site output cache  
 Term store management  
 Content and structure  
 Searchable columns  
 Content and structure logs

**Site Collection Administration**  
 Search settings  
 Search scopes  
 Search keywords  
 Recycle bin  
 Site collection features  
 Site hierarchy  
 Site collection navigation  
 Site collection audit settings  
 Portal site connection  
 Site collection policies  
 Content type publishing  
 Site collection cache profiles  
 Site collection output cache  
 Site collection object cache  
 Variations  
 Variation labels  
 Variation logs  
 Translatable columns  
 Suggested Content Browser Locations  
 SharePoint Designer Settings  
 Visual Upgrade  
 Help settings

**Look and Feel**  
 Welcome Page  
 Title, description, and icon  
 Master page  
 Page layouts and site templates  
 Tree view  
 Site theme  
 Navigation

**Site Actions**  
 Manage site features  
 Reset to site definition  
 Delete this site  
 Site Web Analytics reports  
 Site Collection Web Analytics reports

**Reporting Services**  
 Manage Shared Schedules  
 Reporting Services Site Settings

Site Information

Site URL:  
<http://www.spmcdonough.com/>  
 Mobile Site URL:  
<http://www.spmcdonough.com/?Mobile=1>

[Content and structure logs](#)



## [Site Collection Administration](#)

[Search settings](#)

[Search scopes](#)

[Search keywords](#)

[Recycle bin](#)

[Site collection features](#)

[Site hierarchy](#)

[Site collection navigation](#)

[Site collection audit settings](#)

[Portal site connection](#)

[Site collection policies](#)



















[Content type publishing](#)

[Site collection cache profiles](#)

Site Collection Features - Windows Internet Explorer

http://www.spmcdonough.com/\_layouts/ManageFeatures.aspx?Scope=Site

Sean P. McD... Open Menu

	<b>Custom Site Collection Help</b> Creates a Help library that can be used to store custom help for this site collection.	Activate
	<b>Disposition Approval Workflow</b> Manages document expiration and retention by allowing participants to decide whether to retain or delete expired documents.	Deactivate <b>Active</b>
	<b>Document ID Service</b> Assigns IDs to documents in the Site Collection, which can be used to retrieve items independent of their current location.	Activate
	<b>Document Sets</b> Provides the content types required for creating and using document sets. Create a document set when you want to manage multiple documents as a single work product.	Activate
	<b>In Place Records Management</b> Enable the definition and declaration of records in place.	Activate
	<b>Library and Folder Based Retention</b> Allows list administrators to override content type retention schedules and set schedules on libraries and folders.	Activate
	<b>Open Documents in Client Applications by Default</b> Configures links to documents so they open in client applications instead of Web applications, by default.	Activate
	<b>PerformancePoint Services Site Collection Features</b> Features enabling the PerformancePoint Services site including content types and site definitions for this site collection.	Activate
	<b>Publishing Approval Workflow</b> Routes a page for approval. Approvers can approve or reject the page, reassign the approval task, or request changes to the page. This workflow can be edited in SharePoint Designer.	Deactivate <b>Active</b>
	<b>Report Server Integration Feature</b> Enables rich reporting using Microsoft SQL Server Reporting Services.	Deactivate <b>Active</b>
	<b>Reporting</b> Creates reports about information in Microsoft SharePoint Foundation.	Activate
	<b>Search Server Web Parts</b> This feature uploads all web parts required for Search Center.	Activate
	<b>SharePoint 2007 Workflows</b> Aggregated set of out-of-box workflow features provided by SharePoint 2007.	Activate
	<b>SharePoint Server Enterprise Site Collection features</b> Features such as InfoPath Forms Services, Visio Services, Access Services, and Excel Services Application, included in the SharePoint Server Enterprise License.	Activate
	<b>SharePoint Server Publishing Infrastructure</b> Provides centralized libraries, content types, master pages and page layouts and enables page scheduling and other publishing functionality for a site collection.	Deactivate <b>Active</b>
	<b>SharePoint Server Standard Site Collection features</b> Features such as user profiles and search, included in the SharePoint Server Standard License.	Activate
	<b>Three-state workflow</b> Use this workflow to track items in a list.	Activate
	<b>Workflows</b> Aggregated set of out-of-box workflow features provided by SharePoint.	Deactivate <b>Active</b>

Of course, this poses some problems for SPF with WSS users ...

Done Internet | Protected Mode: On 100%



## **SharePoint 2007 Workflows**

Aggregated set of out-of-box workflow features provided



## **SharePoint Server Enterprise Site Collection features**

Features such as InfoPath Forms Services, Visio Services, and other features are included in the SharePoint Server Enterprise License.



## **SharePoint Server Publishing Infrastructure**

Provides centralized libraries, content types, master pages, and other functionality for a site collection.



## **SharePoint Server Standard Site Collection features**

Features such as user profiles and search, included in the SharePoint Server Standard License.



## **Three-state workflow**

Use this workflow to track items in a list.

Activate

ng

Deactivate **Active**

Activate

Activate

## se Site Collection features

s Services, Visio Services, Access Services  
cense.

Of course, this poses  
some problems for SPF  
AND WSS users ...

g Infrastructure



content types, master pages and page lay  
l.

## l Site Collection features

and search, included in the SharePoint Se



So ... how does  
the plumbing work?



This is a  
web.config  
file section

```
...
<!--
    The following block of directives will register the ASP.NET Core request
    pipeline with the ASP.NET Core services. To be able to use the directives
    in this block, you must set the aspnetCore:enableRequestPipeline property
    to true in the application's appsettings.json file.
-->
<add path="*" verb="" modules="AspNetCoreRequestPipelineModule" type="Microsoft.AspNetCore.Mvc.Infrastructure.RequestPipelineMiddleware" data-bbox="562 42 900 480"/>
...
<!--
    The following block of directives will register the ASP.NET Core request
    pipeline with the ASP.NET Core services. To be able to use the directives
    in this block, you must set the aspnetCore:enableRequestPipeline property
    to true in the application's appsettings.json file.
-->
<add path="*" verb="" modules="AspNetCoreRequestPipelineModule" type="Microsoft.AspNetCore.Mvc.Infrastructure.RequestPipelineMiddleware" data-bbox="562 480 900 964"/>
...

```

W  
real

Yes, just a section.

Prezi choked when I tried to use AN image of the whole web.config. It WAS really, really, REALLY big





```
</system.web>
<system.webServer>
  <security>
    <requestFiltering allowDoubleEscaping="true">
      <requestLimits maxAllowedContentLength="2147483647" />
    </requestFiltering>
  </security>
  <validation validateIntegratedModeConfiguration="false" />
  <modules runAllManagedModulesForAllRequests="true">
    <remove name="AnonymousIdentification" />
    <remove name="FileAuthorization" />
    <remove name="Profile" />
    <remove name="WebDAVModule" />
    <remove name="Session" />
    <add name="SPRequestModule" precondition="integratedMode" type="Microsoft.SharePoint.ApplicationRuntime.S
    <add name="ScriptModule" precondition="integratedMode" type="System.Web.Handlers.ScriptModule, System.Web
    <add name="SharePoint14Module" precondition="integratedMode" />
    <add name="StateServiceModule" type="Microsoft.Office.Server.Administration.StateModule, Microsoft.Office
    <add name="RSRedirectModule" type="Microsoft.ReportingServices.SharePoint.Soap.RSRedirectModule, RSShareP
    <add name="PublishingHttpModule" type="Microsoft.SharePoint.Publishing.PublishingHttpModule, Microsoft.Sh
  </modules>
  <handlers>
    <remove name="OPTIONSVerbHandler" />
    <remove name="WebServiceHandlerFactory-Integrated" />
    <remove name="svc-Integrated" />
    <remove name="WebDAV" />
    <add name="svc-Integrated" path="*.svc" verb="*" type="System.ServiceModel.Activation.HttpHandler, System
    <add name="OwssvrHandler" scriptProcessor="C:\Program Files\Common Files\Microsoft Shared\Web Server Ext
    <add name="ScriptHandlerFactory" verb="*" path="*.asmx" precondition="integratedMode" type="System.Web.Sc
    <add name="ScriptHandlerFactoryAppServices" verb="*" path="*_AppService.axd" precondition="integratedMode
    <add name="ScriptResource" precondition="integratedMode" verb="GET,HEAD" path="ScriptResource.axd" type="
    <add name="JSONHandlerFactory" path="*.json" verb="*" type="System.Web.Script.Services.ScriptHandlerFacto
    <add name="ReportViewerWebPart" verb="*" path="Reserved.ReportViewerWebPart.axd" type="Microsoft.Reportin
    <add name="ReportViewerWebControl" verb="*" path="Reserved.ReportViewerWebControl.axd" type="Microsoft.Re
  </handlers>
</system.webServer>
<system.serviceModel>
```

# Caching in action

Consider this  
sample page as  
we discuss  
SharePoint's  
caching  
mechanisms...

The screenshot shows a web browser window titled "A Web Page" with the address bar containing "http://spdev:18480/Pages/default.aspx". The page header includes "My SharePoint Site" with a smiley icon, a user profile "SPDC\me", and a search box labeled "Search this site...". A "Site Actions" menu is visible. The main content area features a "Home" sidebar with three buttons: "My SharePoint Site", "Your SharePoint Site", and "Another Site". The main heading is "Welcome Back, Bob!" followed by a large image of a crowd. Below the image are two columns of text. The left column contains a video icon and three paragraphs of text, with the first and third paragraphs being identical. The right column contains two paragraphs of text.

A Web Page

http://spdev:18480/Pages/default.aspx

My SharePoint Site

SPDC\me

Search this site...

Site Actions

Home


My SharePoint Site

Your SharePoint Site

Another Site

Top-Level Site > My SharePoint Site

## Welcome Back, Bob!

  
It is by will alone I set my mind in motion.

It is by the juice of Sapho that thoughts acquire speed, the lips acquire stains, the stains become a warning.

It is by will alone I set my mind in motion.

Just sit right back and you'll hear a tale, a tale of a fateful trip, That started from this tropic port, aboard this tiny ship. The mate was a mighty sailin' man, the Skipper brave and sure. Five passengers set sail that day for a three hour tour. A three hour tour.

The weather started

First up ...

First up ...



Object caching

# Object caching

Speeds access to frequently referenced structural, property, and result data





Navigational  
such as this  
breadcrumb

Top-Level Site > My SharePoint Site

Home  
My SharePoint Site  
Your SharePoint Site  
Another Site

... And the Quick Launch

(publishing) page  
layouts also get  
cached

If this happens  
be a Content  
Query Web  
(CQWP), the  
could be  
significantly  
object cache



NAVIGATIONAL DATA  
SUCH AS THIS  
breadcrumb ...



Home

My SharePoint Site

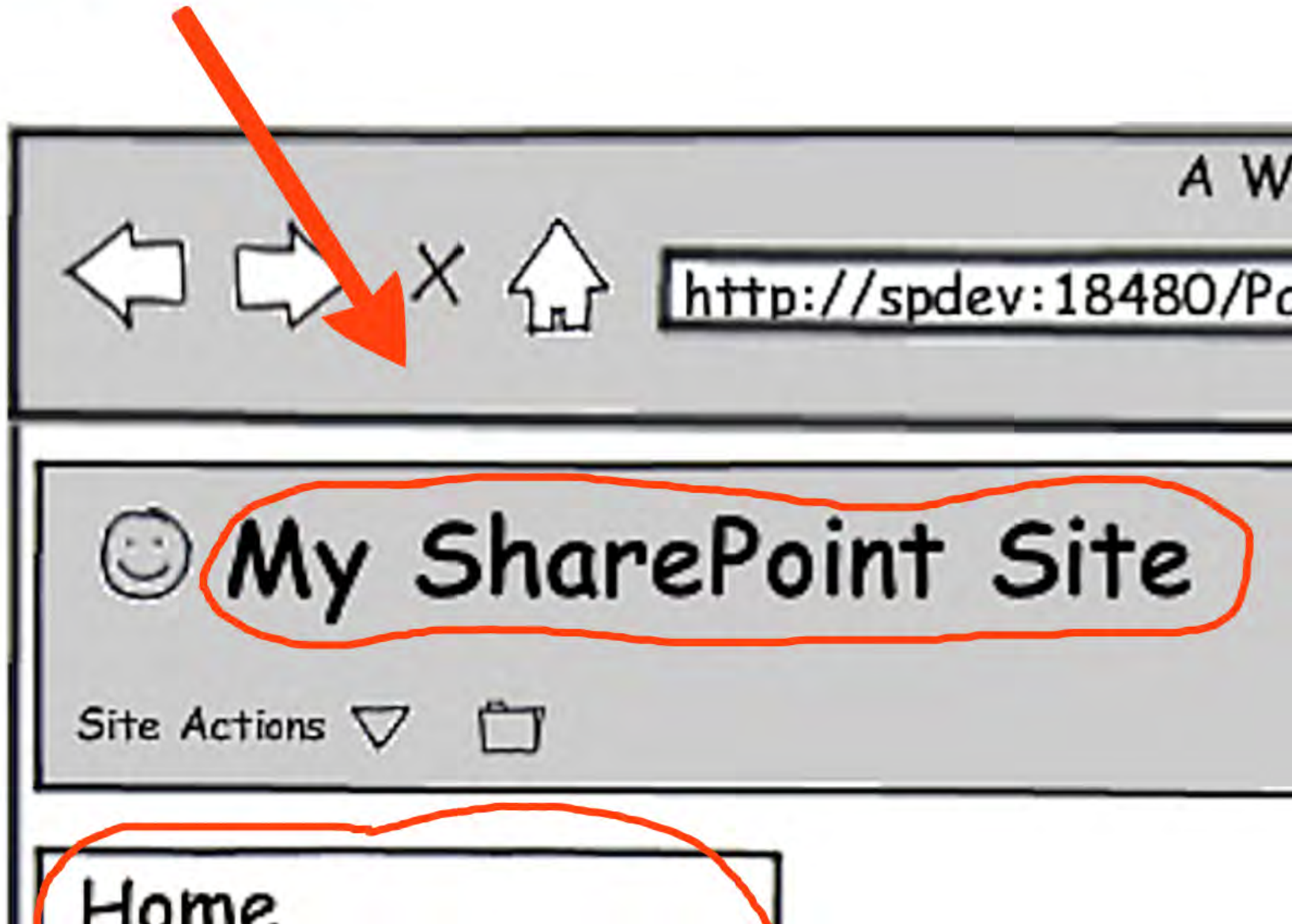
Your SharePoint Site

Another Site

... AND the Quick Launch




Site properties  
like the title



Just sit right back and  
you'll hear a tale, a tale  
of a fateful trip, That  
started from this tropic  
port, aboard this tiny ship.  
The mate was a mighty  
sailin' man, the Skipper  
brave and sure. Five  
passengers set sail that  
day for a three hour tour.  
A three hour tour.

The weather started



If this happened to  
be a Content  
Query Web Part  
(CQWP), then it  
could benefit  
significantly from  
object caching.

(publishing) page  
layouts also get  
cached

th

sp

st

wo

It

mi



Navigational elements such as this breadcrumb

Top-Level Site > My SharePoint Site

Home  
My SharePoint Site  
Your SharePoint Site  
Another Site

... And the Quick Launch

(publishing) page layouts also get cached

If this happens, it could be a Content Query Web Part (CQWP), this could be a significant object cache

Object cache



# Object cache

Backed by memory



# Object cache

Backed by memory



Turned on by default



# Object cache

Backed by memory



Turned on by default



Default ~~size~~ allocation

100MB per  
site collection

# Object cache

Backed by memory



Turned on by default



Default size or allocation

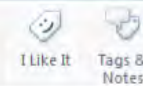
100MB per  
site collection

A trick that started with SharePoint 2010 ...



```
<Action id="0ff1ce14-1021-0000-0000-00000000" />
<Action id="ec0076ac-0c35-4880-8422-8062f59" />
<Action id="602bc8c3-9286-49a3-b973-3376ca7" />
<Action id="00e22a78-33ff-41ac-b0fb-ee46d16" />
<Action id="4b60e42e-e6fc-4188-80d2-ef39e7c" />
<Action id="1d415973-1146-4bc2-8324-83dfff5" />
</MergedActions>
<BlobCache location="C:\BlobCache\14" path="\
<ObjectCache maxSize="100" />
<OutputCacheProfiles useCacheProfileOverrides
<RuntimeFilter Assembly="Microsoft.Office.Ser
</SharePoint>
<system.web>
  <securityPolicy>
    <trustLevel name="WSS_Medium" policyFile="C
    <trustLevel name="WSS_Minimal" policyFile="
  </securityPolicy>
  <httpHandlers />
  <customErrors mode="On" />
  <httpRuntime maxRequestLength="51200" />
```

Sean P. McDonough > Site Settings



Sean P. McDonough Press Releases

Press Releases

- Recycle Bin
- All Site Content

**Users and Permissions**  
People and groups  
Site permissions  
Site collection administrators

**Galleries**  
Site columns  
Site content types  
Web parts  
List templates  
Master pages and page layouts  
Themes  
Solutions

**Site Administration**  
Regional settings  
Site libraries and lists  
User alerts  
RSS  
Search and offline availability  
Sites and workspaces  
Workflows  
Workflow settings  
Site output cache  
Term store management  
Content and structure  
Searchable columns  
Content and structure logs

**Site Collection Administration**  
Search settings  
Search scopes  
Search keywords  
Recycle bin  
Site collection features  
Site hierarchy  
Site collection navigation  
Site collection audit settings  
Portal site connection  
Site collection policies  
Content type publishing  
Site collection cache profiles  
**Site collection output cache**  
**Site collection object cache**  
Variations  
Variation labels  
Variation logs  
Translatable columns  
Suggested Content Browser Locations  
SharePoint Designer Settings  
Visual Upgrade  
Help settings

**Look and Feel**  
Welcome Page  
Title, description, and icon  
Master page  
Page layouts and site templates  
Tree view  
Site theme  
Navigation

**Site Actions**  
Manage site features  
Reset to site definition  
Delete this site  
Site Web Analytics reports  
Site Collection Web Analytics reports

**Reporting Services**  
Manage Shared Schedules  
Reporting Services Site Settings

Site Information

Site URL:  
<http://www.spmcdonough.com/>  
Mobile Site URL:  
<http://www.spmcdonough.com/?Mobile=1>

Site collection audit settings

Portal site connection

Site collection policies

Content type publishing

Site collection cache profiles

Site collection output cache

Site collection object cache

Variations

Variation labels

Variation logs

Translatable columns

Suggested Content Browser Locations

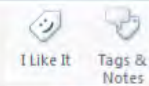
SharePoint Designer Settings

Visual Upgrade

Help settings



### Site Collection Administration > Object cache settings



Sean P. McDonough | Press Releases

Search this site...

Press Releases

#### Object Cache Size

Object Cache Size [Learn more about the object cache.](#)

Max. Cache Size (MB):

100

Recycle Bin

All Site Content

#### Object Cache Reset

When you select this check box, all entries in the object cache will be flushed immediately when you click **OK**. If this check box is not selected, the cache will manage the expiration of items based on when they time out or are changed in the site.

Object Cache Flush

Force all servers in the farm to flush their object caches

#### Cross List Query Cache Changes

Cross list queries initiated by the Content Query Web Part or other custom implementations can use up server resources. Specifying an amount of time to cache the results of a cross list query can positively impact cross-list query performance but may display results that do not reflect the most recent changes to the items returned by the query. Checking the server each time cross list query runs will produce the most accurate results at the possible cost of slower performance across the site.

Check the server for changes every time a cross list query runs  
 Use the cached result of a cross list query for this many seconds:

60

#### Cross List Query Results Multiplier

Each cross list query might retrieve results for a variety of users. To ensure after security trimming that all users will see a valid set of results, the cross list query cache must pull more results than originally requested. Specifying a larger number will retrieve more data from the server and is ideal for site collections that have unique security applied on many lists and sites. Specifying a smaller number will consume less memory per cross list query and is ideally suited for site collections that do not have unique security on each list or site.

Cross list query multiplier:

3

OK

Cancel



## Collection Administration ▶ Object

figure settings for the object cache.

Donough

Press Releases

ases

### **Object Cache Size**

Object Cache Size [Learn more about](#)

Bin

*Search this site...*

Max. Cache Size (MB):

**100**



And now, for a painful story ...

# The take-away:

Don't dial-down the object cache allocation unless you know what you're doing and understand the implications of having too little memory allocated!

# The take-away:

Don't dial-down the object cache allocation unless you know what you're doing and understand the implications of having too little memory allocated!

*I'll give you some performance counters to watch a little later ...*

S

## Object Cache Size

Object Cache Size [Learn more about](#)

ent

## Object Cache Reset

When you select this check box, all entries in the object cache are deleted when you click **OK**. If this check box is not selected, the cache is not reset when they time out or are changed.

100

Object Cache Flush

Force all servers in the farm to flush t

Check the server for changes every ti



you click **OK**. If this check box is not selected, the system will refresh the content on when they time out or are changed in the database.

---

## Cross List Query Cache Changes

Cross list queries initiated by the Content Query use up server resources. Specifying an amount of time to cache the results of a query can positively impact cross-list query performance. The system will refresh the content on when they time out or are changed in the database. The most recent changes to the items returned by a query runs will produce the most accurate results across the site.

Force all servers in the farm to flush the

Check the server for changes every time  
query runs

Use the cached result of a cross list query  
seconds:

60

---

## Cross List Query Results Multiplier





Each cross list query might retrieve results that all users will see a valid set of results, originally requested. Specifying a larger number for site collections that have unique security number will consume less memory per cross list query. Cross list queries for site collections that do not have unique security on each list or

---

Cross list query multiplier:

**3**

# Guidance

	Anonymous	Authenticated
Cache Duration		
Cross List Multiplier		 <i>Especially if per-site and per-item security is prevalent</i>



Especially if per-site  
and per-item security  
is prevalent

### Site Collection Administration > Object cache settings

Configure settings for the object cache.

Sean P. McDonough | Press Releases

Search this site...

Press Releases

#### Object Cache Size

Object Cache Size [Learn more about the object cache.](#)

Max. Cache Size (MB):

100

Recycle Bin

All Site Content

#### Object Cache Reset

When you select this check box, all entries in the object cache will be flushed immediately when you click **OK**. If this check box is not selected, the cache will manage the expiration of items based on when they time out or are changed in the site.

Object Cache Flush

Force all servers in the farm to flush their object caches

#### Cross List Query Cache Changes

Cross list queries initiated by the Content Query Web Part or other custom implementations can use up server resources. Specifying an amount of time to cache the results of a cross list query can positively impact cross-list query performance but may display results that do not reflect the most recent changes to the items returned by the query. Checking the server each time cross list query runs will produce the most accurate results at the possible cost of slower performance across the site.

Check the server for changes every time a cross list query runs  
 Use the cached result of a cross list query for this many seconds:

60

#### Cross List Query Results Multiplier

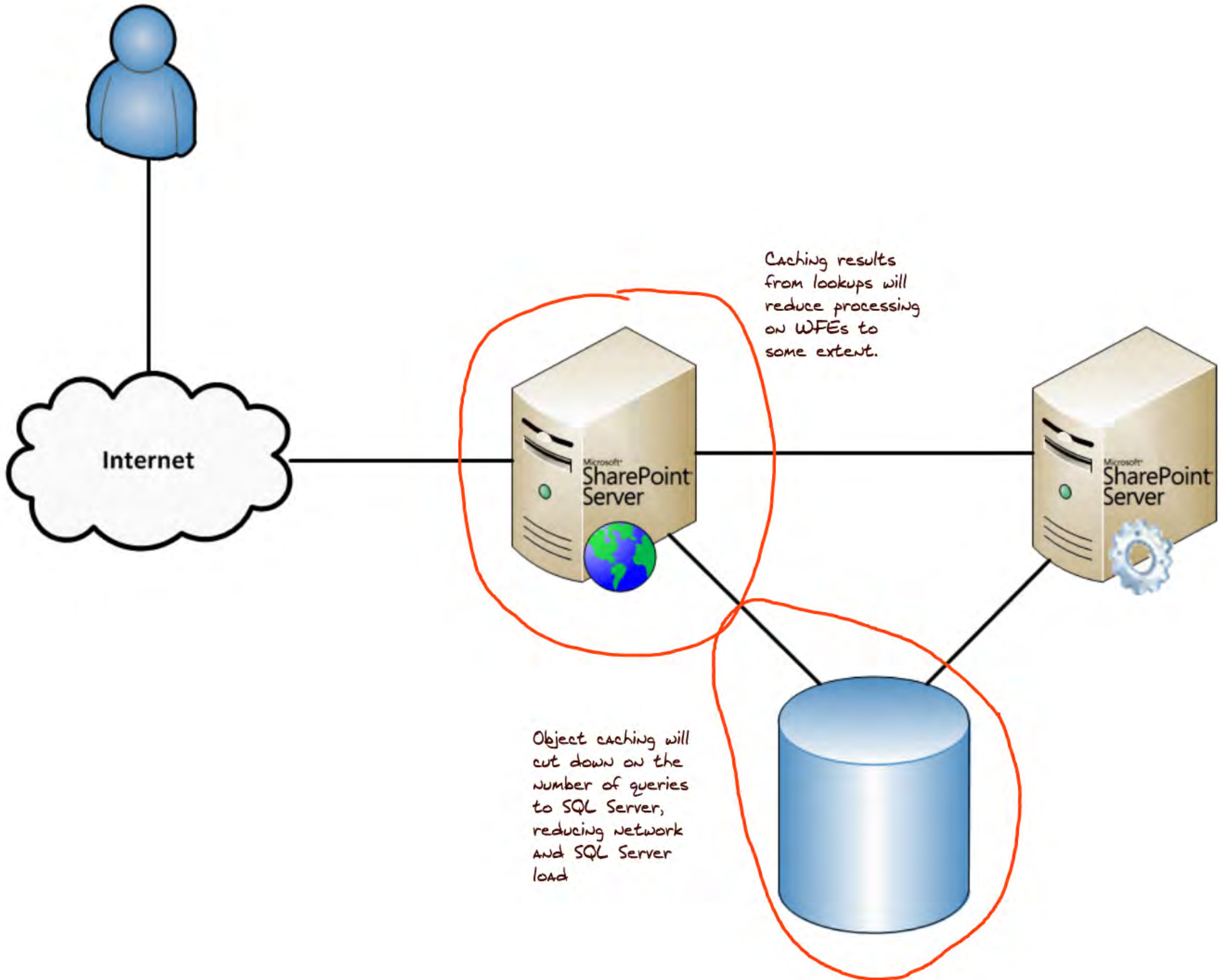
Each cross list query might retrieve results for a variety of users. To ensure after security trimming that all users will see a valid set of results, the cross list query cache must pull more results than originally requested. Specifying a larger number will retrieve more data from the server and is ideal for site collections that have unique security applied on many lists and sites. Specifying a smaller number will consume less memory per cross list query and is ideally suited for site collections that do not have unique security on each list or site.

Cross list query multiplier:

3

OK

Cancel



Caching results from lookups will reduce processing on WFEs to some extent.

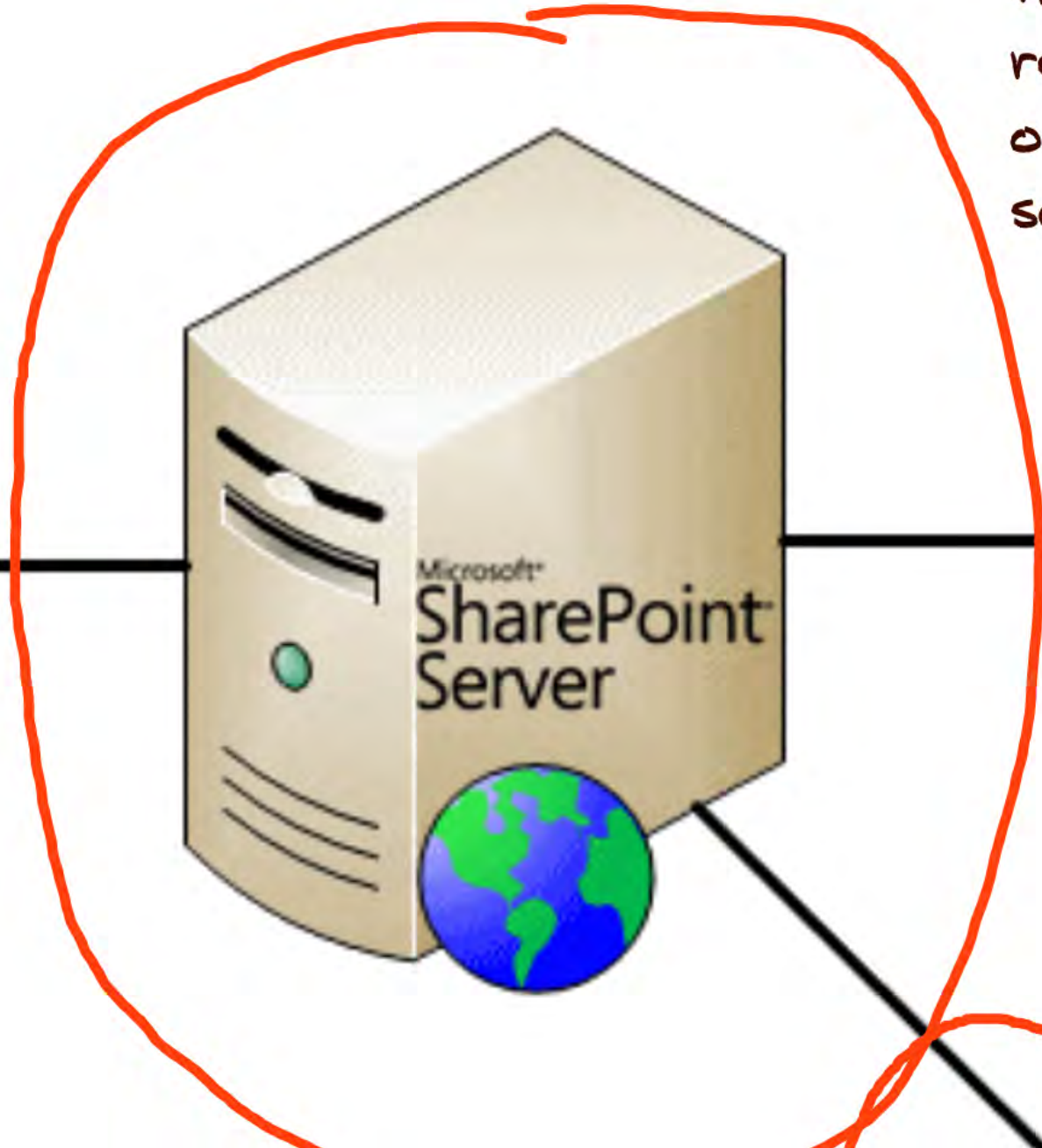
Object caching will cut down on the number of queries to SQL Server, reducing network and SQL Server load

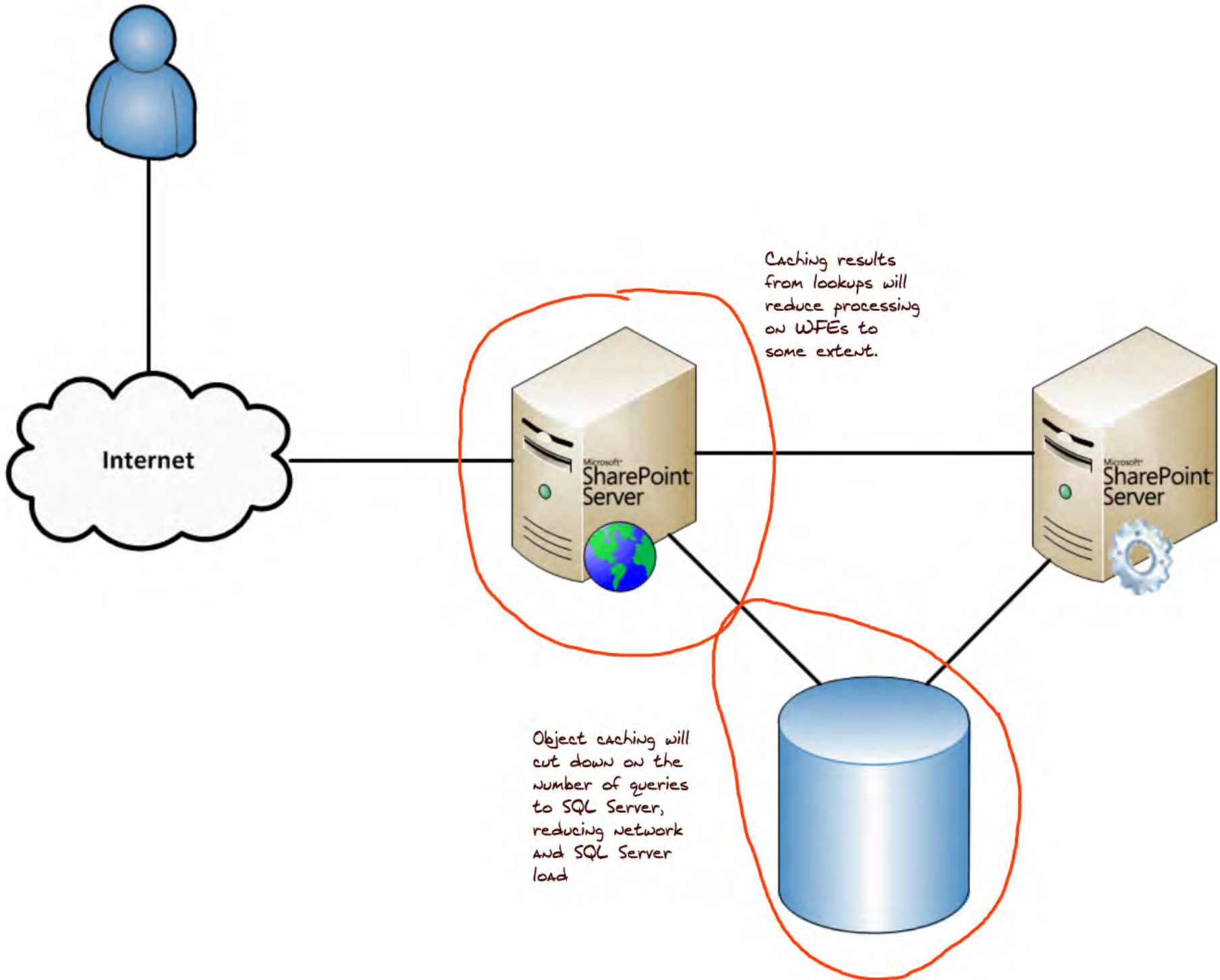


Object caching will  
cut down on the  
number of queries  
to SQL Server,  
reducing network  
AND SQL Server  
load



Caching results from lookups will reduce processing on WFEs to some extent.





Caching results from lookups will reduce processing on WFEs to some extent.

Object caching will cut down on the number of queries to SQL Server, reducing network and SQL Server load

Next up ...

Next up ...



BLOB caching



No, not that  
kind of BLOB

BLOB = binary large object  
(document and attachment  
uploads to SharePoint)

aching



FIGHT NIGHT

# FIGHT NIGHT



BLOB

VS



Blob



# FIGHT NIGHT



BLOB

VS



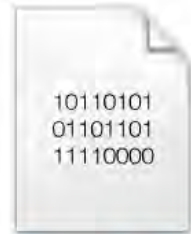
Blob

---

Chews up database space

Consumes entire cities

# FIGHT NIGHT



BLOB

VS



Blob

Chews up database space

Consumes entire cities

Hated by database admins

Bane of humanity

# FIGHT NIGHT



BLOB

VS



Blob

Chews up database space

Consumes entire cities

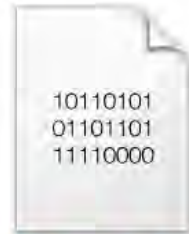
Hated by database admins

Bane of humanity

Kills attempts to organize  
database pages and extents

Kills anyone stupid enough to  
get in its slow-moving way

# FIGHT NIGHT



BLOB

VS



Blob

Chews up database space

Consumes entire cities

Hated by database admins

Bane of humanity

Kills attempts to organize  
database pages and extents

Kills anyone stupid enough to  
get in its slow-moving way

Conquered with RBS

Wiped out through military  
action ... sometimes ...



BLOB

VS



Blob

Chews up database space

Consumes entire cities

Hated by database admins

Bane of humanity

Kills attempts to organize  
database pages and extents

Kills anyone stupid enough to  
get in its slow-moving way

Conquered with RBS

Wiped out through military  
action ... sometimes ...

**WINNER!**



No, not that  
kind of BLOB

BLOB = binary large object  
(document and attachment  
uploads to SharePoint)

aching





BLOB = binary large object  
(document and attachment  
uploads to SharePoint)

aching



also known as "disk-based caching"

Everything that's  
highlighted in yellow  
would be cached  
through BLOB  
caching





# My SharePoint Site

SPDC\me

Site Actions

Search this site...

## Home

My SharePoint Site

Your SharePoint Site

Another Site

Top-Level Site > My SharePoint Site

## Welcome Back, Bob!



SharePoint 2013's Image Renditions capability depends on the BLOB cache to store images that have been rescaled/resized to different dimensions



Caching can be extended to cover any static file type, including Flash, PDF, and other common web file types.

It is by will alone I set my mind in motion.

It is by the juice of Sapho that thoughts acquire speed, the lips acquire stains, the stains become a warning.

It is by will alone I set my mind in motion.

Just sit right back and you'll hear a tale, a tale of a fateful trip, That started from this tropic port, aboard this tiny ship. The mate was a mighty sailin' man, the Skipper brave and sure. Five passengers set sail that day for a three hour tour. A three hour tour.

The weather started

Everything that's highlighted in yellow would be cached through BLOB caching

Caching can be extended to cover any static file type, including Flash, PDF, and other common web file types.



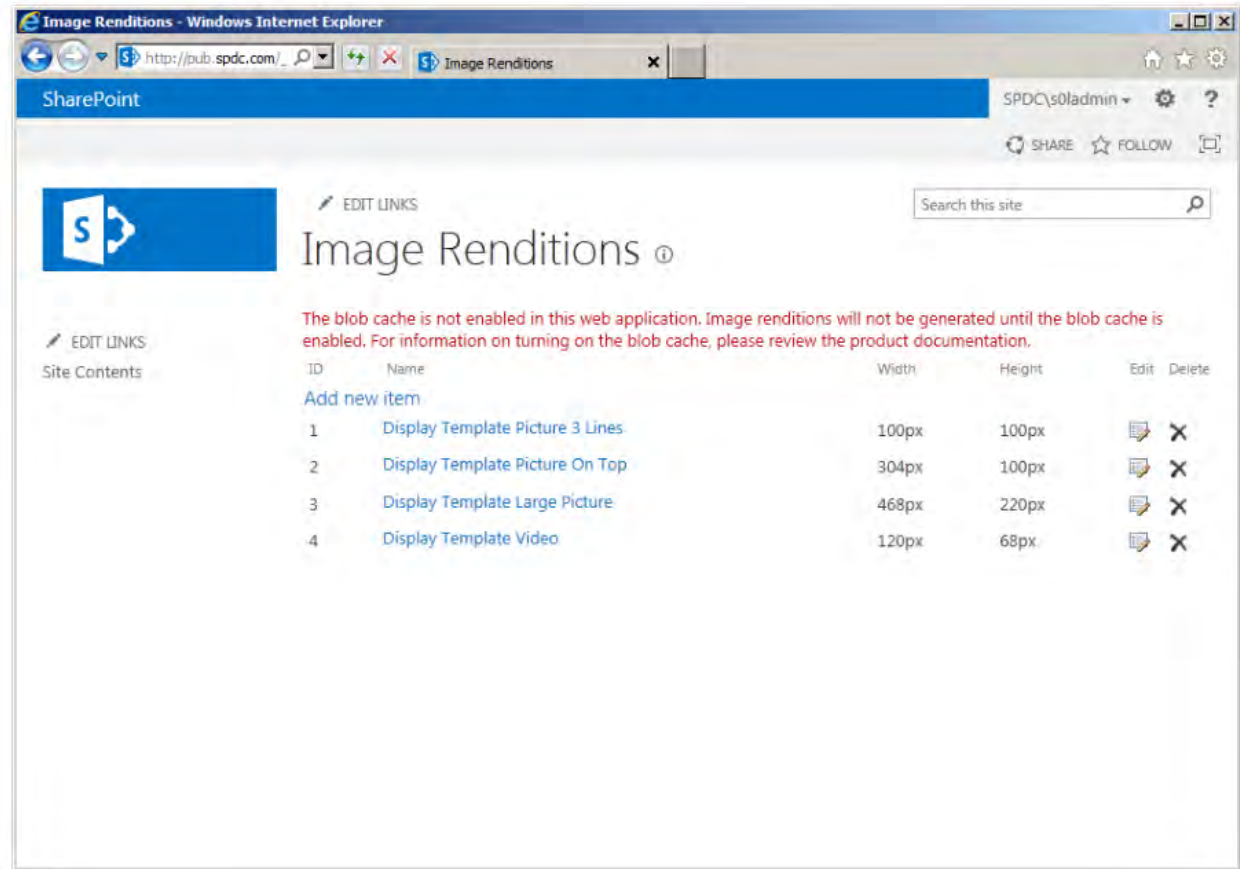
It is by v  
mind in m

It is by t  
that the



SharePoint 2013's Image Renditions capability depends on the BLOB cache to store images that have been rescaled/resized to different dimensions

ack and



SharePoint 2013's Image Renditions capability depends on the BLOB cache to store images that have been rescaled/resized to different dimensions



http://spdev:18480/Pages/default.aspx



# My SharePoint Site

SPDC\me

Site Actions

Search this site...

## Home

My SharePoint Site

Your SharePoint Site

Another Site

Top-Level Site > My SharePoint Site

### Welcome Back, Bob!



SharePoint 2013's Image Renditions capability depends on the BLOB cache to store images that have been rescaled/resized to different dimensions



Caching can be extended to cover any static file type, including Flash, PDF, and other common web file types.

It is by will alone I set my mind in motion.

It is by the juice of Sapho that thoughts acquire speed, the lips acquire stains, the stains become a warning.

It is by will alone I set my mind in motion.

Just sit right back and you'll hear a tale, a tale of a fateful trip, That started from this tropic port, aboard this tiny ship. The mate was a mighty sailin' man, the Skipper brave and sure. Five passengers set sail that day for a three hour tour. A three hour tour.

The weather started

Everything that's highlighted in yellow would be cached through BLOB caching

BLOB cache

# BLOB cache

Backed by disk



# BLOB cache

Backed by disk



Turned off by default





# BLOB cache

Backed by disk



Turned off by default



Default size or allocation

10GB per  
IIS site (zone)

# BLOB cache

Backed by disk



Turned off by default



Default size or allocation

10GB per  
IIS site (zone)

Controlled through web.config settings



```
<Action id="0ff1ce14-101a-0000-0000-000000000000" sourceFile="C:\Program Files\Common Files\Mi
<Action id="0ff1ce14-101b-0000-0000-000000000000" sourceFile="C:\Program Files\Common Files\Mi
<Action id="0ff1ce14-101c-0000-0000-000000000000" sourceFile="C:\Program Files\Common Files\Mi
<Action id="0ff1ce14-101d-0000-0000-000000000000" sourceFile="C:\Program Files\Common Files\Mi
<Action id="0ff1ce14-101e-0000-0000-000000000000" sourceFile="C:\Program Files\Common Files\Mi
<Action id="0ff1ce14-1020-0000-0000-000000000000" sourceFile="C:\Program Files\Common Files\Mi
<Action id="0ff1ce14-1021-0000-0000-000000000000" sourceFile="C:\Program Files\Common Files\Mi
<Action id="ec0076ac-0c35-4880-8422-8062f5925bec" sourceFile="C:\Program Files\Common Files\Mi
<Action id="602bc8c3-9286-49a3-b973-3376ca78b297" sourceFile="C:\Program Files\Common Files\Mi
<Action id="00e22a78-33ff-41ac-b0fb-ee46d1636e22" sourceFile="C:\Program Files\Common Files\Mi
<Action id="4b60e42e-e6fc-4188-80d2-ef39e7cc0065" sourceFile="C:\Program Files\Common Files\Mi
<Action id="1d415973-1146-4bc2-8324-83dfff5bfe33" sourceFile="C:\Program Files\Common Files\Mi
```

```
</mergedActions>
```

```
<BlobCache location="C:\BlobCache\14" path="\".(gif|jpg|jpeg|jpe|jfif|bmp|dib|tif|tiff|ico|png|wd
```

```
<ObjectCache maxSize="100" />
```

```
<OutputCacheProfiles useCacheProfileOverrides="false" varyByHeader="" varyByParam="*" varyByCust
```

```
<RuntimeFilter Assembly="Microsoft.Office.Server, Version=14.0.0.0, Culture=neutral, PublicKeyTo
```

```
</SharePoint>
```

```
<system.web>
```

```
<securityPolicy>
```

```
<trustLevel name="WSS_Medium" policyFile="C:\Program Files\Common Files\Microsoft Shared\Web S
```

```
<trustLevel name="WSS_Minimal" policyFile="C:\Program Files\Common Files\Microsoft Shared\Web
```

```
</securityPolicy>
```

```
<httpHandlers />
```

```
<customErrors mode="On" />
```

```
<httpRuntime maxRequestLength="51200" />
```

```
<authentication mode="Windows" />
```

```
<identity impersonate="true" />
```

```
<authorization>
```

```
<allow users="*" />
```

```
</authorization>
```

```
<httpModules />
```

Default BlobCache Elements

# Default BlobCache Elements

MOSS 2007

```
<BlobCache location="C:\blobCache" path="\.(\gif|jpg|png|css|js)$" maxSize="10" enabled="false" />
```

# Default BlobCache Elements

## MOSS 2007

```
<BlobCache location="C:\blobCache" path="\.(gif|jpg|png|css|js)$" maxSize="10" enabled="false" />
```

## SharePoint Server 2010

```
<BlobCache location="C:\BlobCache\14" path="
"\.(gif|jpg|jpeg|jpe|jfif|bmp|dib|tif|tiff|ico|png|wdp|hdp|css|js|asf|avi|flv|m4v|mov|mp3|mp4|mpeg
|mpg|rm|rmvb|wma|wmv)$" maxSize="10" enabled="false" />
```

# Default BlobCache Elements

## MOSS 2007

```
<BlobCache location="C:\blobCache" path="\.(gif|jpg|png|css|js)$" maxSize="10" enabled="false" />
```

## SharePoint Server 2010

```
<BlobCache location="C:\BlobCache\14" path=
"\.(gif|jpg|jpeg|jpe|jfif|bmp|dib|tif|tiff|ico|png|wdp|hdp|css|js|asf|avi|flv|m4v|mov|mp3|mp4|mpe
g|mpg|rm|rmvb|wma|wmv)$" maxSize="10" enabled="false" />
```

## SharePoint Server 2013

```
<BlobCache location="C:\BlobCache\14" path=
"\.(gif|jpg|jpeg|jpe|jfif|bmp|dib|tif|tiff|themedbmp|themedcss|themedgif|themedjpg|themedpng|ico|png|wdp|hdp|css|
js|asf|avi|flv|m4v|mov|mp3|mp4|mpe
g|mpg|rm|rmvb|wma|wmv|ogg|ogv|oga|webm|xap)$" maxSize="10" enabled="false" />
```



Available Attributes

# Available Attributes

## Common

enabled	true if the BLOB cache is turned-on, false if not*
location	path to location in file system where cached items will be stored*
path	regular expression against which files must match in order to be cached
size	maximum disk space (in GB) that BLOB cache can consume*
max-age	client-side cache duration (in seconds) for downloaded BLOB cache items

Side note: to be BLOB  
cached, a file must be a  
document in a Document  
Library or a list item  
attachment. "Loose files"  
won't be cached.

# Available Attributes

## Common

enabled	true if the BLOB cache is turned-on, false if not*
location	path to location in file system where cached items will be stored*
path	regular expression against which files must match in order to be cached
size	maximum disk space (in GB) that BLOB cache can consume*
max-age	client-side cache duration (in seconds) for downloaded BLOB cache items

Recommendation:  
point at someplace  
other than C:

# Available Attributes

## Common

enabled	true if the BLOB cache is turned-on, false if not*
location	path to location in file system where cached items will be stored*
path	regular expression against which files must match in order to be cached
size	maximum disk space (in GB) that BLOB cache can consume*
max-age	client-side cache duration (in seconds) for downloaded BLOB cache items

Recommendation: make  
sure you add up your  
allocations (each site)  
and have enough disk  
space!

# Available Attributes

## Common

enabled	true if the BLOB cache is turned-on, false if not*
location	path to location in file system where cached items will be stored*
path	regular expression against which files must match in order to be cached
size	maximum disk space (in GB) that BLOB cache can consume*
max-age	client-side cache duration (in seconds) for downloaded BLOB cache items



# Available Attributes

## Common

enabled	true if the BLOB cache is turned-on, false if not*
location	path to location in file system where cached items will be stored*
path	regular expression against which files must match in order to be cached
size	maximum disk space (in GB) that BLOB cache can consume*
max-age	client-side cache duration (in seconds) for downloaded BLOB cache items

DO NOT simply delete files  
out of the BLOB cache!

Now, for a  
word about  
the MAX-AGE  
attribute ...



max-age in action: initial request (non-zero max-age value)

---

# max-age in action: initial request (non-zero max-age value)

Web Sessions						
#	Result	Protocol	URL	Body	Caching	
64	200	HTTP	/SiteCollectionImages/common/content...	79	public, max-age=2232	image/gif
65	200	HTTP	/SiteCollectionImages/common/btnNoTh...	2,112	public, max-age=2478	image/gif
66	200	HTTP	/SiteCollectionImages/common/signinOv...	165	public, max-age=4707	image/png
67	200	HTTP	/SiteCollectionImages/common/benefits...	16,907	public, max-age=5791	image/png
68	200	HTTP	/_controltemplates/MultiBanner/ModalP...	15,618	max-age=867	image/png
69	302	HTTP	/s/www.kroger.com?U=/SiteCollectionI...	0	max-age=0, no-cache, no-store Expires: Sun, 03 Apr 2011...	
70	200	HTTP	/SiteCollectionImages/common/160x41...	5,099	public, max-age=2141	image/jpeg
71	200	HTTP	/PublishingImages/section_headers/hea...	4,538	public, max-age=1452	image/jpeg
72	200	HTTP	/PublishingImages/2011/Period_3/Week...	73,370	public, max-age=1320	image/jpeg
73	200	HTTP	/PublishingImages/2011/Period_3/Week...	77,412	public, max-age=944	image/jpeg
74	200	HTTP	/PublishingImages/2011/Period_3/Week...	52,993	public, max-age=1307	image/jpeg
75	200	HTTP	/_layouts/1033/core.js?rev=mHksOQ0i...	265,384	max-age=2908	application/x-javascript
76	200	HTTP	/style%20library/omniture/s_code_krog...	20,172	public, max-age=2590	application/x-javascript
77	200	HTTP	/SiteCollectionImages/common/closeBtn...	879	public, max-age=4795	image/gif
78	200	HTTP	/SiteCollectionImages/Icons/icon_import...	1,287	public, max-age=2785	image/gif
79	200	HTTP	/iframe.php?targeting_bucket=Banner_...	6,147	max-age=300, max-age=600 Expires: Sun, 03 Apr 2011 2...	text/html; charset=utf-8
80	200	HTTP	/adj/mwl.kroger.www/?page=home_ma...	571	private Expires: Sun, 03 Apr 2011 20:13:57 GMT	application/x-javascript
81	200	HTTP	/SiteCollectionImages/common/boxBg_...	82	public, max-age=767	image/gif
82	200	HTTP	/SiteCollectionImages/common/boxTop_...	923	public, max-age=888	image/gif
83	200	HTTP	/includes/css/iframe.css	1,603	max-age=2592000 Expires: Tue, 03 May 2011 20:11:19 GMT	text/css
84	200	HTTP	/images/generic_header.png	10,978	max-age=2592000 Expires: Tue, 03 May 2011 20:11:16 GMT	image/png
85	200	HTTP	/srv/upload_files/fea90f998a8b8d3401...	5,744	max-age=2592000 Expires: Tue, 03 May 2011 20:09:42 GMT	image/gif
86	200	HTTP	/images/coupon-pointer.png	1,952	max-age=2592000 Expires: Tue, 03 May 2011 20:09:02 GMT	image/png
87	200	HTTP	/srv/upload_files/acdf9eb5cc1b4b75e4...	5,985	max-age=2592000 Expires: Tue, 03 May 2011 20:11:19 GMT	image/gif
88	200	HTTP	/srv/upload_files/46263a8ea7a6c1251a...	4,942	max-age=2592000 Expires: Tue, 03 May 2011 20:11:19 GMT	image/gif
89	200	HTTP	/srv/upload_files/5467f518013f109e51...	5,241	max-age=2592000 Expires: Tue, 03 May 2011 20:11:19 GMT	image/gif
90	200	HTTP	/SiteCollectionImages/swf/heroHomepa...	105,036	public, max-age=5897	application/x-shockwave-flash
91	200	HTTP	/PublishingImages/2011/Period_3/Week...	164,821	public, max-age=1546	image/jpeg
92	200	HTTP	/PublishingImages/2011/Period_3/Week...	153,151	public, max-age=1863	image/jpeg
93	200	HTTP	/PublishingImages/2011/Period_3/Week...	118,575	public, max-age=1894	image/jpeg
94	200	HTTP	/SiteCollectionImages/common/signinOv...	594	public, max-age=5181	image/png
95	200	HTTP	/SiteCollectionImages/common/bgSignI...	434	public, max-age=5094	image/gif
96	200	HTTP	/SiteCollectionImages/common/signinOv...	470	public, max-age=1584	image/png
97	200	HTTP	/SiteCollectionImages/common/benefits...	250	public, max-age=2539	image/png
98	200	HTTP	/SiteCollectionImages/common/benefits...	10,762	public, max-age=5053	image/png
99	200	HTTP	/SiteCollectionImages/common/benefits...	939	public, max-age=6742	image/gif
100	200	HTTP	/SiteCollectionImages/common/benefits...	1,428	public, max-age=5869	image/gif
101	200	HTTP	/SiteCollectionImages/common/benefits...	1,508	public, max-age=1087	image/gif
102	200	HTTP	/SiteCollectionImages/common/benefits...	1,472	public, max-age=5494	image/gif
103	200	HTTP	/SiteCollectionImages/common/benefits...	1,496	public, max-age=4800	image/gif
104	200	HTTP	/_controltemplates/MultiBanner/ModalP...	1,386	max-age=1776	image/gif
105	200	HTTP	/SiteCollectionImages/common/benefits...	1,511	public, max-age=6492	image/gif
106	200	HTTP	/2934496/2of3_tr1_Mars_GC.jpg	137,333	public, max-age=86400 Expires: Mon, 04 Apr 2011 04:05:...	image/jpeg
107	200	HTTP	/PublishingImages/section_headers/hea...	3,922	public, max-age=1000	image/jpeg
108	200	HTTP	/SiteCollectionImages/common/footer_...	1,401	public, max-age=4232	image/gif
109	200	HTTP	/SiteCollectionImages/common/footerL...	54	public, max-age=1035	image/gif
110	200	HTTP	/SiteCollectionImages/common/boxBott...	838	public, max-age=1818	image/gif
111	200	HTTP	/SiteCollectionImages/common/content...	5,785	public, max-age=1121	image/jpeg
113	302	HTTP	/b/ss/krgkrogerprod/1/H.14/s2205936...	0	no-cache, no-store, must-revalidate, max-age=0, proxy-re...	text/plain
114	200	HTTP	/SiteCollectionImages/common/bgSelect...	654	public, max-age=6811	image/gif
115	200	HTTP	/b/ss/krgkrogerprod/1/H.14/s2205936...	43	no-cache, no-store, must-revalidate, max-age=0, proxy-re...	image/gif

115 HTTP requests issued and answered to fully load page

max-age in action: subsequent request (re-opened browser)

max-age in action: subsequent request (re-opened browser)



#	Result	Protocol	URL	Body	Caching	Content-Type
1	302	HTTP	/	163		text/html
2	200	HTTP	/Pages/default.aspx	81,746	private Expires: Sun, 03 Apr 2011 20:23:34 GMT	text/html; charset=utf-8
3	200	HTTP	/adj/mwl.kroger.www/?page=home_ma...	571	private, x-gzip-ok="" Expires: Sun, 03 Apr 2011 20:16:05...	application/x-javascript
4	200	HTTP	/b/ss/trg/krogerprod/1/H.14/s2656257...	43	no-cache, no-store, must-revalidate, max-age=0, proxy-re...	image/gif

Only 4 requests  
needed to load  
the page

# max-age in action: subsequent request (re-opened browser)

#	Result	Protocol	URL	Body	Caching	Content-Type
1	302	HTTP	/	163		text/html
2	200	HTTP	/Pages/default.aspx	81,746	private Expires: Sun, 03 Apr 2011 20:23:34 GMT	text/html; charset=utf-8
3	200	HTTP	/adj/mwl.kroger.www/?page=home_ma...	571	private, x-gzip-ok="" Expires: Sun, 03 Apr 2011 20:16:05 ...	application/x-javascript
4	200	HTTP	/b/ss/krgrkrogerprod/1/H.14/s2656257...	43	no-cache, no-store, must-revalidate, max-age=0, proxy-re...	image/gif

Only 4 requests needed to load the page



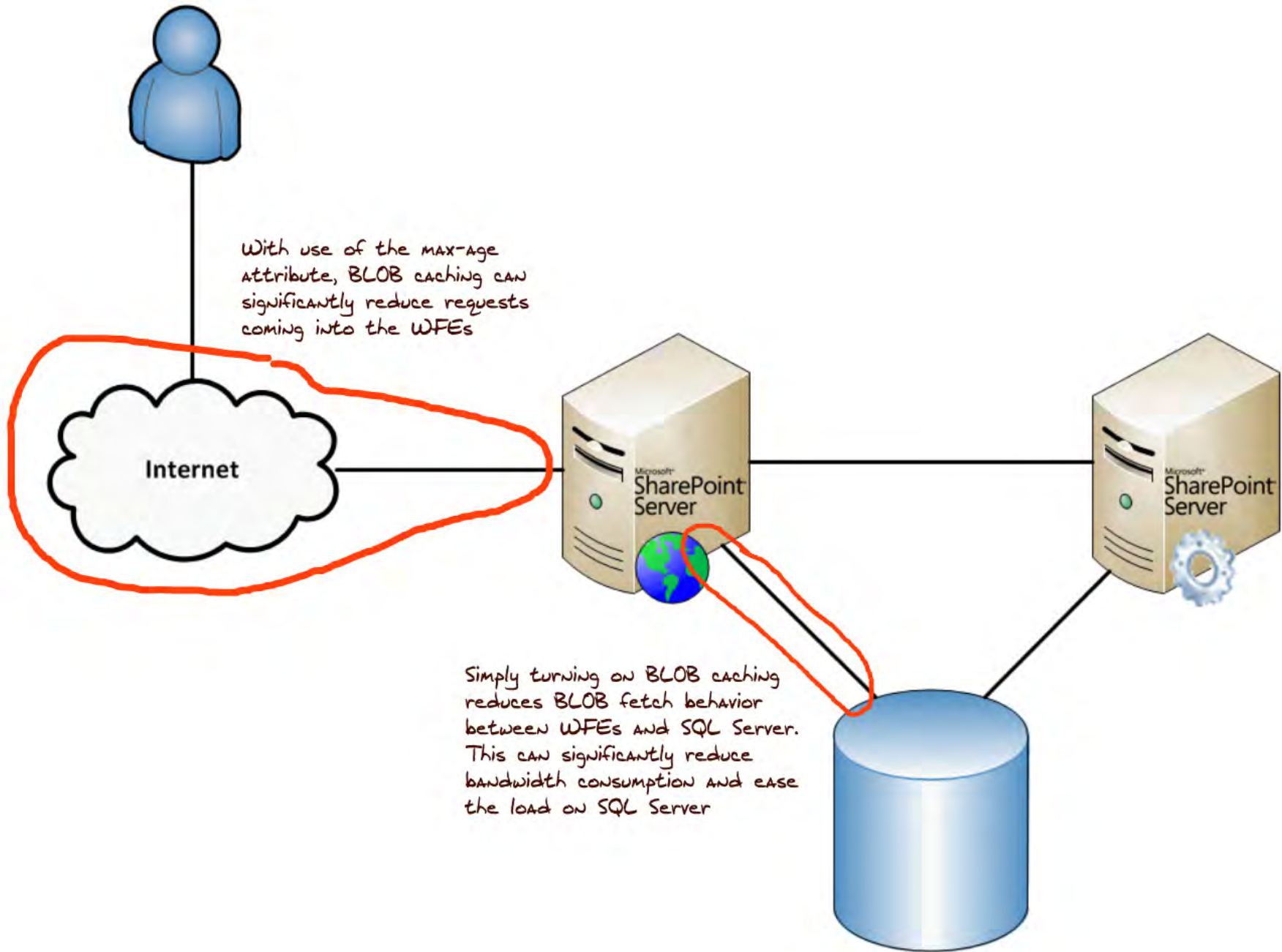
Of course, this behavior CAN work both for you AND AGAINST you ...



Of course, this behavior  
CAN work both for you  
AND AGAINST you ...

If you don't want persistent client-side caching when the BLOB cache is enabled, be sure to explicitly set a max-age value of zero (0). If you don't specify a max-age attribute value, the default is 86,400 seconds (24 hours).

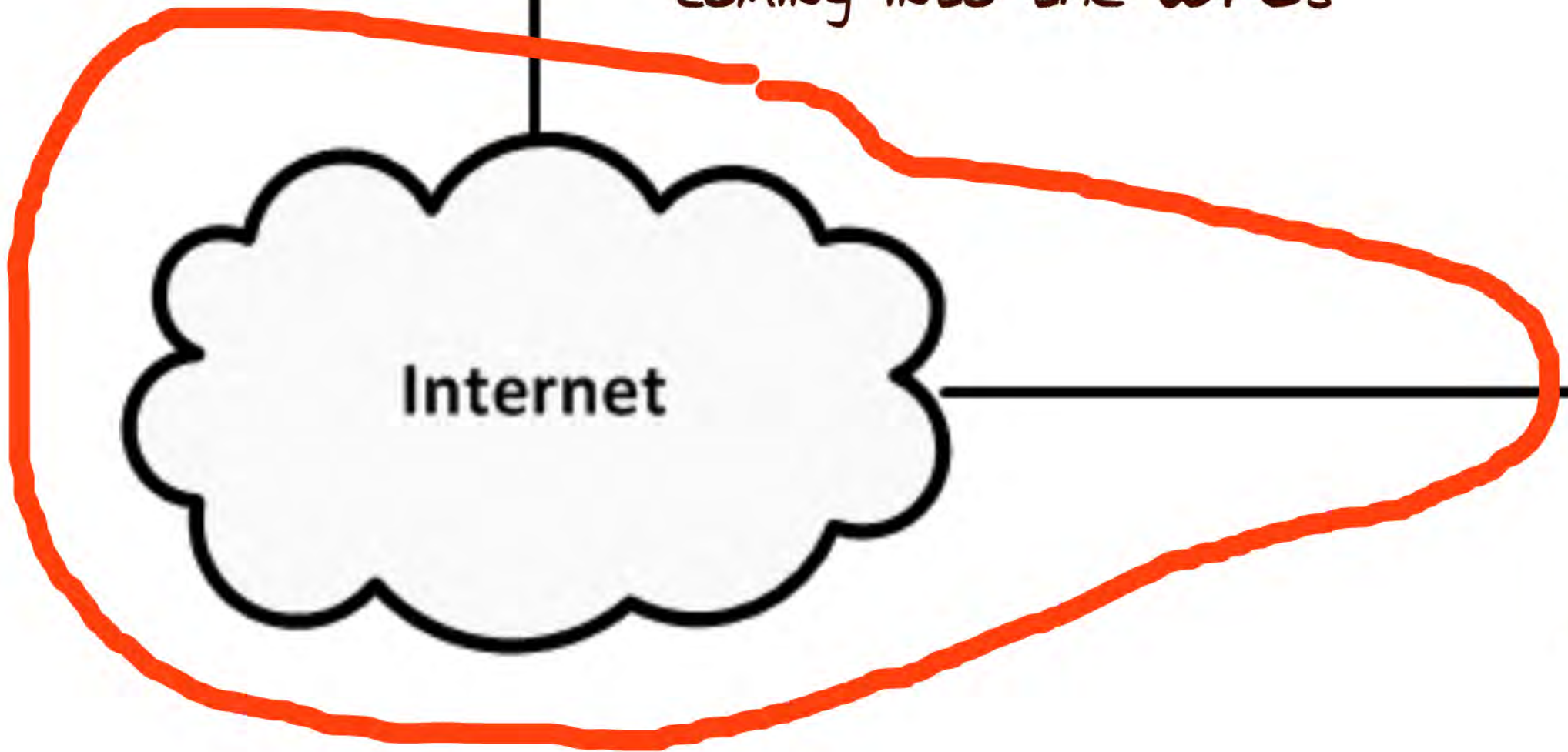


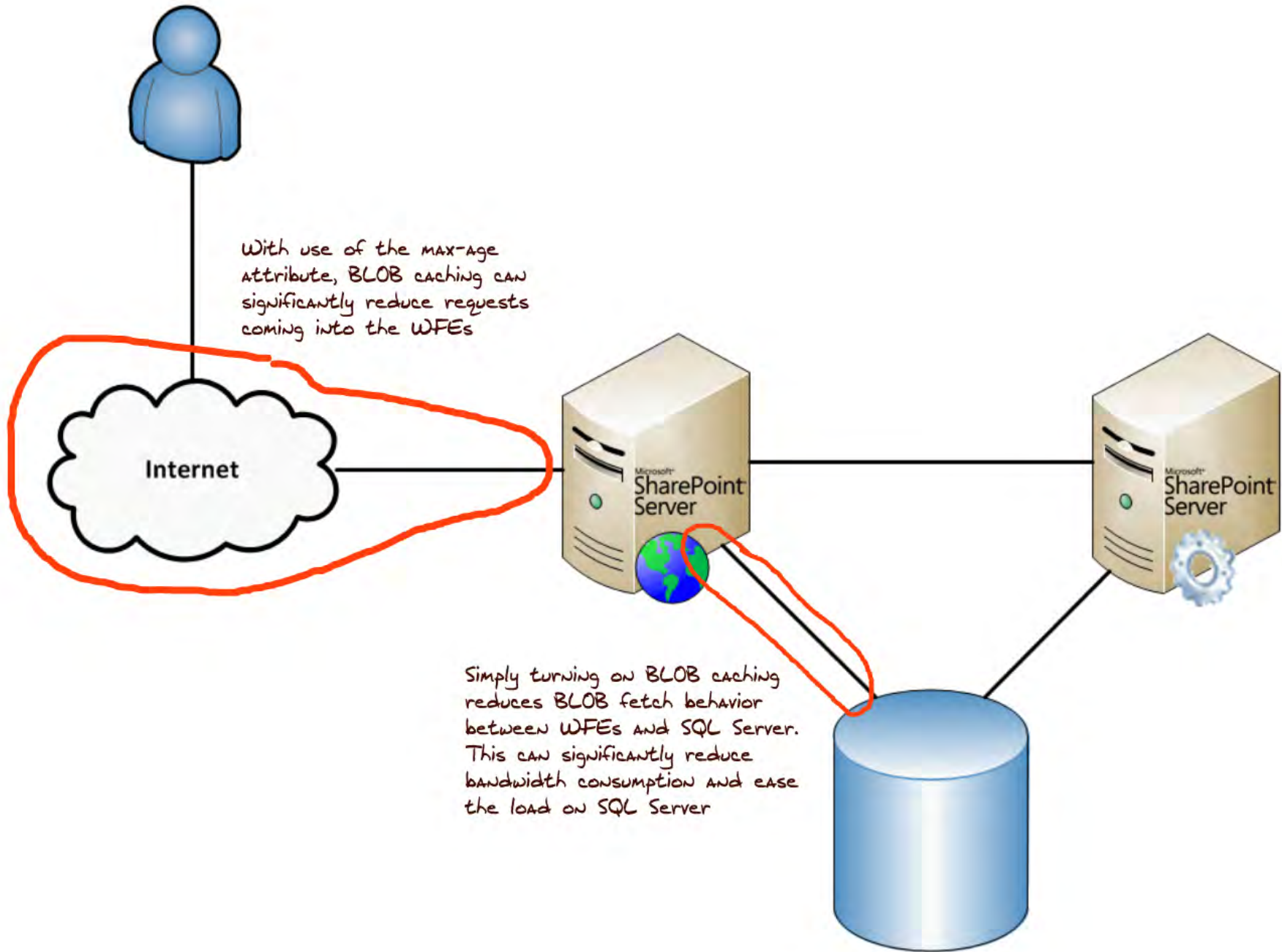




Simply turning on BLOB caching reduces BLOB fetch behavior between WFES AND SQL Server. This can significantly reduce bandwidth consumption AND ease the load on SQL Server

With use of the MAX-Age attribute, BLOB caching can significantly reduce requests coming into the WFEs





Next up...

Next up...



Page output  
caching

Next up...



# Page output caching

*piggybacks on ASP.NET output caching*



http://spdev:18480/Pages/default.aspx



# ~~My SharePoint Site~~

~~SPDC\me~~

Site Actions ~~?~~ ~~?~~

Search this site... ~~?~~

I'll talk about the reason for highlighting this a little later. For now, though, let's just say "it isn't covered by page output caching."

Top-Level Site > My SharePoint Site

## Home

My SharePoint Site

Your SharePoint Site

Another Site

Welcome Back, Bob!



It is by will alone I set my mind in motion.

It is by the juice of Sapho that thoughts acquire speed, the lips acquire stains, the stains become a warning.

It is by will alone I set my mind in motion.

Just sit right back and you'll hear a tale, a tale of a fateful trip, That started from this tropic port, aboard this tiny ship. The mate was a mighty sailin' man, the Skipper brave and sure. Five passengers set sail that day for a three hour tour. A three hour tour.

The weather started

It's easier to simply put red X's through the content and items that aren't covered by page output caching.



It's easier to simply put red X's through the content and items that aren't covered by page output caching.



http://spdev:18480/Pages/default.aspx



# ~~My SharePoint Site~~

~~SPDC\me~~

Site Actions ~~?~~ ~~?~~

Search this site... ~~?~~

I'll talk about the reason for highlighting this a little later. For now, though, let's just say "it isn't covered by page output caching."

Top-Level Site > My SharePoint Site

## Home

My SharePoint Site

Your SharePoint Site

Another Site

Welcome Back, Bob!



It's easier to simply put red X's through the content and items that aren't covered by page output caching.



It is by will alone I set my mind in motion.

It is by the juice of Sapho that thoughts acquire speed, the lips acquire stains, the stains become a warning.

It is by will alone I set my mind in motion.

Just sit right back and you'll hear a tale, a tale of a fateful trip, That started from this tropic port, aboard this tiny ship. The mate was a mighty sailin' man, the Skipper brave and sure. Five passengers set sail that day for a three hour tour. A three hour tour.

The weather started

Page output caching

# Page output caching

Backed by memory



# Page output caching

Backed by memory



Turned off by default  
*(thankfully)*



# Page output caching

Backed by memory



Turned off by default  
*(thankfully)*



Default size or allocation

*None\**

# Page output caching

Backed by memory



Turned off by default  
*(thankfully)*



Default size or allocation

*None\**

*A trick that started with SharePoint 2010 ...*

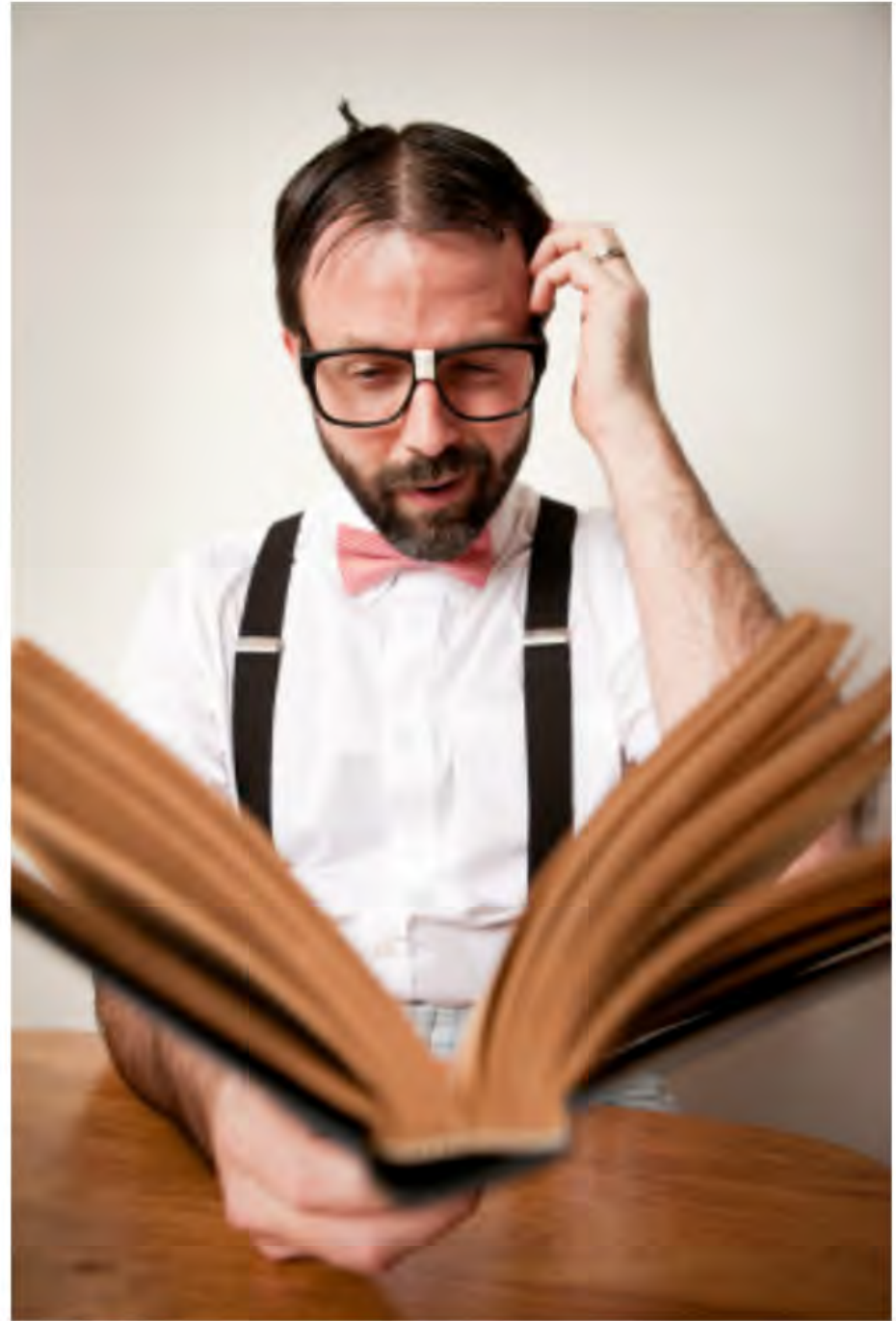




```
<Action id="0ff1ce14-101d-0000-0000-000000000000" sourceFile="C:\Program
<Action id="0ff1ce14-101e-0000-0000-000000000000" sourceFile="C:\Program
<Action id="0ff1ce14-1020-0000-0000-000000000000" sourceFile="C:\Program
<Action id="0ff1ce14-1021-0000-0000-000000000000" sourceFile="C:\Program
<Action id="ec0076ac-0c35-4880-8422-8062f5925bec" sourceFile="C:\Program
<Action id="602bc8c3-9286-49a3-b973-3376ca78b297" sourceFile="C:\Program
<Action id="00e22a78-33ff-41ac-b0fb-ee46d1636e22" sourceFile="C:\Program
<Action id="4b60e42e-e6fc-4188-80d2-ef39e7cc0065" sourceFile="C:\Program
<Action id="1d415973-1146-4bc2-8324-83dfff5bfe33" sourceFile="C:\Program
</MergedActions>
<BlobCache location="C:\BlobCache\14" path="\".(gif|jpg|jpeg|jpe|jfif|bmp|di
<ObjectCache maxSize="100" />
<OutputCacheProfiles useCacheProfileOverrides="false" varyByHeader="" varyB
<RuntimeFilter Assembly="Microsoft.Office.Server, Version=14.0.0.0, Culture
</SharePoint>
<system.web>
  <securityPolicy>
    <trustLevel name="WSS_Medium" policyFile="C:\Program Files\Common Files\M
    <trustLevel name="WSS_Minimal" policyFile="C:\Program Files\Common Files\
  </securityPolicy>
  <httpHandlers />
  <customErrors mode="On" />
  <httpRuntime maxRequestLength="51200" />
  <authentication mode="Windows" />
  <identity impersonate="true" />
```

# So ...

How's this page  
output caching  
thing work,  
ANYWAY?



The Page Output Cache  
is like a big lookup table

# The Page Output Cache is like a big lookup table

Each page request is broken down into a set of characteristics

- Characteristics are selected based on page output cache profiles
- These characteristics (browser type, page requested, etc.) are used to build a key

Notice I said request.  
The actual content in the page that is rendered by SharePoint has no bearing on how items are cached or served from cache.



The is like a Page

Each page request is

- Characteristics are
- These characteri

The ca

# The Page Output Cache is like a big lookup table

Each page request is broken down into a set of characteristics

- Characteristics are selected based on page output cache profiles
- These characteristics (browser type, page requested, etc.) are used to build a key

The cache is searched for a page with the key that was built

- If a page with the same key is found, the page HTML is returned from the cache.
- If no match is made, the page is rendered and served back. It is then cached for subsequent requests until it is expired out of the cache or ejected for other reasons.

# The Page Output Cache is like a big lookup table

Each page request is broken down into a set of characteristics

- Characteristics are selected based on page output cache profiles
- These characteristics (browser type, page requested, etc.) are used to build a key

The cache is searched for a page with the key that was built

- If a page with the same key is found, the page HTML is returned from the cache.
- If no match is made, the page is rendered and served back. It is then cached for subsequent requests until it is expired out of the cache or ejected for other reasons.

The trick is to balance profile granularity against memory consumption

*Search this site*



Enable output cache

Anonymous Cache Profile





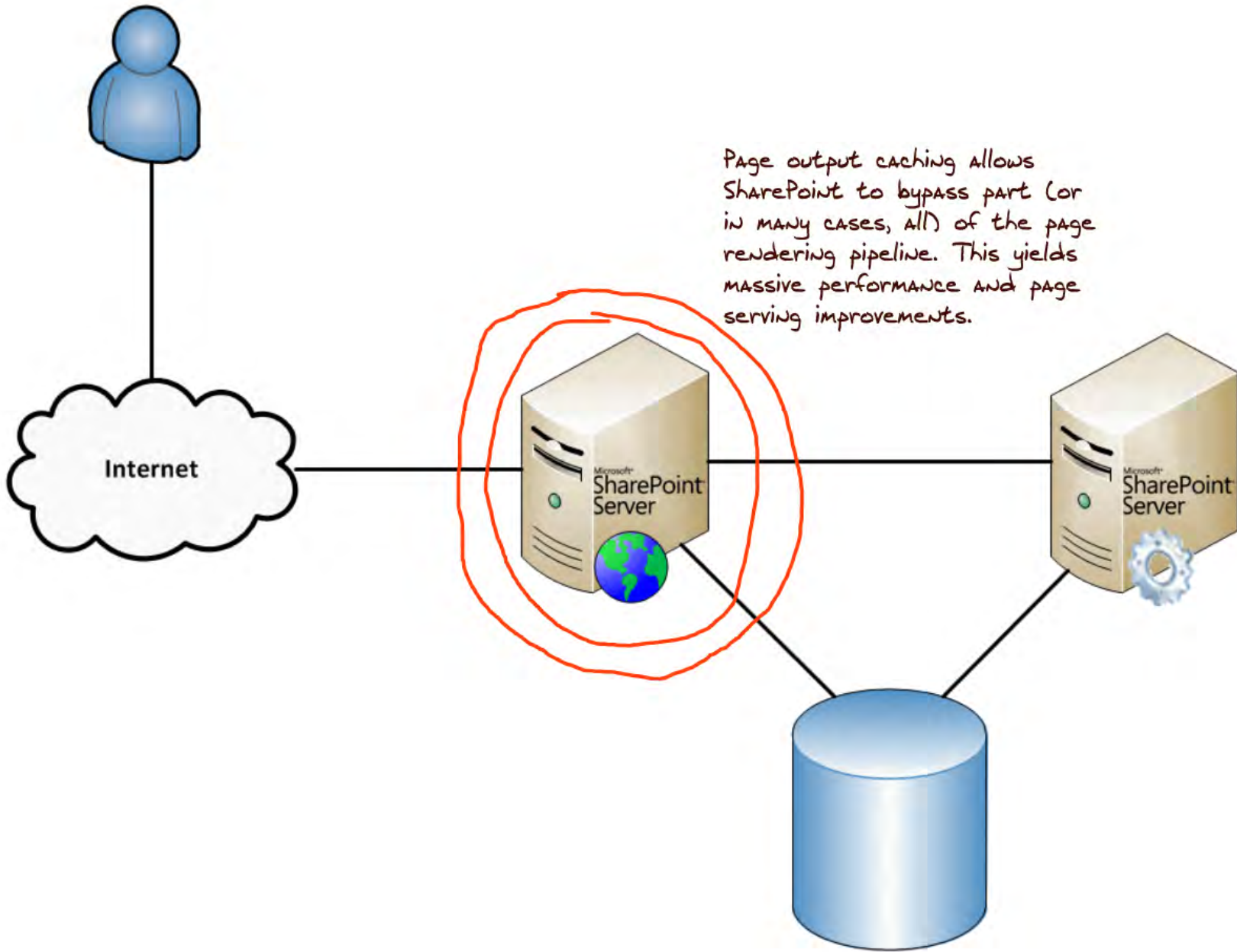
You really, really, *\*really\** need to do concurrent multi-user testing with your cache profile settings!



You really, really, \*really\* need to do concurrent multi-user testing with your cache profile settings!

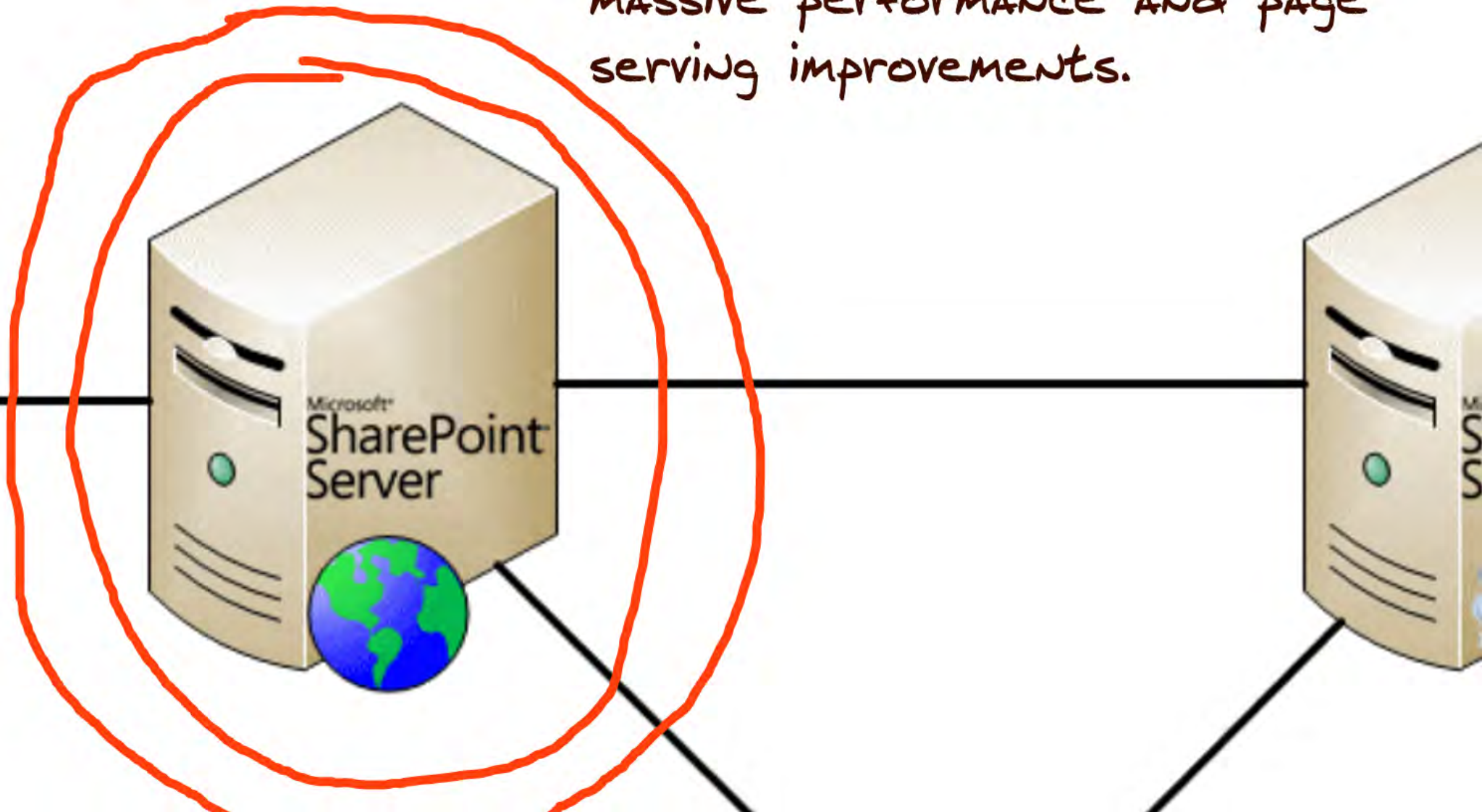


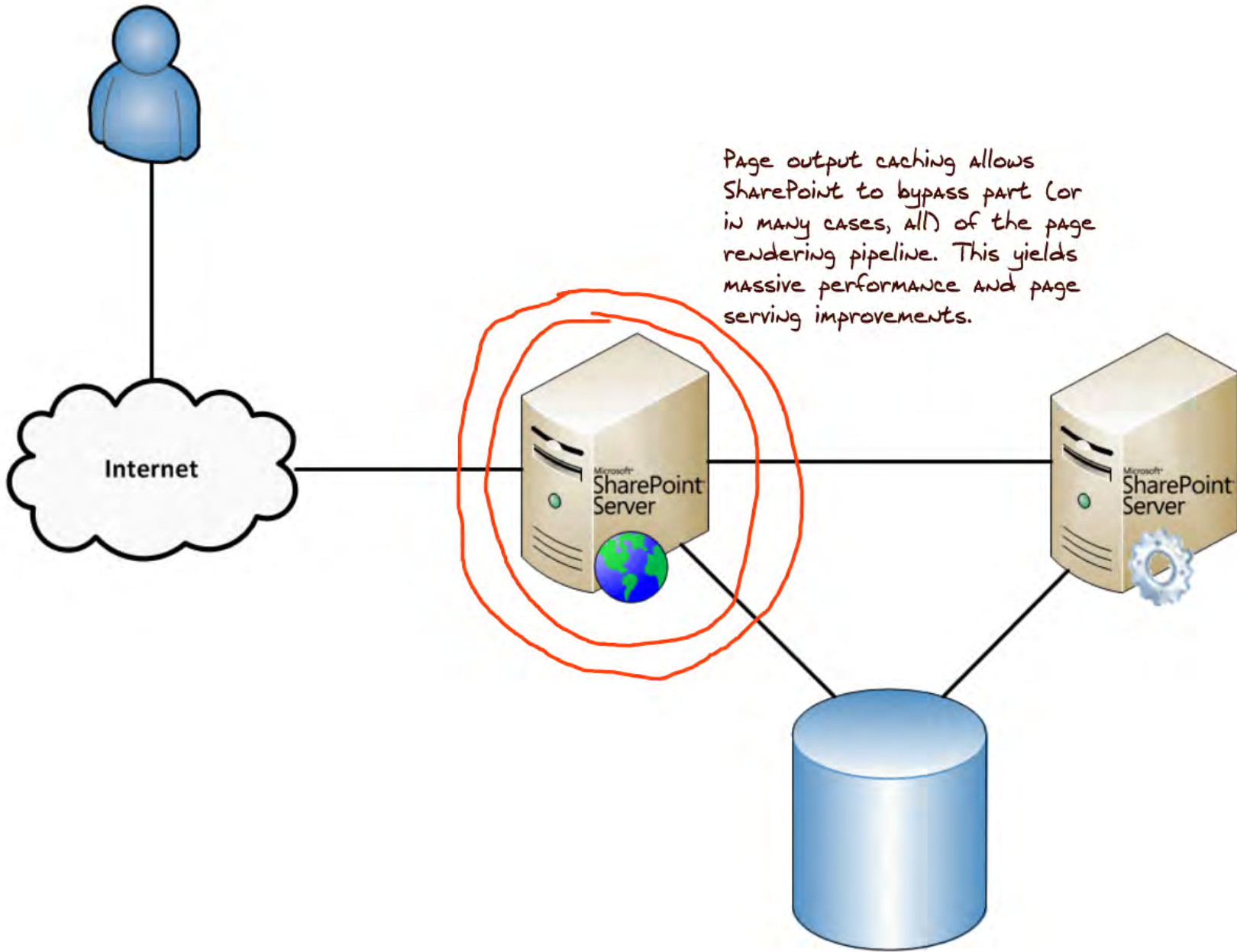
Do you sense a story coming?



Page output caching allows SharePoint to bypass part (or in many cases, all) of the page rendering pipeline. This yields massive performance and page serving improvements.

Page output caching allows SharePoint to bypass part (or in many cases, all) of the page rendering pipeline. This yields massive performance and page serving improvements.





Page output caching allows SharePoint to bypass part (or in many cases, all) of the page rendering pipeline. This yields massive performance and page serving improvements.

Office Web

Apps Cache

# Office Web Apps Cache



I'm referring to  
SharePoint 2010  
specifically; things  
change dramatically  
with SharePoint 2013







Houses images, XAML (eXtensible Application Markup Language), etc, that is generated so documents can be viewed and edited via browser.



Houses images, XAML (eXtensible Application Markup Language), etc, that is generated so documents can be viewed and edited via browser.



*How the cache is implemented ...*

## Central Administration


- Application Management
- System Settings
- Monitoring
- Backup and Restore
- Security
- Upgrade and Migration
- General Application Settings
- Configuration Wizards

URL Search Web Application: 

URL	URL	http://spdev:18480/sites/Office_Viewing_Service_Cache
	Title	Team Site
	Description	
<a href="#">/sites/Office_Viewing_Service_Cache</a>	Primary administrator:	SPDC\s0ladmin
	E-mail address:	
	Database Name	WSS_Content_PublishingTestWeb

OK

Cancel


Site Actions  SPDC\s0ladmin

Microsoft SharePoint 2010 Central Administration > Site Collection List

I Like It Tags & Notes

Central Administration

- Application Management
- System Settings
- Monitoring
- Backup and Restore
- Security
- Upgrade and Migration
- General Application Settings
- Configuration Wizards

URL Search   Web Application:

URL													
<a href="#">/sites/Office_Viewing_Service_Cache</a>	<table border="1"> <tr> <td>URL</td> <td>http://spdev:18480/sites/Office_Viewing_Service_Cache</td> </tr> <tr> <td>Title</td> <td>Team Site</td> </tr> <tr> <td>Description</td> <td></td> </tr> <tr> <td>Primary administrator:</td> <td>SPDC\s0ladmin</td> </tr> <tr> <td>E-mail address:</td> <td></td> </tr> <tr> <td>Database Name</td> <td>WSS_Content_PublishingTestWeb</td> </tr> </table>	URL	http://spdev:18480/sites/Office_Viewing_Service_Cache	Title	Team Site	Description		Primary administrator:	SPDC\s0ladmin	E-mail address:		Database Name	WSS_Content_PublishingTestWeb
URL	http://spdev:18480/sites/Office_Viewing_Service_Cache												
Title	Team Site												
Description													
Primary administrator:	SPDC\s0ladmin												
E-mail address:													
Database Name	WSS_Content_PublishingTestWeb												

OK Cancel

- standard Team Site (site collection)
- each Web application gets one (timer job-managed)
- can grow to consume 100 GB (by default)
- 30 day content expiration period (by default)

Recommendations

# Recommendations



Get friendly with  
Set-OfficeSPWebAppsCache  
PowerShell cmdlet

# Recommendations



Get friendly with  
Set-OfficeSPWebAppsCache  
PowerShell cmdlet

- relocate cache site collection to a dedicated DB

# Recommendations



Get friendly with  
Set-OfficeSPWebAppsCache  
PowerShell cmdlet

- relocate cache site collection to a dedicated DB
- increase cache size and expiration for Web applications housing static documents
- decrease cache size and expiration for Web applications housing dynamic or highly collaborative Office documents



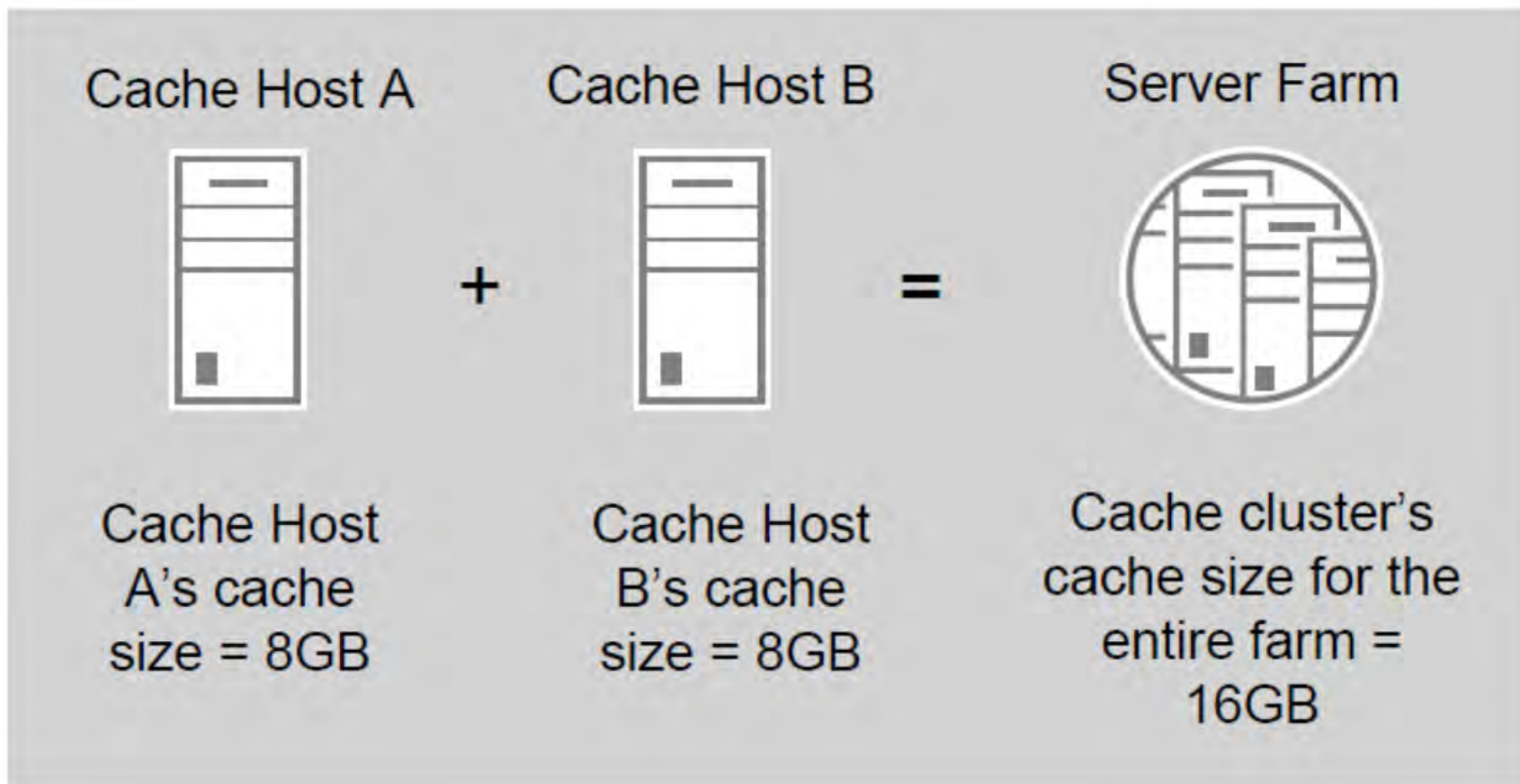
I've got some scripting  
help for you on these  
two items ...

- relocate
- increase o  
applications
- decrease o  
applic

Distributed  
Cache service

# Distributed Cache service





Provides memory-based caching for several types of data/objects.

Provides memory-based caching for several types of data/objects.

- authentication (tokens)
- newsfeeds
- OneNote and Access
- security trimming results

When you first set up  
SharePoint 2013, the  
Distributed Cache service

... is running and in collocated  
mode (vs. dedicated mode)

... is configured to consume  
10% of a server's total memory



So, is there ANY  
guidance?



So, is there ANY  
guidance?

- Do not run the following services on the same server running the Distributed Cache service: SQL Server, Project Server, Excel Services and Search services.





So, is there ANY guidance?

- Do not run the following services on the same server running the Distributed Cache service: SQL Server, Project Server, Excel Services and Search services.
- Review SharePoint Server 2013's Health Rules for Distributed Cache service issues



So, is there ANY guidance?

- Do not run the following services on the same server running the Distributed Cache service: SQL Server, Project Server, Excel Services and Search services.
- Review SharePoint Server 2013's Health Rules for Distributed Cache service issues
- If possible, run AppFabric on its own server

Is there anything else I can do or tweak?

Is there anything else I can do or tweak?

Before you do anything, pay attention

 **Important:**

The Distributed Cache service can end up in a nonfunctioning or unrecoverable state if you do not follow the procedures that are listed in this article. In extreme scenarios, you might have to rebuild the server farm. The Distributed Cache depends on Windows Server AppFabric as a prerequisite. Do not administer the **AppFabric Caching Service** from the **Services** window in **Administrative Tools** in **Control Panel**. Do not use the applications in the folder named **AppFabric for Windows Server** on the **Start** menu.

# Before you do ANYTHING, PAY ATTENTION

**!** Important:

The Distributed Cache service can end up in a nonfunctioning or unrecoverable state if you do not follow the procedures that are listed in this article. In extreme scenarios, you might have to rebuild the server farm. The Distributed Cache depends on Windows Server AppFabric as a prerequisite. Do not administer the **AppFabric Caching Service** from the **Services** window in **Administrative Tools** in **Control Panel**. Do not use the applications in the folder named **AppFabric for Windows Server** on the **Start** menu.

## My interpretation



"tread carefully"



That said, my suggestions:

That said, my suggestions:

- If you need to stop the cache, use the `-graceful` switch to avoid data loss

# That said, my suggestions:

- If you need to stop the cache, use the `-graceful` switch to avoid data loss
- Get an AppFabric patch (newest is CU7, but ...) for maximum reliability and stability



# That said, my suggestions:

- If you need to stop the cache, use the `-graceful` switch to avoid data loss
- Get an AppFabric patch (newest is CU7, but ...) for maximum reliability and stability
- After patching the service, apply the `backgroundGC` setting for better performance

# That said, my suggestions:

- If you need to stop the cache, use the `-graceful` switch to avoid data loss
- Get an AppFabric patch (newest is CU7, but ...) for maximum reliability and stability
- After patching the service, apply the `backgroundGC` setting for better performance
- If hosting the Distributed Cache service in a virtual machine (VM), do not use dynamically allocated memory - VM memory must be fixed

QUIN



DON'T PANIC - just for fun!

# Object caching

## Action

Cache size reduced (significantly) below 100MB

# Object caching

## Action

Cache size reduced (significantly) below 100MB

## Potential Result

- Object cache fills and becomes memory constrained
- Resource contention and ejections lead to cache compactions
- Under heavy load, compaction process leads to thrashing
- SharePoint's ability to serve pages falls through the floor

# Object caching

## Action

Cache size reduced (significantly) below 100MB

## Potential Result

- Object cache fills and becomes memory constrained
- Resource contention and ejections lead to cache compactions
- Under heavy load, compaction process leads to thrashing
- SharePoint's ability to serve pages falls through the floor

## What to Watch

- Publishing Cache Hit Ratio performance counter
- Total Number Of Cache Compactions performance counter

# Page output caching

## Observation

User A requests a page. User B requests the same page.  
User B sees information tied to User A.



# Page output caching

## Observation

User A requests a page. User B requests the same page.  
User B sees information tied to User A.

## Potential Cause

- Page output cache profile isn't granular enough to distinguish User A from User B

# Page output caching

## Observation

User A requests a page. User B requests the same page.  
User B sees information tied to User A.

## Potential Cause

- Page output cache profile isn't granular enough to distinguish User A from User B

## What You Can Do

- Refine the cache profile in-use (use additional attributes)
- Set caching exclusions by sub-site or page layout type
- Use post-cache substitution (donut caching) in custom code
- Leverage a custom caching handler (IVaryByCustomHandler)

# Page output caching

## Observation

Memory consumption of ASP.NET worker process grows significantly over time; performance may deteriorate.

# Page output caching

## Observation

Memory consumption of ASP.NET worker process grows significantly over time; performance may deteriorate.

## Potential Cause

- Page output caching profile is overly granular and too many pages are being cached causing excessive memory load.

# Page output caching

## Observation

Memory consumption of ASP.NET worker process grows significantly over time; performance may deteriorate.

## Potential Cause

- Page output caching profile is overly granular and too many pages are being cached causing excessive memory load.

## What You Can Do

- Adjust caching profiles if possible to reduce page load.
- Selectively disable caching for highly varying sub-sites.
- Adjust cache element values in web.config that controls ASP.NET worker process (e.g., `privateBytesLimit` attribute)

# BLOB caching

## Observation

Path property is set correctly, location is set correctly, BLOB caching is enabled, but images stored in site collection aren't being cached.

# BLOB caching

## Observation

Path property is set correctly, location is set correctly, BLOB caching is enabled, but images stored in site collection aren't being cached.

## Potential Cause

- BLOB cache only works with resources that are stored as list items in lists or document libraries.

# BLOB caching

## Observation

Path property is set correctly, location is set correctly, BLOB caching is enabled, but images stored in site collection aren't being cached.

## Potential Cause

- BLOB cache only works with resources that are stored as list items in lists or document libraries.

## What You Can Do

- Leverage built-in libraries such as Site Collection Images.
- Move resources to a custom list.



# BLOB caching

## Observation

Image is changed on a SharePoint site. Some client browsers show new image while others show the old image.

# BLOB caching

## Observation

Image is changed on a SharePoint site. Some client browsers show new image while others show the old image.

## Potential Cause

- A high max-age attribute (such as the default 24-hour value of 86,400 seconds) may be in-use.

# BLOB caching

## Observation

Image is changed on a SharePoint site. Some client browsers show new image while others show the old image.

## Potential Cause

- A high max-age attribute (such as the default 24-hour value of 86,400 seconds) may be in-use.

## What You Can Do

- Instruct clients to clear their browser cache and revisit site.
- Apply a smaller max-age attribute value or use zero (0) to disable persistent client-side caching of BLOB assets.
- Recognize that this behavior is by-design!

# References and Resources

## SharePoint Server Caches Overview

<http://download.microsoft.com/download/7/F/0/7F069D0B-B6BD-4692-868B-E8555BB72445/SharePointServerCachesPerformance.docx>

## Configure cache settings for a Web application (SharePoint Server 2010)

<http://technet.microsoft.com/en-us/library/cc770229.aspx>

## Configure object cache user accounts

<http://technet.microsoft.com/en-us/library/ff758656.aspx>

## Disk-Based Caching for Binary Large Objects

<http://msdn.microsoft.com/en-us/library/aa604896.aspx>

## Flush the BLOB cache (SharePoint Server 2010)

<http://technet.microsoft.com/en-us/library/gg277249.aspx>

## MANUALLY Clearing the MOSS 2007 BLOB Cache

<http://sharepointinterface.com/2009/10/30/manually-clearing-the-moss-2007-blob-cache/>

## MOSS 2007 Farm-Wide BLOB Cache Flushing Solution

<http://blobcachefarmflush.codeplex.com/>

## Client-Server Interactions and the max-age Attribute with SharePoint...

<http://sharepointinterface.com/2011/02/21/client-server-interactions-and-the-max-age-attribute-with-sharepoint-blob-caching/>

## MANAGE the Office Web Apps cache

<http://technet.microsoft.com/en-us/library/ee837422.aspx>

## Quick Tips for MANAGING the SharePoint 2010 Office Web Apps' Cache

<http://www.idera.com/News/Newsletters/Quick-Tips-for-Mnging-SP2010-Office-Web-Apps-Cache.pdf>

## MOSS Object Cache Memory Tuning is not an Intuitive Process

<http://sharepointinterface.com/2009/08/30/moss-object-cache-memory-tuning-is-not-an-intuitive-process/>

## cache Element for caching (ASP.NET Settings Schema)

<http://msdn.microsoft.com/en-us/library/ms228248.aspx>

## Image Renditions in SharePoint 2013

<http://blog.mastykarz.nl/image-renditions-sharepoint-2013/>

## MANAGE the Distributed Cache service in SharePoint 2013

[http://technet.microsoft.com/en-US/library/jj219613\(v=office.15\).aspx](http://technet.microsoft.com/en-US/library/jj219613(v=office.15).aspx)

## Overview of microblog features, feeds, and the Distributed Cache service in SharePoint Server 2013

[http://technet.microsoft.com/library/jj219700\(office.15\).aspx](http://technet.microsoft.com/library/jj219700(office.15).aspx)

## The Five Minute Cheat-Sheet on SharePoint 2013's Distributed Cache Service

<http://blog.idera.com/sharepoint/the-five-minute-cheat-sheet-on-sharepoint-2013s-distributed-cache-service/>

## SharePoint 2013 + Distributed Cache (AppFabric) Troubleshooting

<http://blogs.msdn.com/b/sambetts/archive/2014/03/19/sharepoint-2013-distributed-cache-appfabric-troubleshooting.aspx>

## Cumulative Update 7 for Microsoft AppFabric 1.1 for Windows Server

<https://support.microsoft.com/en-us/kb/3092423>



# Sean P. McDonough

SharePoint & Office 365

Gearhead, Tinkerer, and  
Microsoft MVP

My  
Employer: **PAIT GROUP**

Twitter: @spmcdonough

Blog: <http://SharePointInterface.com>

About: <http://about.me/spmcdonough>