TECHNICAL NOTE

OutSystems® Platform

Integrating OutSystems and SharePoint Applications

The OutSystems® Platform can easily be integrated with external systems. SharePoint is one of them and it's the one we focus in this technical note.

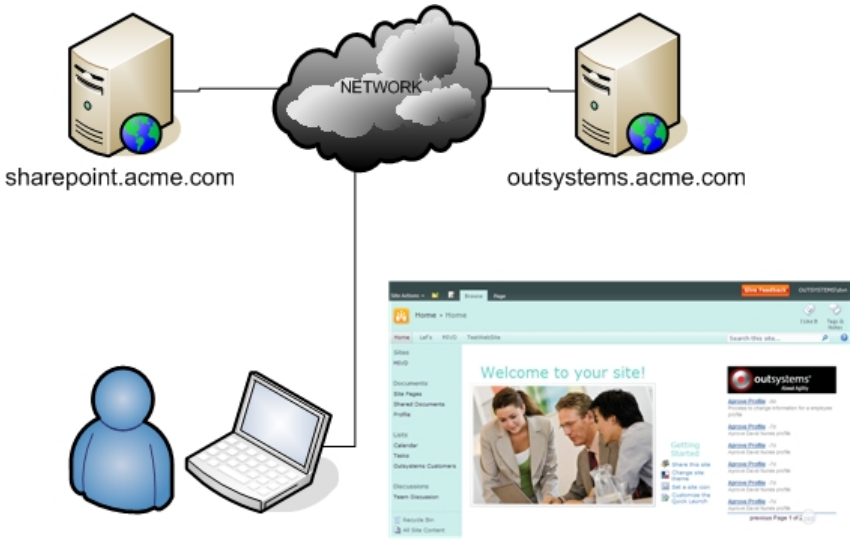
We will describe how to integrate OutSystems and SharePoint applications both at the level of the user interface and at the level of business logic and data through web services. We will also address how to ensure security and authentication in these scenarios.

The steps described have been tested with SharePoint 2010 and the Agile Platform 5.1.

1 The Integration Scenario

This document revolves around a simple scenario where you have part of your intranet running under SharePoint (e.g., with your intranet's homepage and document management) and set of custom applications delivered using the OutSystems Platform (in this text a Recruitment application).

SharePoint is running in one server named *sharepoint.acme.com* and the OutSystems Platform is running in a separate server named *outsystems.acme.com*. The key characteristic here is that they share the parent domain acme.com. Other configurations in which the SharePoint and OutSystems share a common parent domain (e.g., *sharepoint.intranet.acme.com* and *outsystems.acme.com*) are fully supported. Adjust the instructions as needed.



Configurations where a parent domain isn't shared but the domains belongs to the same forest are supported but you will lose the page interaction described in 2.4 and will need to perform extra configurations, not covered in this document, to support Kerberos authentication. Configurations where server domains are in different forests are not supported.

Running the OutSystems Platform and SharePoint from the same server is not supported.

2 Integrating the User Interface of OutSystems' apps in SharePoint

2.1 Requirements for UI Integration

Together with this document you should have downloaded `OutSystemsAndSharepoint.zip` which contains a SharePoint Solution Package with a helper SharePoint Web Part (`OSWebparts.wsp`), a helper SharePointAdapter eSpace (`SharePointAdapter.oml`) and a sample eSpace (`SPRecruitment.oml`) which will be used throughout this document.

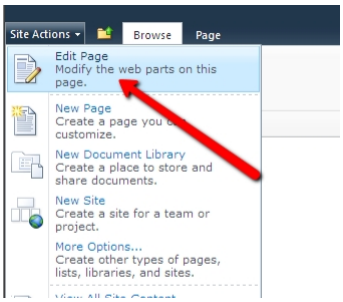
If you have not downloaded these yet you can download the zip file at http://www.outsystems.com/NetworkSolutions/ProjectDetail.aspx?ProjectId=170.

Before following the steps below you should install `OSWebparts.wsp` as described in Installing OutSystems Web Parts Package, deploy `SharePointAdapter.oml` to your OutSystems Platform server and, optionally, deploy `SPRecruitment.oml`.

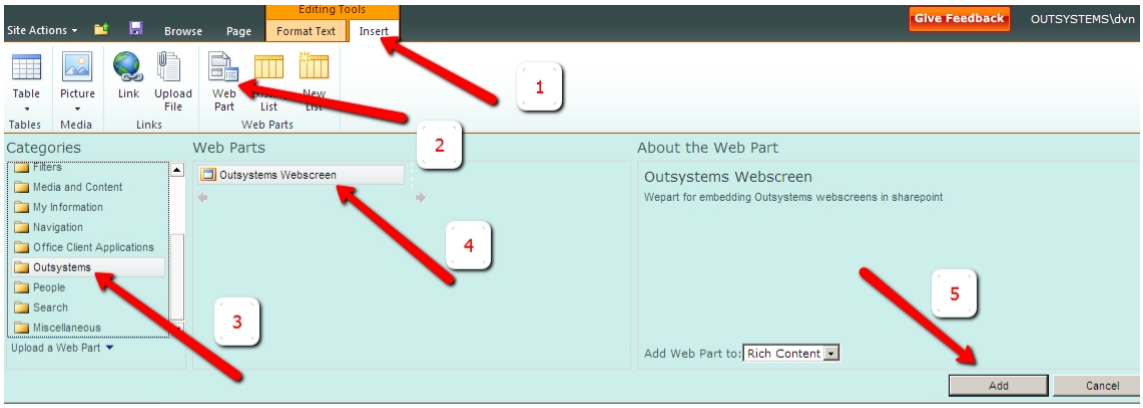
2.2 Integrating the OutSystems Apps' User Interfaces

To integrate your OutSystems' application user interface into a SharePoint page you should leverage the `OSWebscreen` web part. This web part allows you to easily embed a web page from your application as part of a SharePoint page.

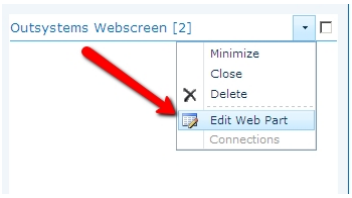
1. Edit the page in SharePoint;



2. Add the `OutSystems Webscreen` web part to the desired page section;



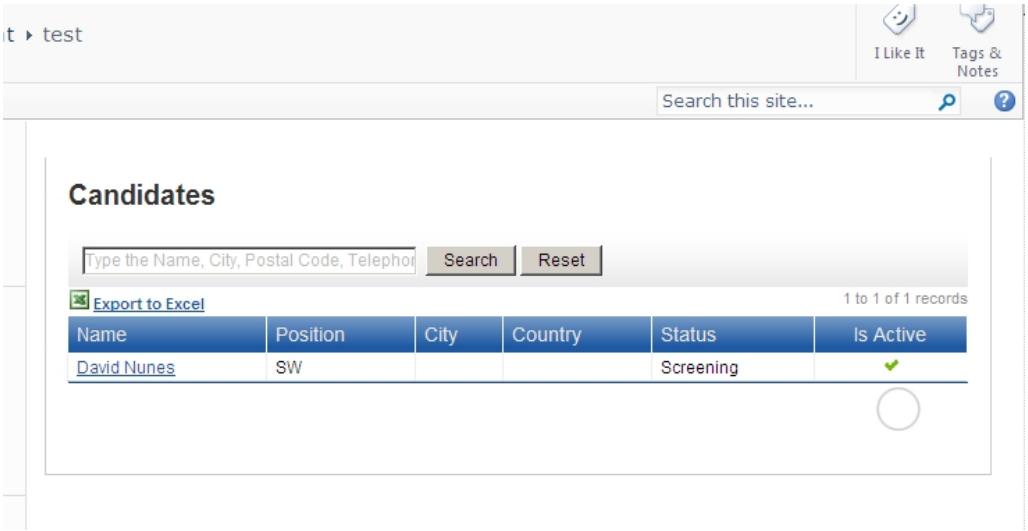
3. Edit the properties of the web part you just added;



In the OutSystems section of the web part properties, type the `URL` of your application's page. In the example below we are using the URL http://outsystems.acme.com/SPRecruitment/candidate_list.aspx which corresponds to the `Candidate_List` webscreen of the eSpace `SPRecruitment` published on `outsystems.acme.com`. When finished press OK to update the web part with the new content.

You can safely leave `IFrame Id` and `Document Domain` blank. These will be properly explained later in this document.

4. Finish the page design and review the final result.



The `OsWebscreen` web part creates an IFrame for the Outsystems content. The `IFrame Id` property is available so that you may later use it if you need to write JavaScript to access and manipulate the contents of the IFrame. Note that, as the SharePoint and OutSystems pages come from different domains, strict restrictions on cross-domain scripting exist. Section 2.4 explains in detail how to overcome this barrier.

2.3 User Interface Authentication

This section focuses on how to enable a user to authenticate transparently across SharePoint and OutSystems. This allows the user to login only once and have a seamless experience across SharePoint and OutSystems pages.

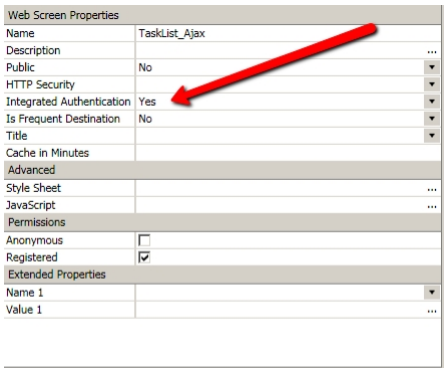
As we are using an IFrame to embed the OutSystems' web page the browser will effectively fetch two pages, one from SharePoint and another from the OutSystems Platform, although for the user it all just seems one page. This means that the user could potentially be asked for authentication twice, one for the SharePoint page and another for the OutSystems page. The instructions below focus on how to make the OutSystems Platform determine the identity of the user transparently in case he/she has not yet signed in in the OutSystems Platform but has already done so in SharePoint.

Technology wise we will focus on NTLM and Kerberos authentication as they are the two most popular authentications methods for SharePoint.

2.3.1 Integrating User Authentication

The first step to achieve a single sign on experience is to set SharePoint to use NTLM or Kerberos authentication. After this you need to perform a few small changes to the pages of the application you built with the OutSystems Platform and want to expose within SharePoint.

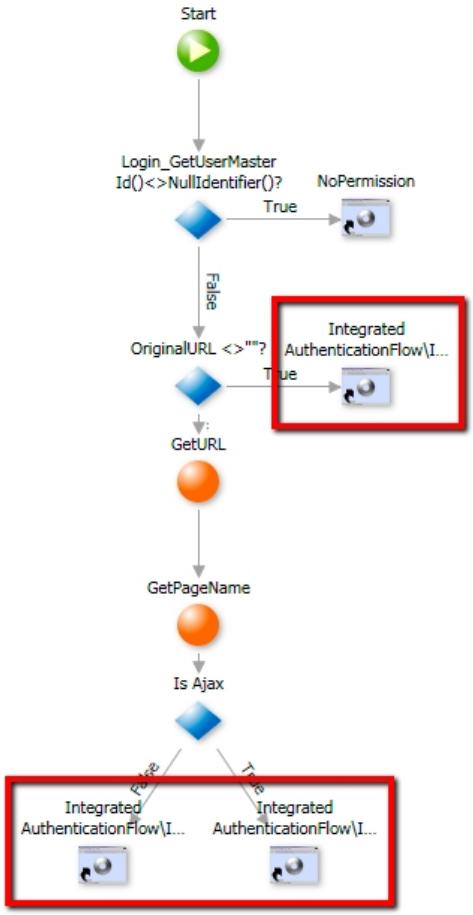
1. Set Integrated Authentication to Yes in the web screen or web flow you want to expose in SharePoint



2. Handle exceptions for unregistered users that reach your web screen. To make this easier we provide in the `SharePointAdapter` eSpace the `IntegratedAuthenticationScreen` which has a set of adjustments for a smoother integration with SharePoint. For exception handling itself we will use the OutSystems Platform's ability to have a single exception flow that manages all unhandled exceptions for a given eSpace. We will assume in the instructions you haven't changed the flow which is generated by default.

    a. Use Add/Remove References in your eSpace so that it includes a reference to the `IntegratedAuthenticationScreen` from the `SharePointAdapter` eSpace;

    b. In the Preparation action of the ScreenFlows\Exceptions\UnregisteredHandler web screen change the Destination elements that originally linked to the local `Login` web screen so that they now link to the `IntegratedAuthenticationScreen`;



    c. Check that the Exceptions Web Flow of the eSpace is set to the `Exceptions` web flow – this will be the Web Flow that will handle any unhandled exception raised in the eSpace.

2.3.2 Setting Browsers for Integrated Authentication

Internet browsers behave differently regarding integrated authentication, as follows:

Internet Explorer 7+: by default it will automatically use the operating system's credentials as long as it considers the site as an intranet site. See how to configure a site as Local Intranet in Internet Explorer;

FireFox 1.9+: requires sites to be trusted to pass on operation system's credentials. See how to configure trusted sites in Firefox;

Chrome 6.0+: by default it will automatically use the operating system's credentials as long as it considers the site as an intranet site. See how to configure a site as Local Intranet;

2.3.3 Web Services Authentication

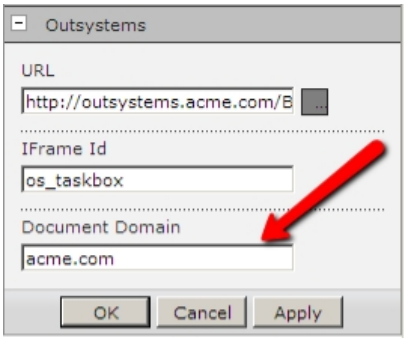
Web Services with integrated authentication (see further ahead in this document) are also supported but require OutSystems and SharePoint servers have to be configured for Kerberos authentication and delegation. More detailed instructions on how to configure Kerberos can be found later in this document.

2.4 Page Interactions between SharePoint and OutSystems

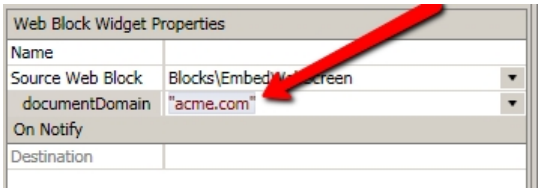
For security reasons all major browsers enforce the Same-Origin Policy which specifies that a page from `site1.com` should not have access to or change the properties of a page from `site2.com`. This means that, for our integration scenario to be successful, an additional measure needs to be taken so that both SharePoint pages and OutSystems pages behave as if they belonged to the same domain.

The way to achieve this is explicitly setting in each page the document domain that the browser should consider. In this case we will set pages served both by *sharepoint.intranet.acme.com* and by *outsystems.acme.com* to identify themselves as belonging to the *acme.com* parent domain.

SharePoint: set the parent domain in the `Document Domain` property of the OSWebscreen web part.



OutSystems: Add the `EmbedScreenSharepoint` web block from the `SharepointAdapter` eSpace to the specific Outsystems web screens that are being embedded in SharePoint and set the parent domain in the `documentDomain` argument.

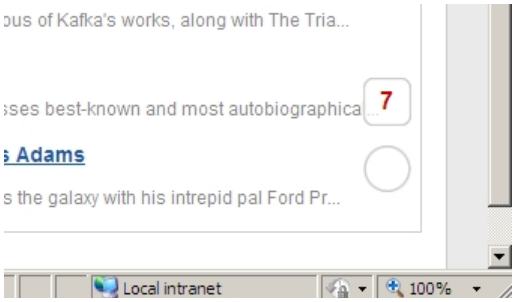


With this, both SharePoint's pages and Outsystems' web screens have their document domain elevated to a common parent domain and can now interact with each other. A positive side effect of this is that the IFrame defined in the `OSWebscreen` web part will now resize itself according to the size of its content.

A negative side effect is that, changing the page domains in the OutSystems environment will prevent Ajax calls from working when using Firefox. Everything works properly with Internet Explorer 7.0+ and Chrome 2.0+.

2.5 Embedded Change Technology and Embedded Process Automation

OutSystems' Embedded Change Technology (ECT) and Embedded Process Automation (EPA) both work by overlaying themselves to the displayed page.



Typically you do not want these to appear in the inner page when it is being embedded within another page. This is not an issue for EPA as it automatically disables itself when the page which would contain it is inside an IFrame.

As for ECT you can disable it in one of two ways:

1. If your eSpace is only used to be embedded within SharePoint, you should disable ECT for that eSpace altogether. You can easily do that in Enterprise Manager.
2. If only specific screens are embedded in SharePoint and you only want to remove ECT from these, you can add to the Preparation action of each screen a call to the `RemoveScreenFeedback` which you can find in the `ECT_Controller` extension.

3 Integrating Business Logic and Data

3.1 Consuming OutSystems Business Logic and Data in SharePoint

The best way to reuse business logic and data maintained by OutSystems applications within SharePoint is through web services. Web services are easily built in the OutSystems Platform and you can then consume them in SharePoint custom web parts you code or with Business Connectivity Services.

To ensure security and authentication Web Services with integrated authentication are also supported. Note that before you can consume a web service both OutSystems and SharePoint servers have to be configured for Kerberos authentication and delegation. Detailed instructions on how to configure Kerberos can be found later in this document.

Once Kerberos authentication and delegation have been setup the web services created with the OutSystems Platform are ready to be consumed like any other authenticated web service.

3.2 Consuming SharePoint Web Services in OutSystems Applications

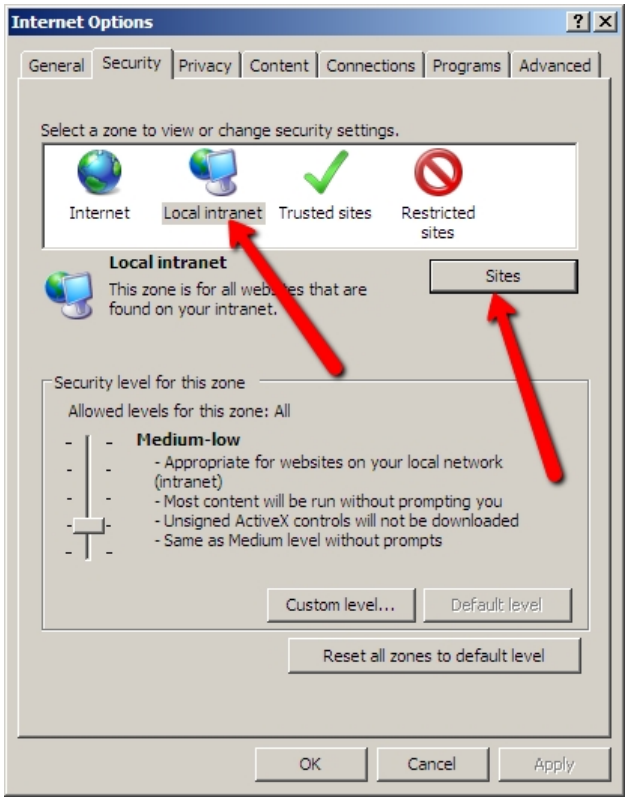
Web Services exposed from SharePoint can be consumed by OutSystems applications as normal.

Microsoft provides a list of the web services SharePoint 2010 exposes, including detailed descriptions, which can be found at http://msdn.microsoft.com/en-us/library/ee705814.aspx.

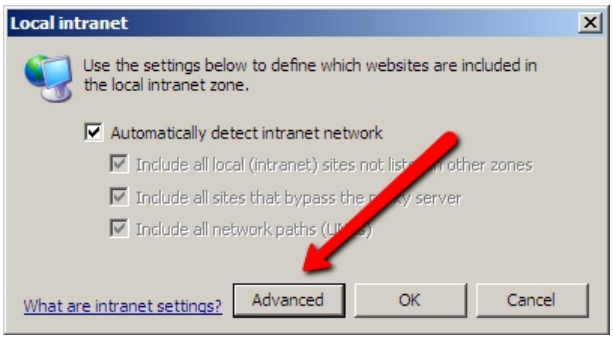
4 Appendixes

4.1 Configuring a Site as Local Intranet in Internet Explorer 8

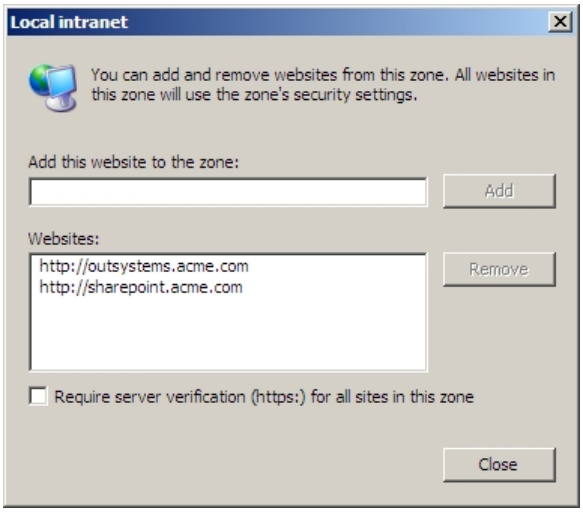
1. Go to the Tools menu and choose Internet Options
2. Switch to the Security tab choose Local Intranet and click on the Sites button



3. Click on the Advanced button



4. Add the address of the sites to be considered as local intranet; wildcards are accepted e.g.: `*.acme.com`

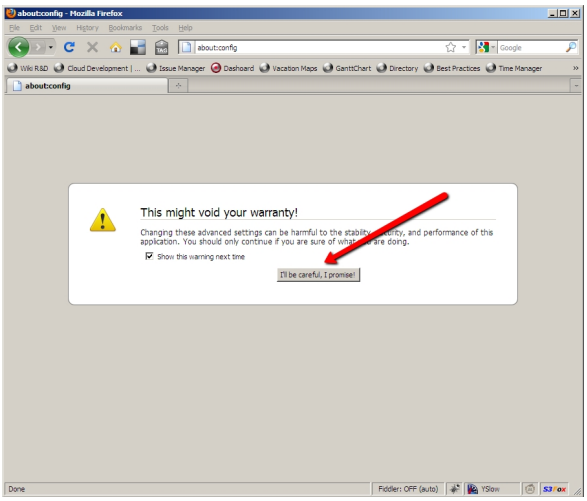


5. Now confirm and close all opened windows.
6. Open the site in Internet Explorer 8 and check that it is a local intranet on the status bar, at the bottom of the browser.

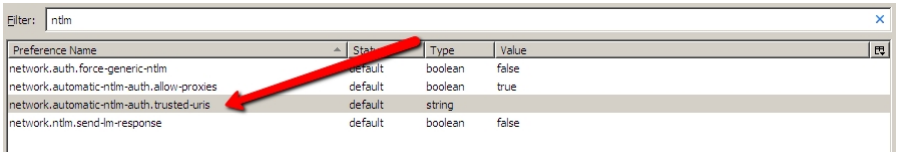
7. For an enterprise wide deployment Microsoft provides instructions on how to deploy customized versions of Internet Explorer 8 can be found at http://technet.microsoft.com/en-us/library/cc985339.aspx.

4.2 Configuring Trusted Sites in Firefox

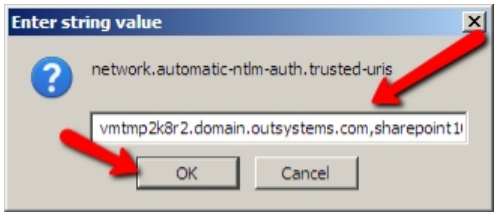
1. Launch Firefox and type `about:config` in the URL. For the most recent Firefox versions a confirmation is required.



2. Type `ntlm` on the filter and double click on `network.automatic-ntlm-auth.trusted-uris`.



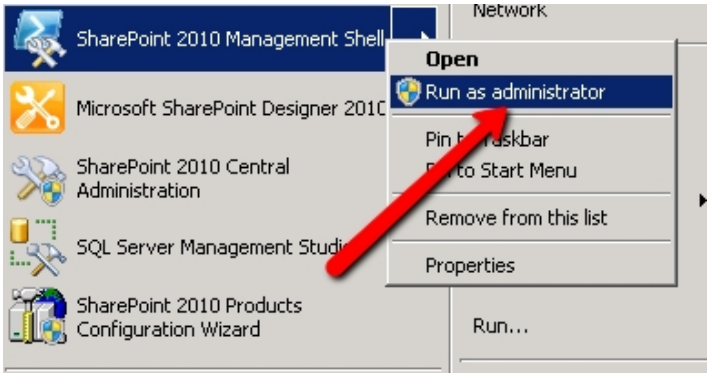
3. Enter the host names of the servers that should be trusted for authentication – separated by comas.



4. For an enterprise wide deployment Mozilla provides instructions on how to deploy customized versions of Firefox can be found at https://wiki.mozilla.org/Deployment:Deploying_Firefox.

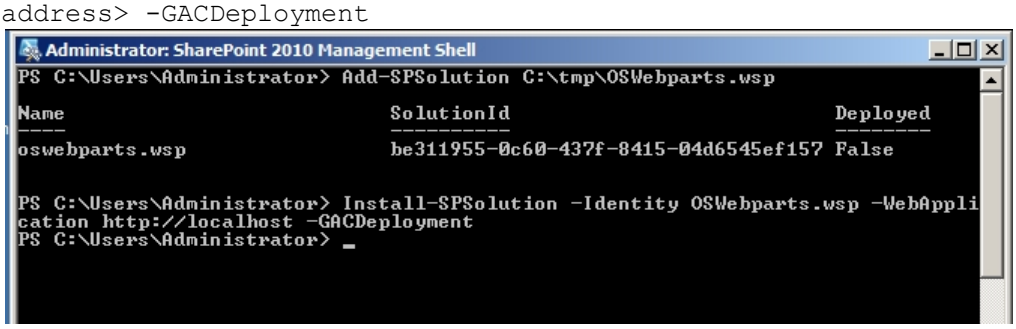
4.3 Installing OutSystems Web Parts Package

1. Get the Web Parts package from http://www.outsystems.com/NetworkSolutions/ProjectDetail.aspx?ProjectId=170.

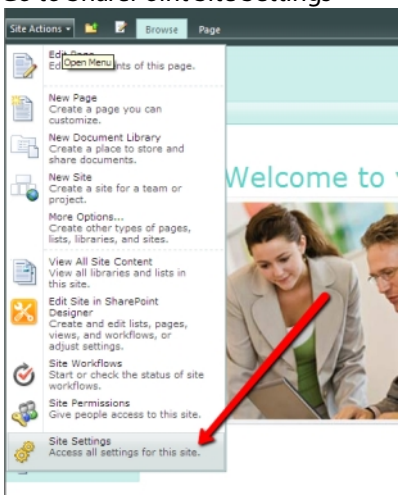


2. Open SharePoint 2010 Management Shell as administrator

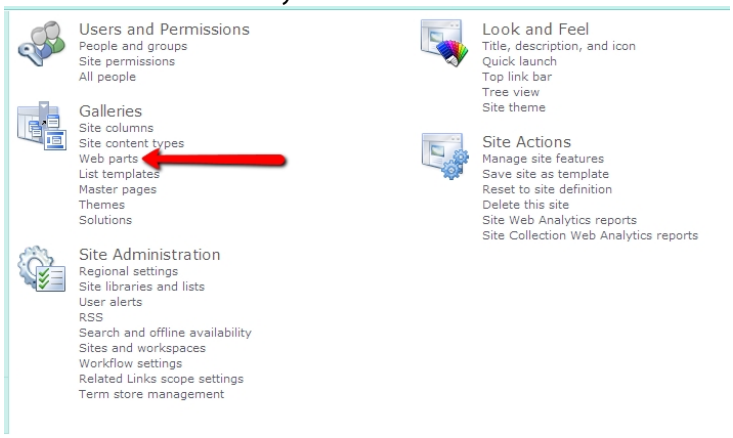
3. Type `Add-SPSolution <path>\OSWebparts.wsp`
4. Type `Install-SpSolution -Identity OSWebparts.wsp -WebApplication <app address> -GACDeployment`



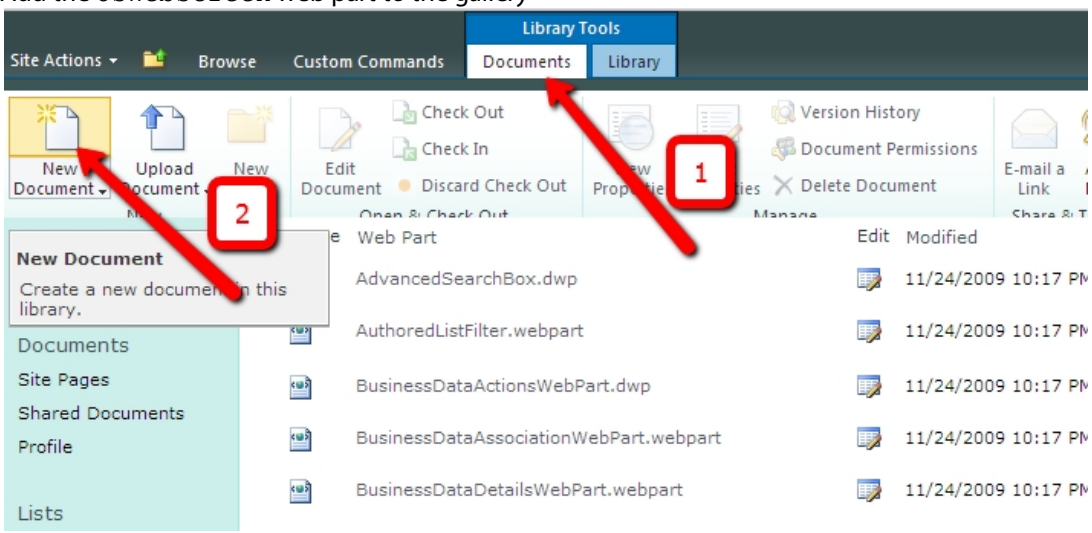
5. Go to SharePoint Site Settings



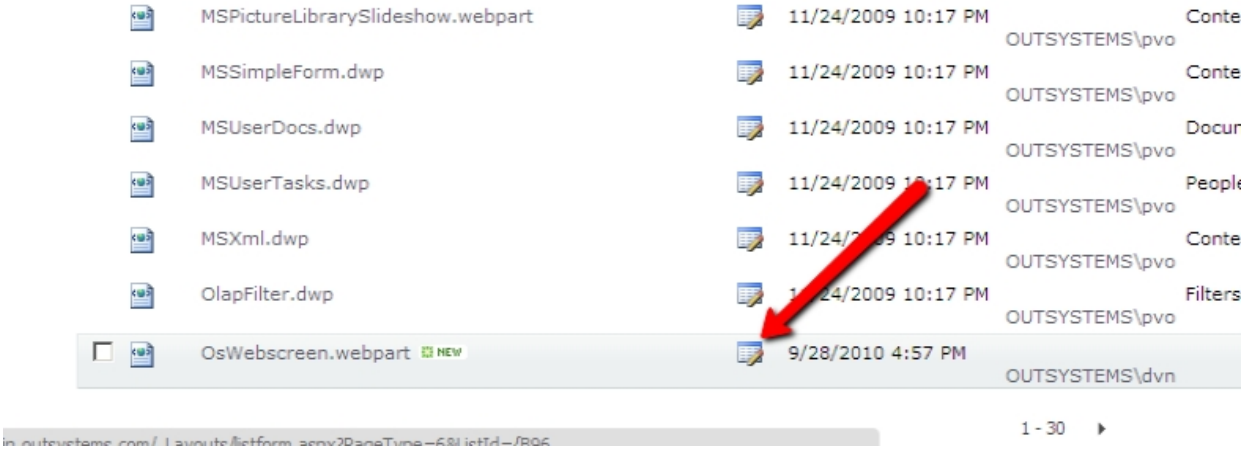
6. Go to the Web Part Gallery



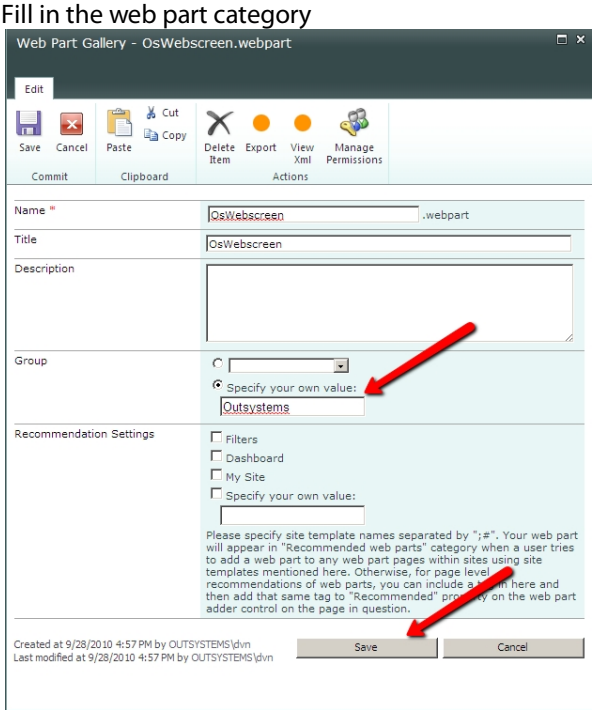
7. Add the `OsWebscreen` web part to the gallery



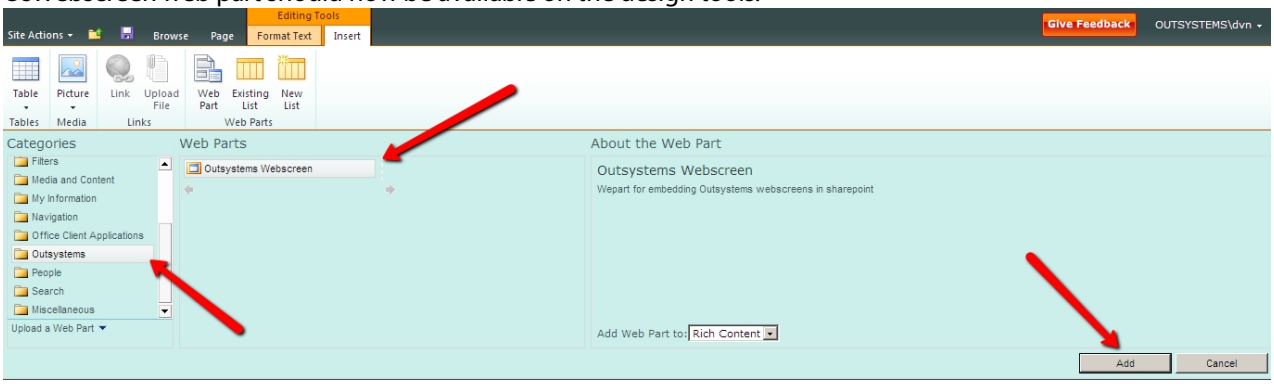
8. Edit the web part



9. Fill in the web part category



10. OsWebscreen web part should now be available on the design tools.



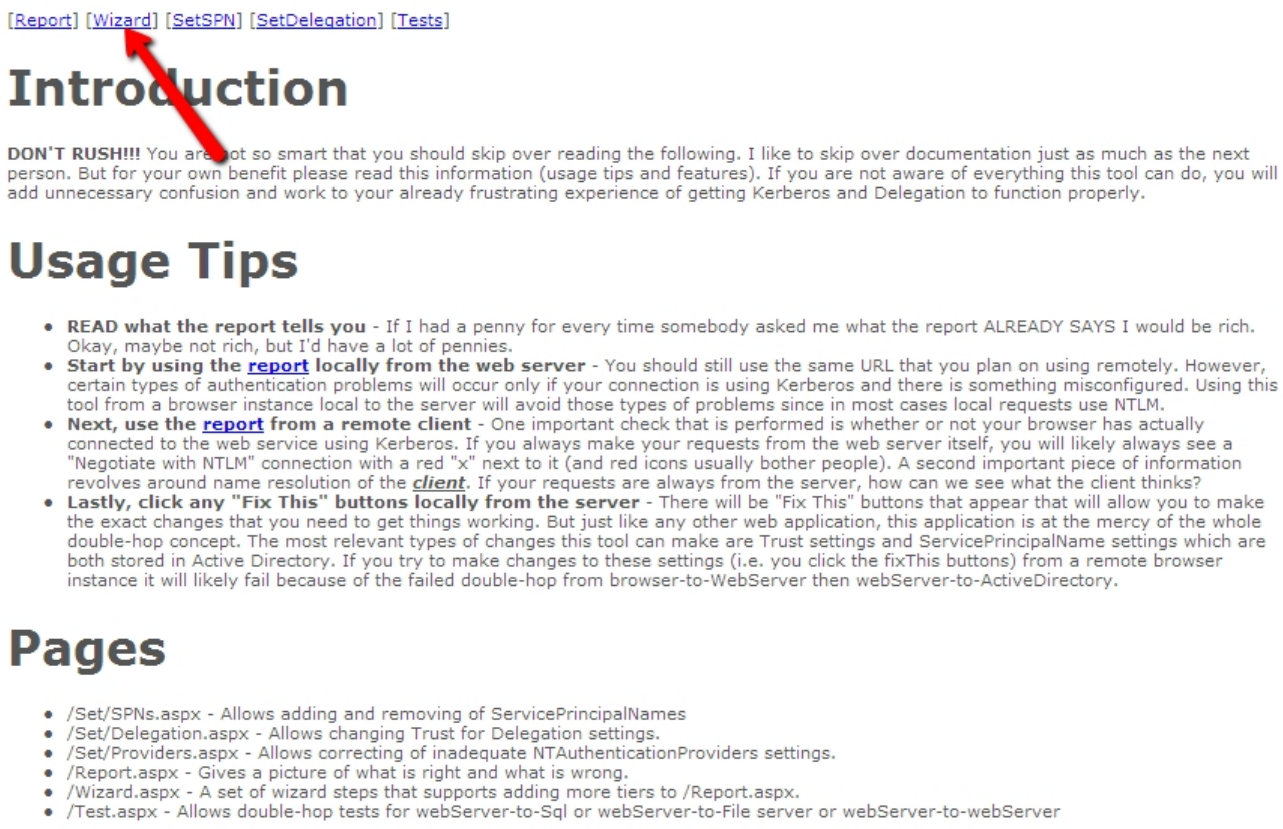
4.4 Configuring Kerberos for SharePoint

Microsoft has a detailed white paper on how to configure Kerberos authentication and delegation for SharePoint 2010 which you can review at http://blogs.technet.com/b/tothesharepoint/archive/2010/07/22/whitepaper-configuring-kerberos-authentication-for-sharepoint-2010-and-sql-server-2008-r2-products.aspx.

Alternatively, you can leverage a tool called DelegConfig written by Brian Murphy-Booth that guides you, step by step, on setting up Kerberos for SharePoint. This ASP.NET application examines a SharePoint server for Kerberos authentication and delegation issues and produces a detailed report with the missing configurations and instructions on how they can be addressed. You can download this application at http://blogs.iis.net/brian-murphy-booth/archive/2009/04/22/delegconfig-v2-beta.aspx. The installation instructions are packaged with the download.

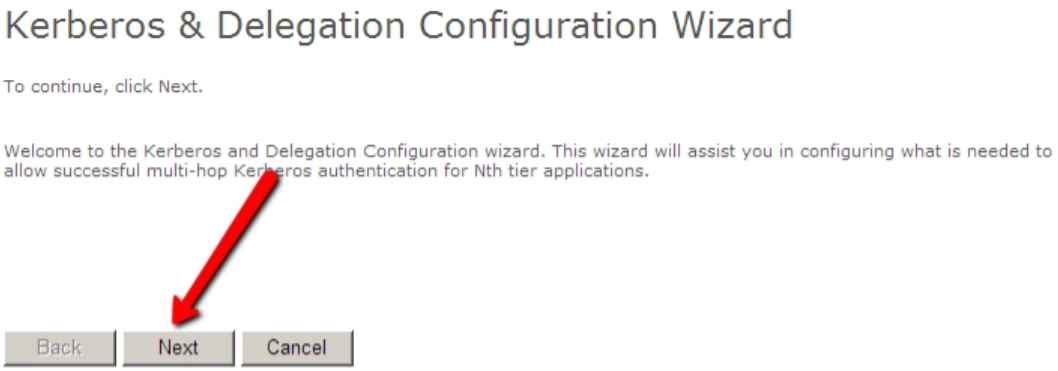
4.4.1 Using the DelegConfig Application to Configure Kerberos

After installing the DelegConfig application, open it in an Internet browser, and start the Kerberos configuration Wizard.

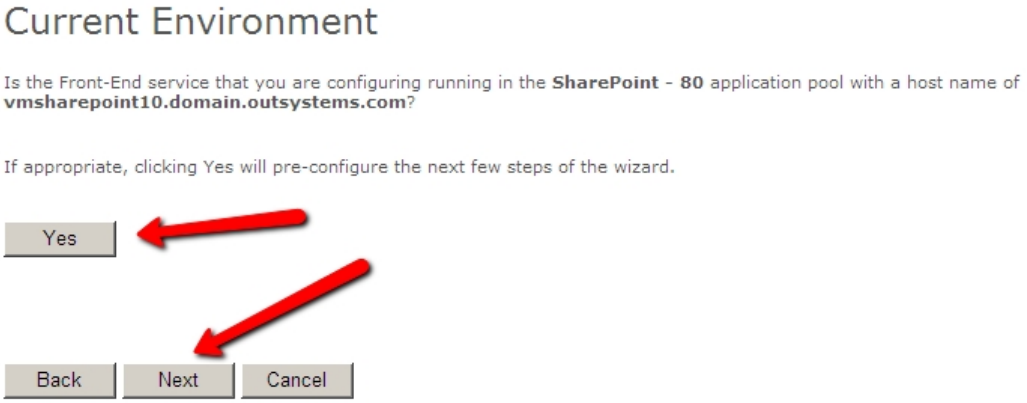


The following steps illustrate the setting up of Kerberos for SharePoint using the DelegConfig application. Although this is a specific example for a specific scenario, it may be used as basis to set up your situation only by changing the responses in order to match your infrastructure scenario.

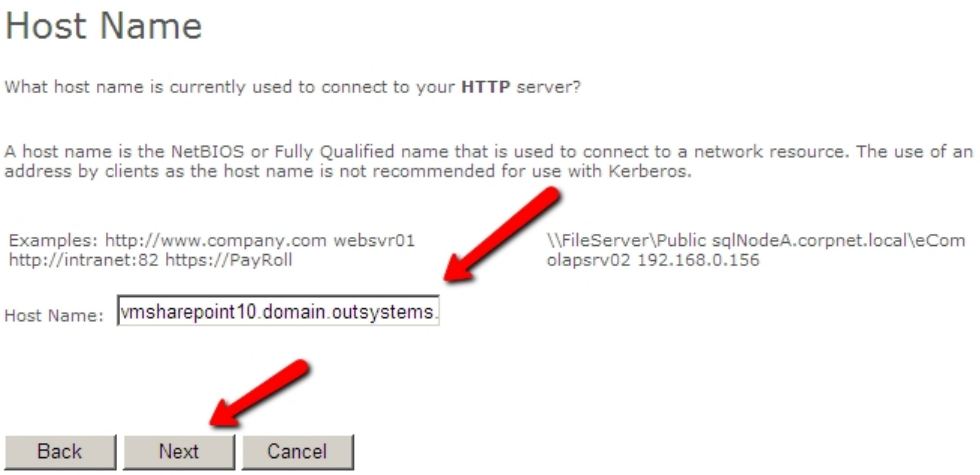
1. A short welcome message is displayed before the setup of Kerberos authentication and delegation parameters;



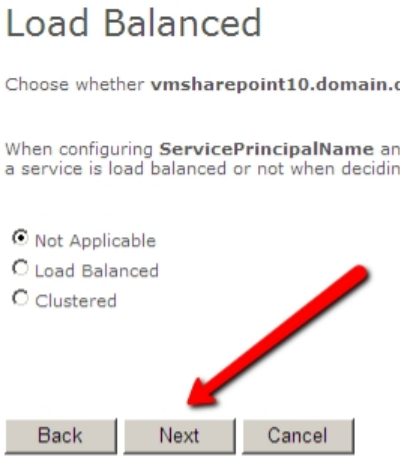
2. Confirm that the SharePoint server is the right one;



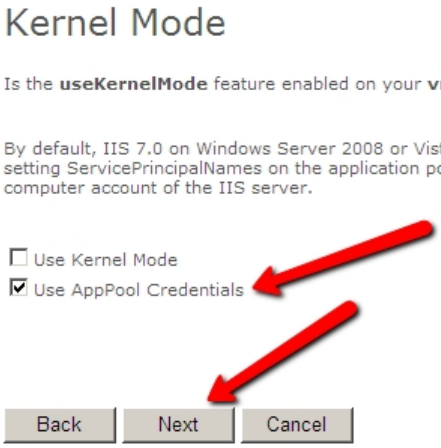
3. Define the access name to the server that is hosting SharePoint;



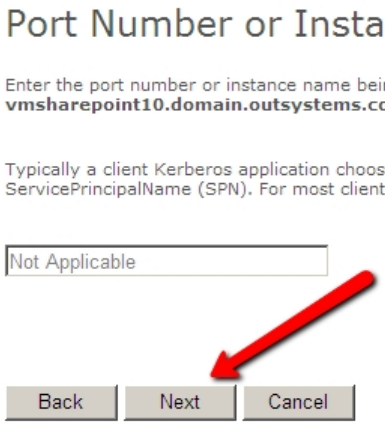
4. Set whether the SharePoint server is load balanced or not;



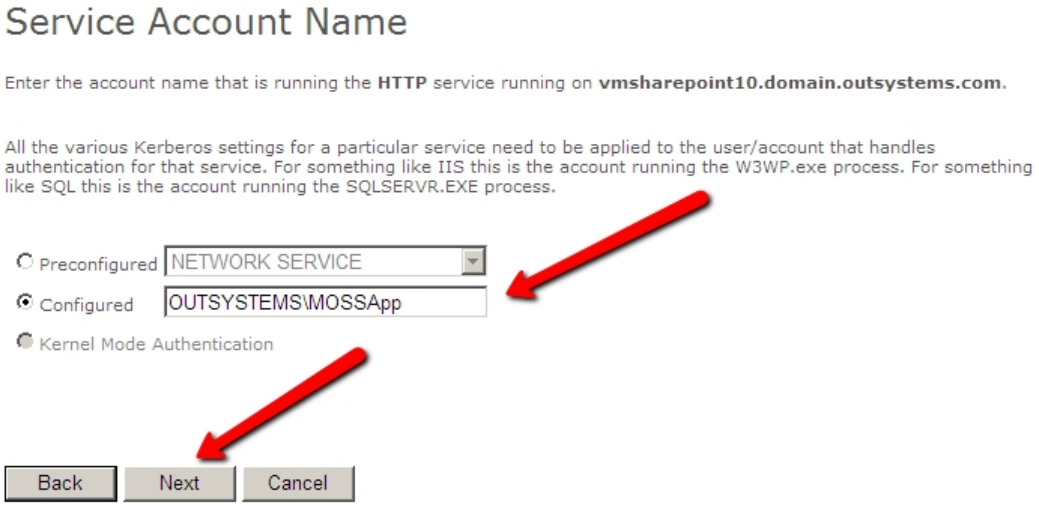
5. For the Kernel Mode choose 'Use AppPool Credentials' option because kernel mode authentication is not supported by SharePoint 2010 products;



6. The Port Number and Instance Name settings do not apply to HTTP services for the SharePoint server, so skip forward;

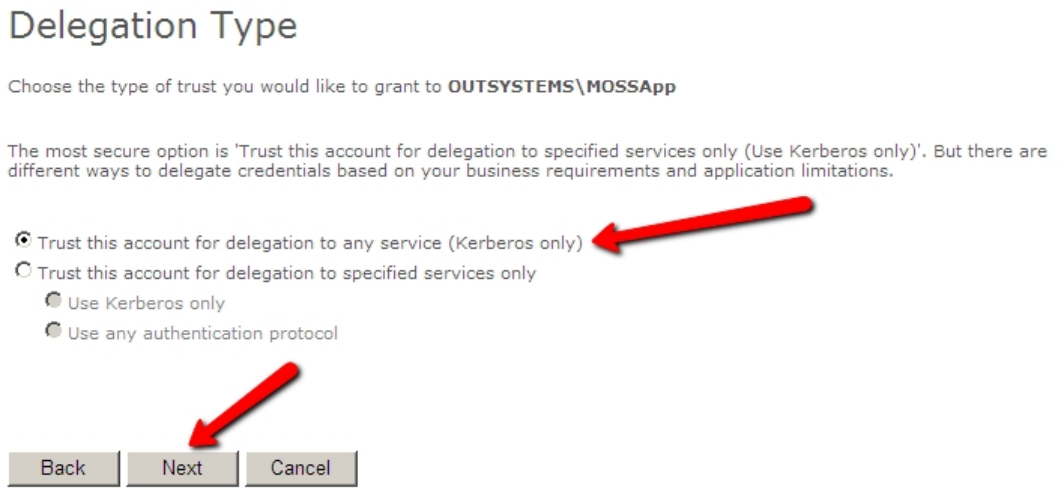


7. Set the account that is configured on the SharePoint application pool;

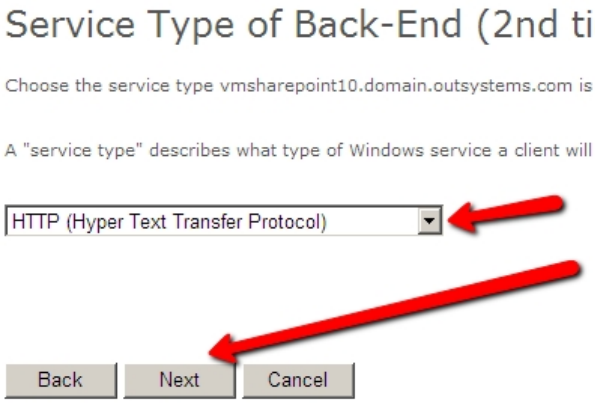


8. Configure SharePoint to delegate credentials to another server;

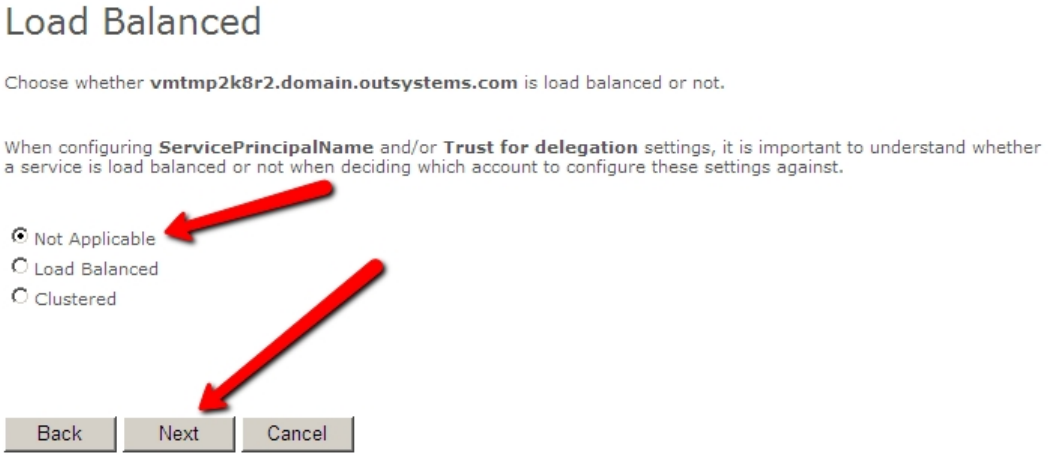
9. Choose the type of delegation trust: the first option is easier to configure but less secure. Choose the option that better suits your needs;



10. Set the delegation to use the HTTP service (OutSystems server);

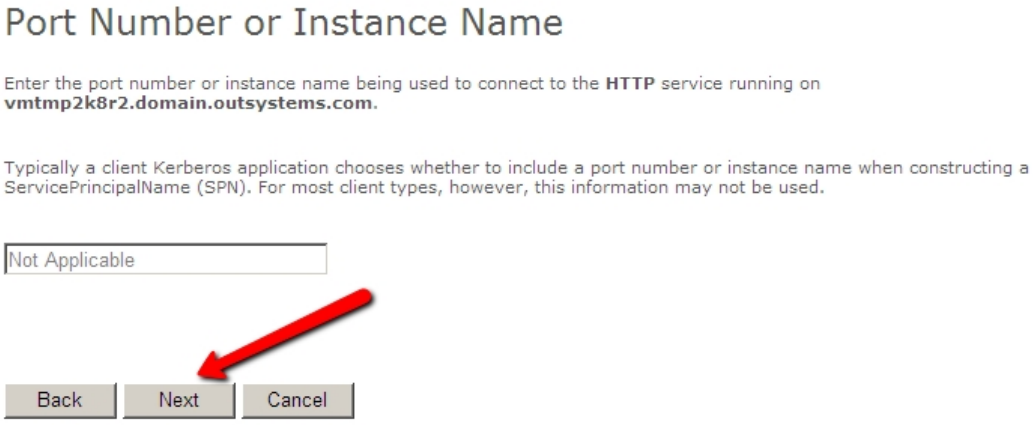


11. Set OutSystems server(s) to have no load balancing;

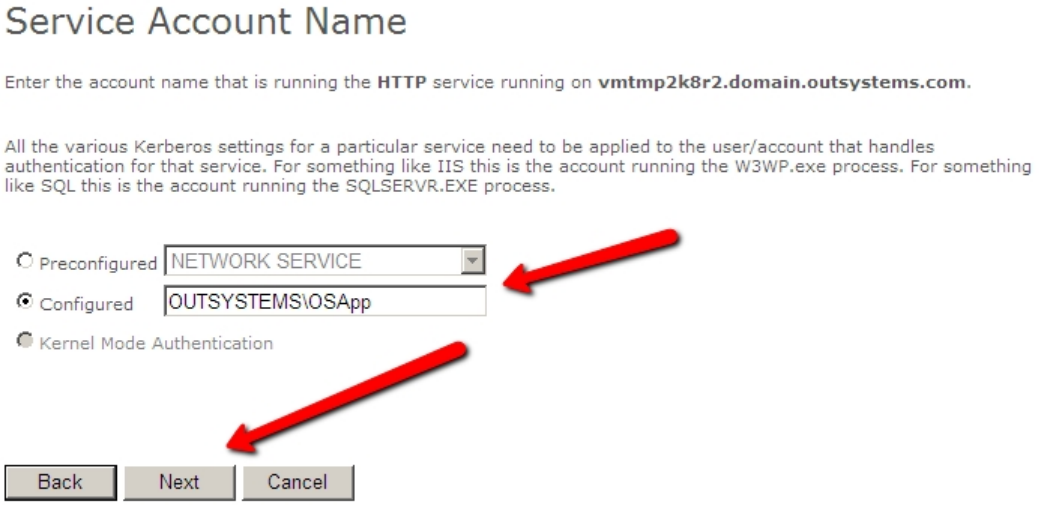


12. There are known issues on Kernel mode authentication with Windows 2008 R2, therefore choosing ' Use AppPool Credentials' is recommended;

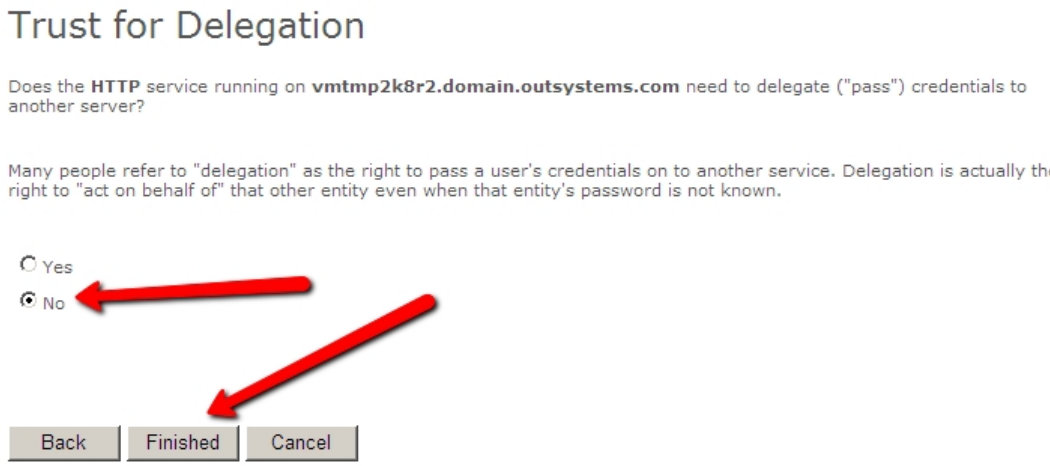
13. The Port Number and Instance Name settings do not apply to HTTP services for the OutSystems server, so skip forward;



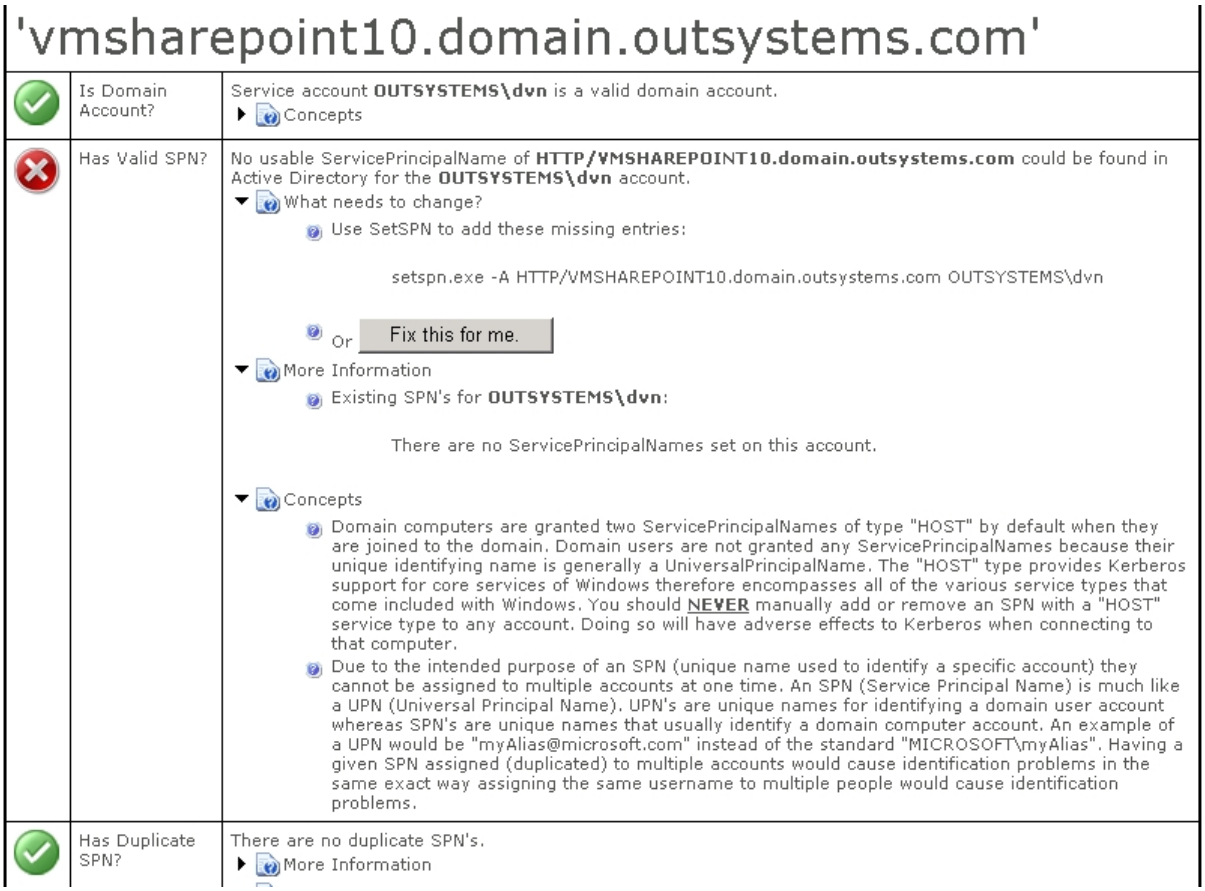
14. Indicate the user account configured on the OutSystems application pool;



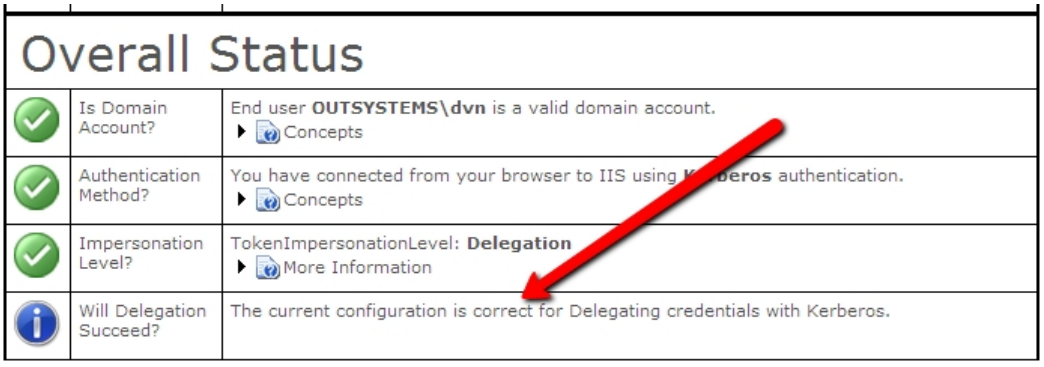
15. OutSystems servers usually don't need to delegate credentials to other servers, so choose No and finish up the wizard.



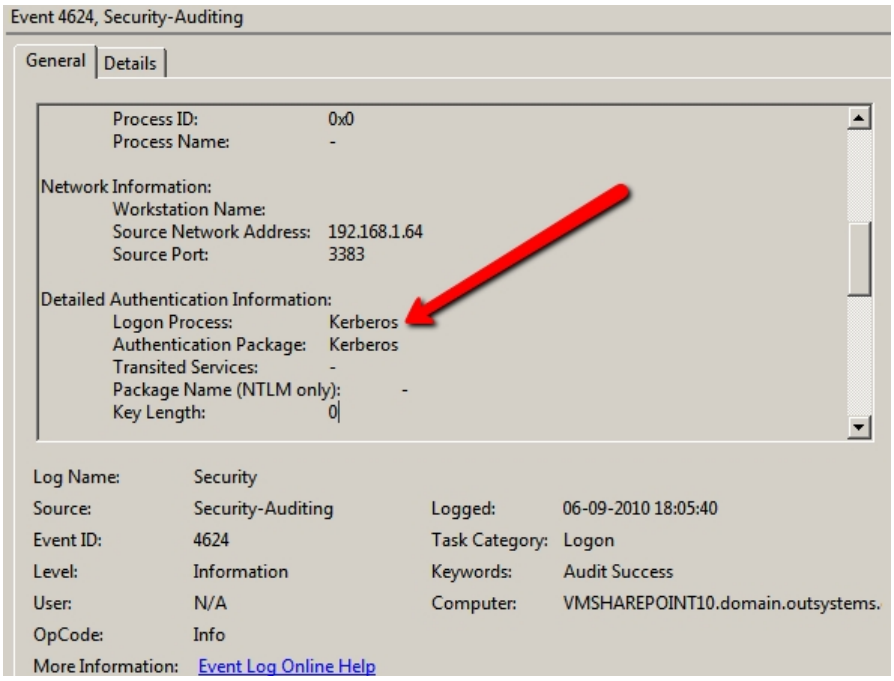
After finishing the wizard a report like the one below will be presented and each item that is not valid has a detailed explanation on how to correct it.



Multiple iterations might be required until you reach the correct Kerberos configuration.



After all configurations have been correctly set, open the Event Viewer in the Security section for the SharePoint server and for the OutSystems server, and check that both are using Kerberos.



For any further troubleshooting please refer to the Microsoft's http://blogs.technet.com/b/tothesharepoint/archive/2010/07/22/whitepaper-configuring-kerberos-authentication-for-sharepoint-2010-and-sql-server-2008-r2-products.aspx.