

ASP.NET Deployment in IIS

How to Deploy ASP.NET
Web Applications in IIS?

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1. IIS Intro & History
2. Installing IIS / IIS Express
3. Deploying ASP.NET Apps in IIS
 - Sites, Application Pools, Applications
 - Deploying Simple ASP.NET Application
 - Web Publishing from Visual Studio
 - Deploying Data-Driven Application
 - Configuring a Domain + SSL



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INTERNET INFORMATION SERVICES

(IIS 6.0 / 7.0 / 7.5 / 8.0 / 8.5)

- Internet Information Services (IIS) is a Web server (HTTP server)
 - Microsoft's Web server, part of Windows Server
 - Serves static and dynamic content (through the ISAPI interface)
 - IIS hosts and runs ASP.NET Web applications
- IIS processes
 - World Wide Web Publishing Service (**iissvcs** in **svchost.exe**) holds the IIS core runtime
 - IIS Worker Process (**w3wp.exe**) hosts the application pools which host the ASP.NET runtime and the ASP.NET apps

IIS: History and Versions

- IIS 5.1 (Windows XP)
 - 10 simultaneous connections, a single Web site
- IIS 6.0 (Windows Server 2003)
 - Faster and more secure, supports application pools
- IIS 7.0 (Windows Vista / Server 2008)
 - Can restrict machine resources per user / app
- IIS 7.5 (Windows 7 / Server 2008 R2)
 - IIS Express – limited developer edition
- IIS 8 (Windows Server 2012)
- IIS 8.5 (Windows Server 2012 R2)





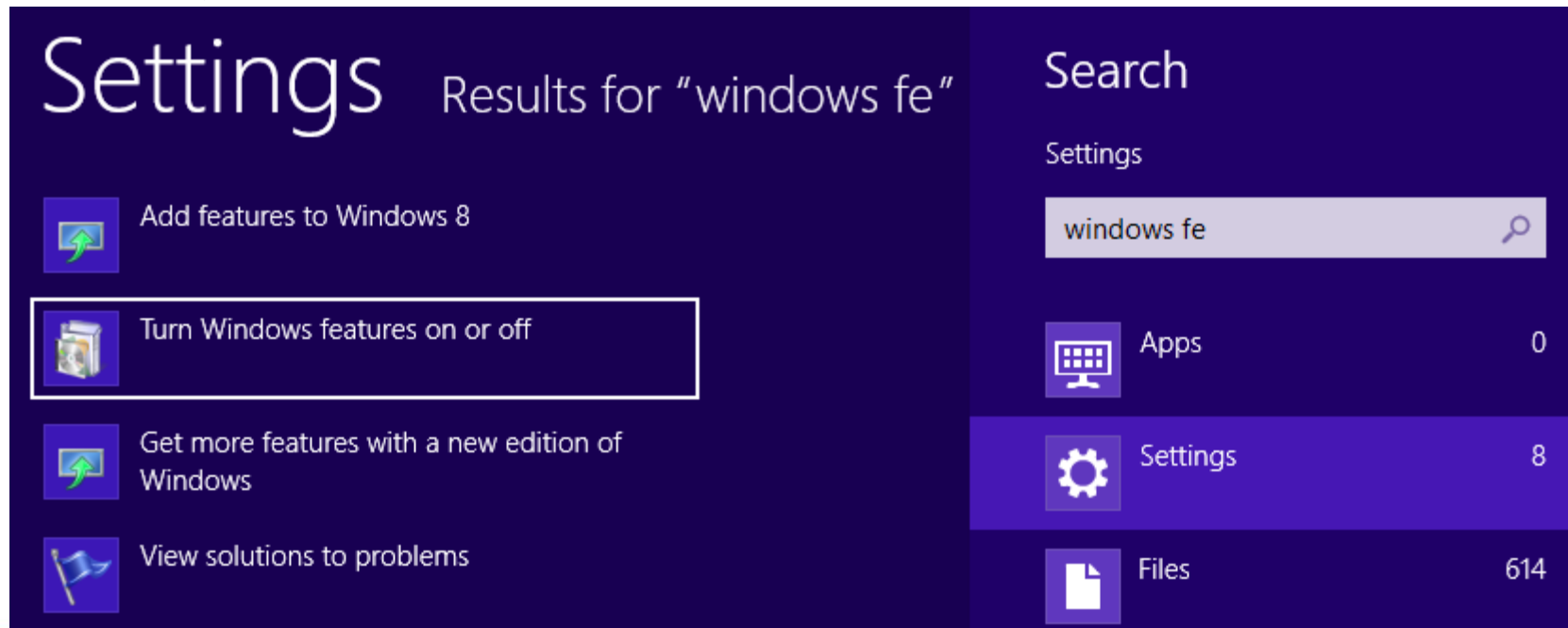
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INSTALLING IIS / IIS EXPRESS

Turn On / Off Windows Features,
Web Platform Installer

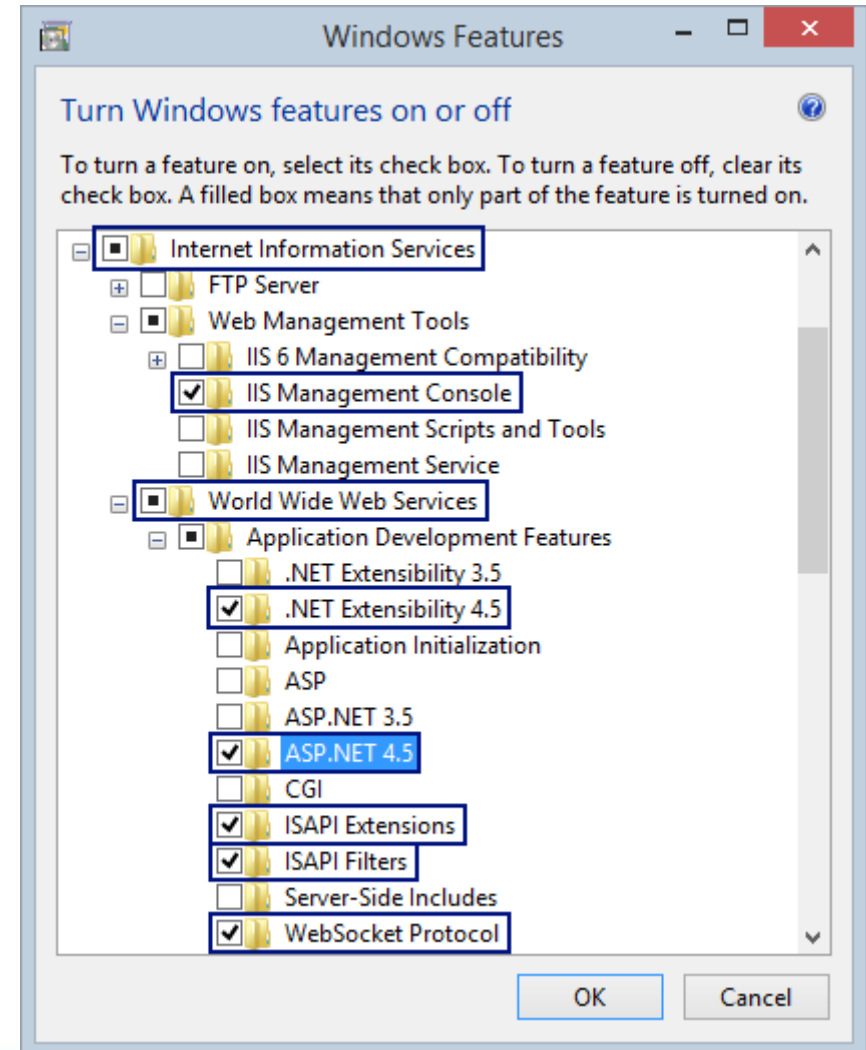
Installing IIS

- IIS is part of Windows (Win7, Win8, Windows Server 2008, Windows Server 2012, ...)
 - Installed by "Turn Windows features on or off"

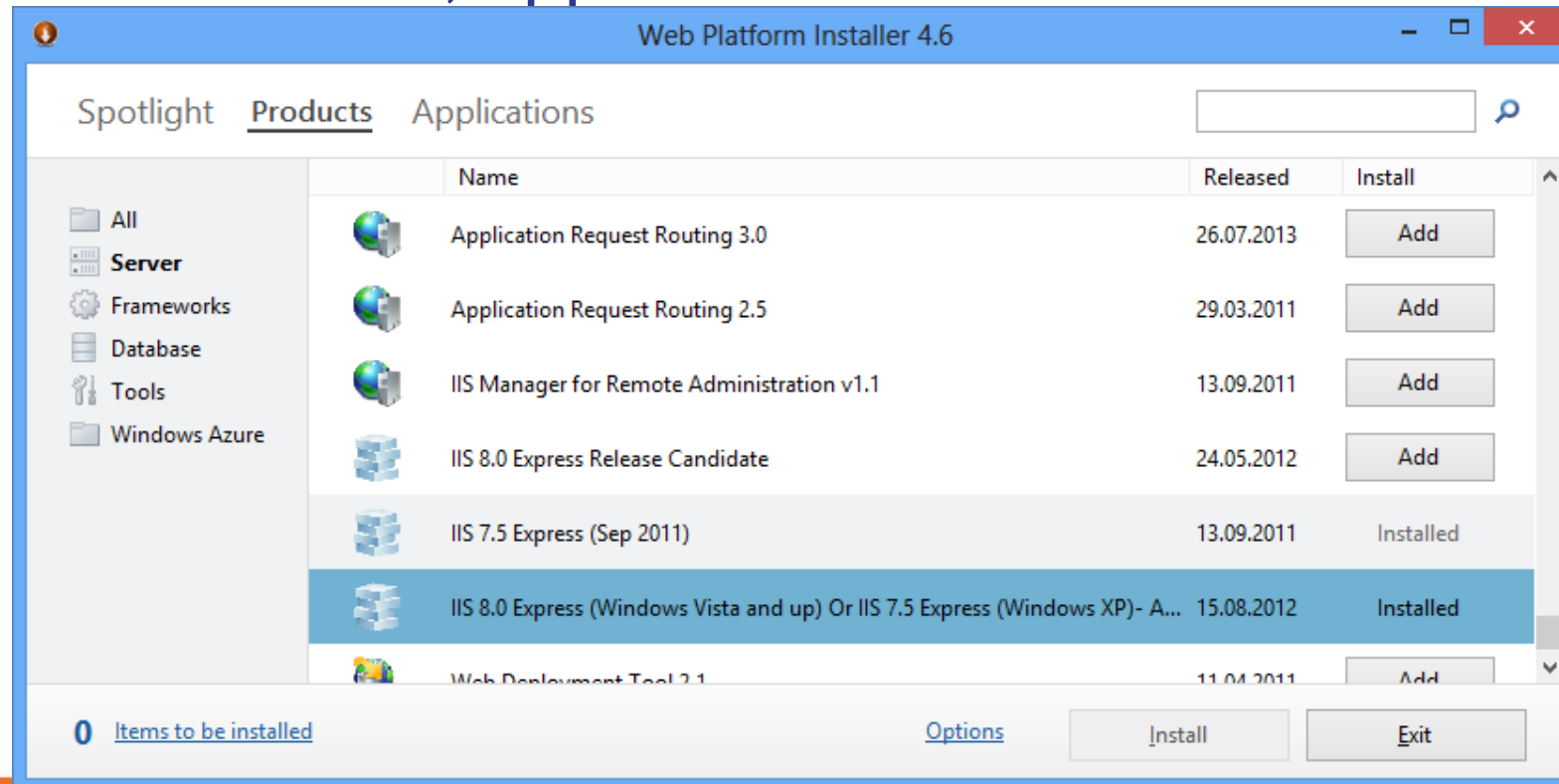


Installing IIS (2)

- IIS features to install:
 - Internet Information Services
 - ASP.NET 4.5 + .NET Extensibility 4.5
 - ISAPI Filters + ISAPI Extensions
 - WebSocket Protocol (for SignalR)
 - IIS Management Console



- Web Platform Installer (Web PI) can install IIS Express
 - Installs Web servers, applications and tools



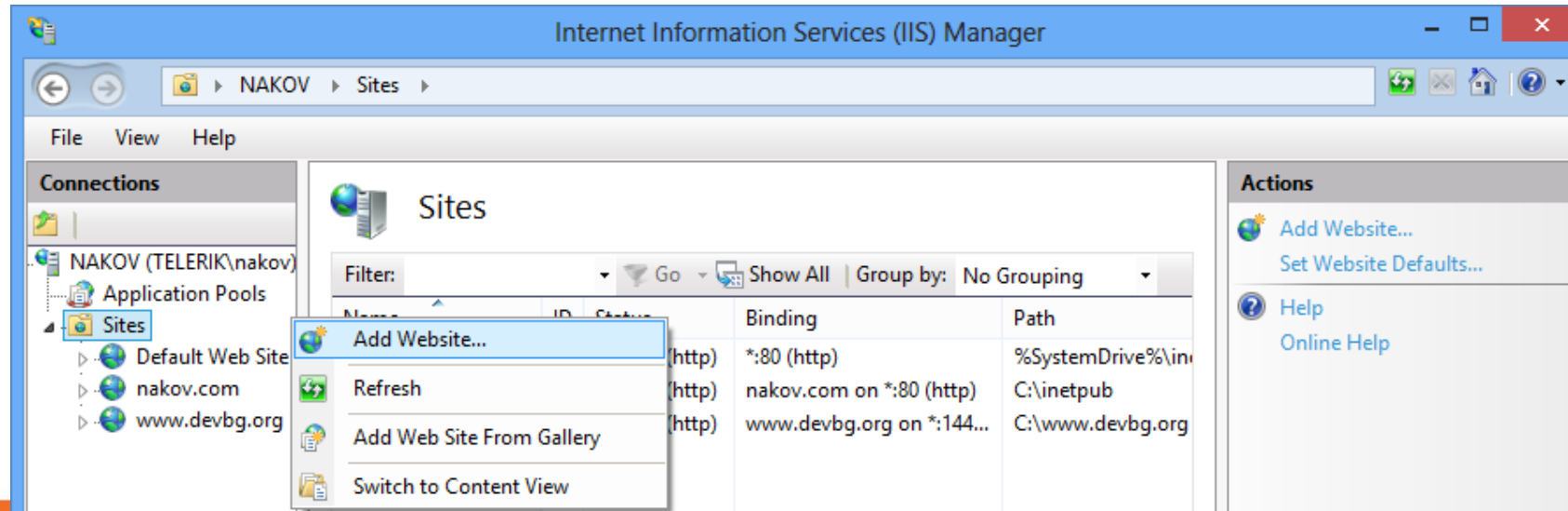


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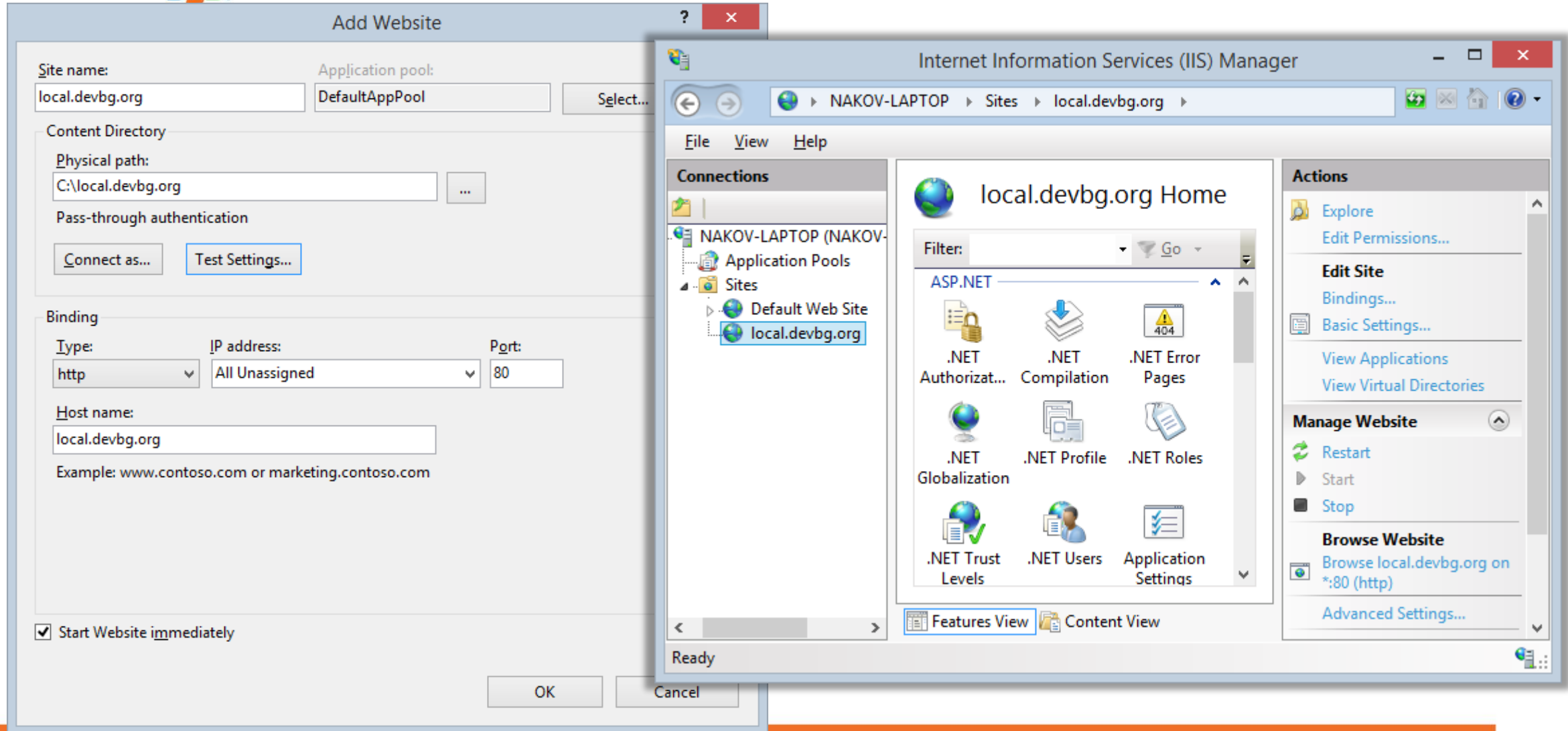
DEPLOYING ASP.NET APPS IN IIS

Sites, Applications, Application Pools, DB, ...

- Sites in IIS
 - Instances of the IIS Web server, hosting files and applications
 - Sites are bound to some protocol + host + port
 - E.g. <http://mysite.com>, <https://localhost:8443>



Web Sites in IIS (2)



The image shows two overlapping windows from the Windows operating system. The background window is the 'Add Website' dialog box, and the foreground window is the 'Internet Information Services (IIS) Manager'.

Add Website Dialog:

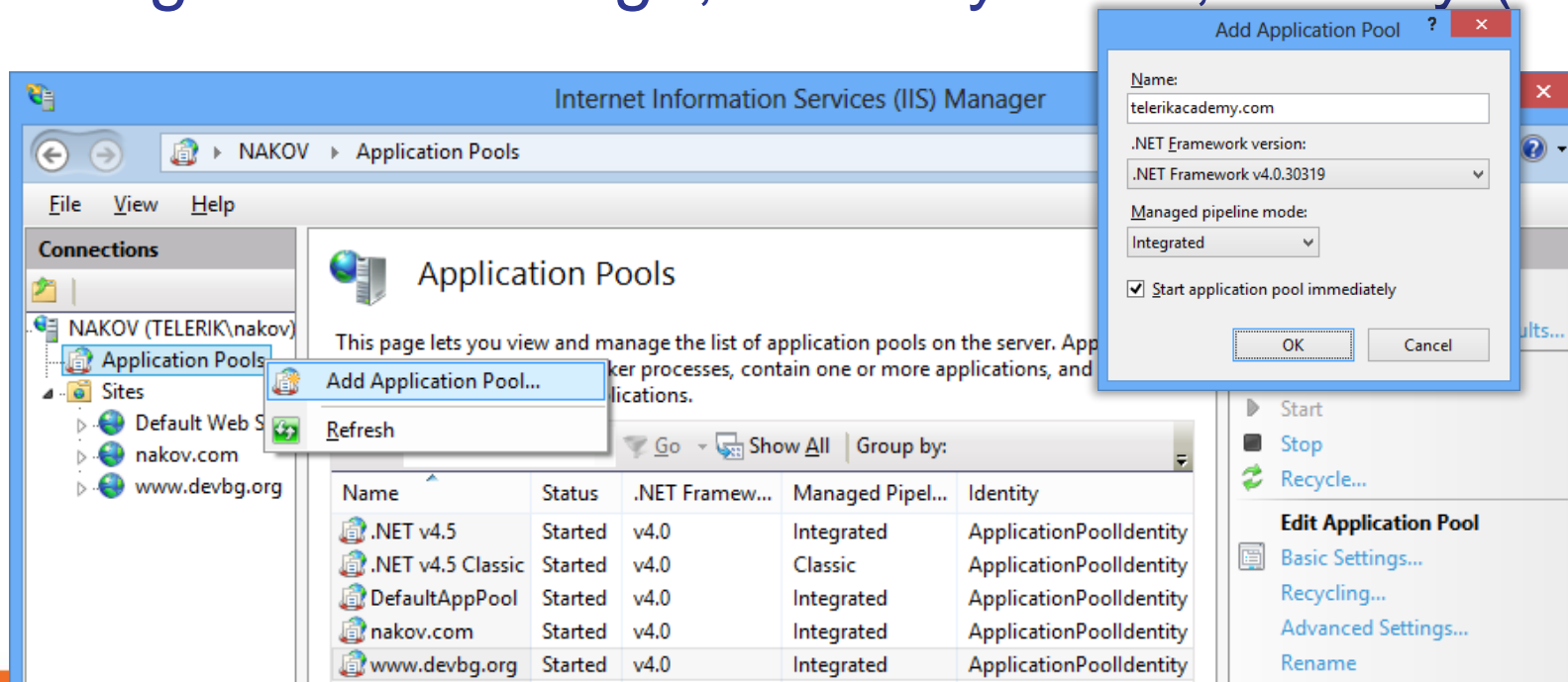
- Site name:** local.devbg.org
- Application pool:** DefaultAppPool
- Content Directory:**
 - Physical path:** C:\local.devbg.org
 - Pass-through authentication:** (unchecked)
 - Buttons:** Connect as..., Test Settings...
- Binding:**
 - Type:** http
 - IP address:** All Unassigned
 - Port:** 80
 - Host name:** local.devbg.org
 - Example:** www.contoso.com or marketing.contoso.com
- Start Website immediately:** (checked)
- Buttons:** OK, Cancel

Internet Information Services (IIS) Manager:

- Address bar:** NAKOV-LAPTOP > Sites > local.devbg.org
- Connections:** NAKOV-LAPTOP (NAKOV) > Application Pools > Sites > Default Web Site > local.devbg.org
- Local.devbg.org Home:**
 - Filter:** ASP.NET
 - Features:** .NET Authorization, .NET Compilation, .NET Error Pages, .NET Globalization, .NET Profile, .NET Roles, .NET Trust Levels, .NET Users, Application Settings
 - Buttons:** Features View, Content View
- Actions:**
 - Explore, Edit Permissions...
 - Edit Site:** Bindings..., Basic Settings...
 - View Applications, View Virtual Directories
 - Manage Website:** Restart, Start, Stop
 - Browse Website:** Browse local.devbg.org on *:80 (http), Advanced Settings...
- Status:** Ready

Application Pools in IIS

- Application pools **host Web applications in IIS**
 - A process group that run the ASP.NET runtime
 - Can configure CPU usage, memory limits, identity (Windows user)



Application Pools in IIS (2)

The screenshot shows the Internet Information Services (IIS) Manager console. The left pane displays the 'Connections' tree with 'NAKOV-LAPTOP (NAKOV-LAPTOP)' selected, and 'Application Pools' expanded. The main pane shows the 'Application Pools' page with a table of existing pools. The 'Add Application Pool' dialog box is open, showing the configuration for a new pool named 'local.devbg.org'.

Application Pools Table:

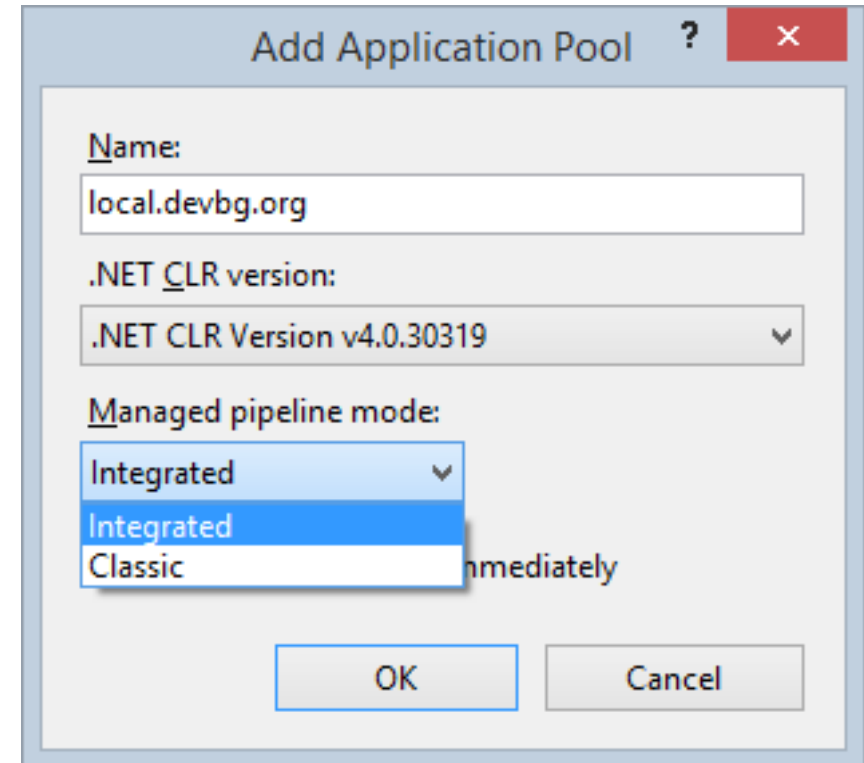
Name	Status	.NET CLR V...	Managed Pipel...	Identity	Applications
.NET v4.5	Started	v4.0	Integrated	ApplicationPoolIdentity	0
.NET v4.5 Classic	Started	v4.0	Classic	ApplicationPoolIdentity	0
DefaultAppPool	Started	v4.0	Integrated	ApplicationPoolIdentity	2

Add Application Pool Dialog Box:

- Name: local.devbg.org
- .NET CLR version: .NET CLR Version v4.0.30319
- Managed pipeline mode: Integrated
- ☒ Start application pool immediately

Pipeline Mode for IIS Application Pools

- Managed pipeline mode:
 - Classic
 - Use ASP.NET as external IIS plugin, like the PHP and Perl interpreters
 - Integrated (recommended)
 - ASP.NET is integrated inside IIS
 - ASP.NET can control the request pipeline, e.g. through `HttpModule` and `HttpHandler`



Add Application Pool ? x

Name:
local.devbg.org

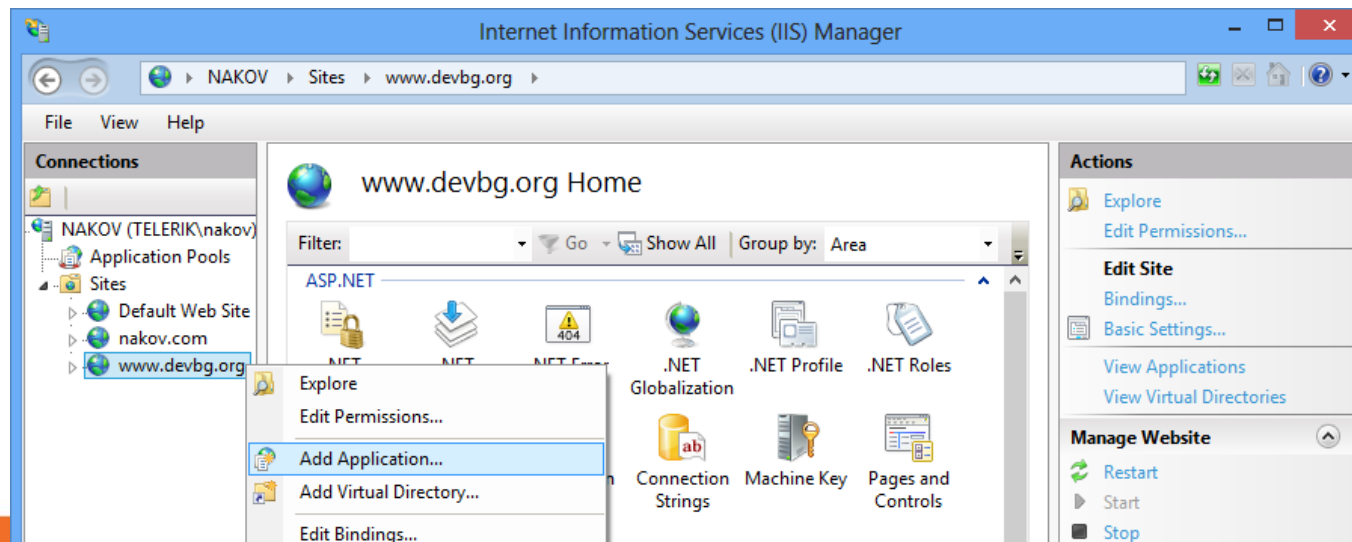
.NET CLR version:
.NET CLR Version v4.0.30319 v

Managed pipeline mode:
Integrated v
Integrated
Classic immediately

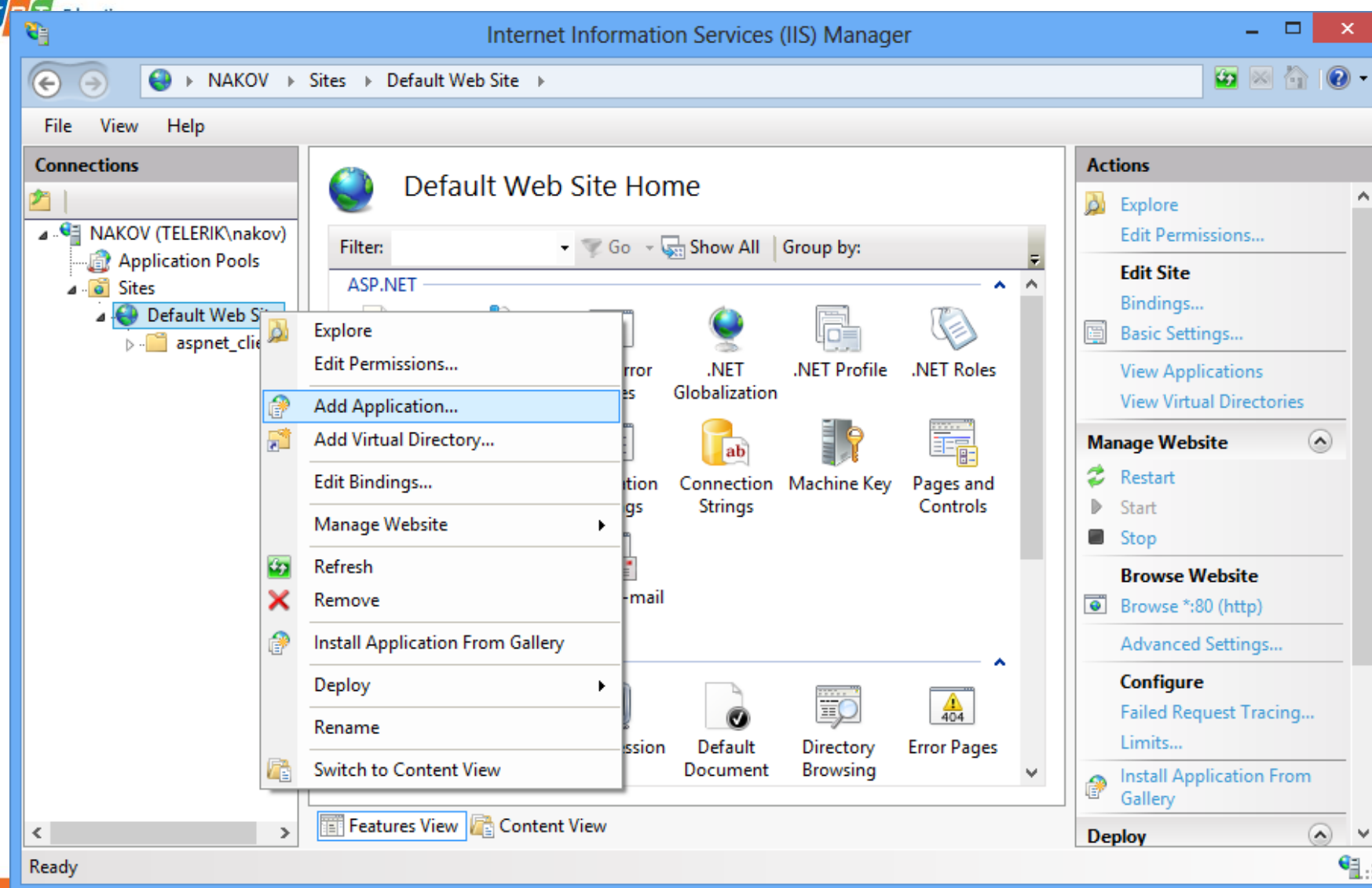
OK Cancel

Applications in IIS

- Applications in IIS are
 - Physical directory with files (application code)
 - Belong to existing Web site and run in existing application pool
 - Have alias (virtual directory), e.g. <http://localhost/alias/>



Creating an Application in IIS



Creating an Application in IIS (2)

Add Application ? X

Site name: Default Web Site
Path: /

Alias: Demo Application pool: DefaultAppPool Select...

Example: sales

Physical path: C:\Users\16. IIS Deployment\IIS-Demos\WebAppSimpleASPX ...

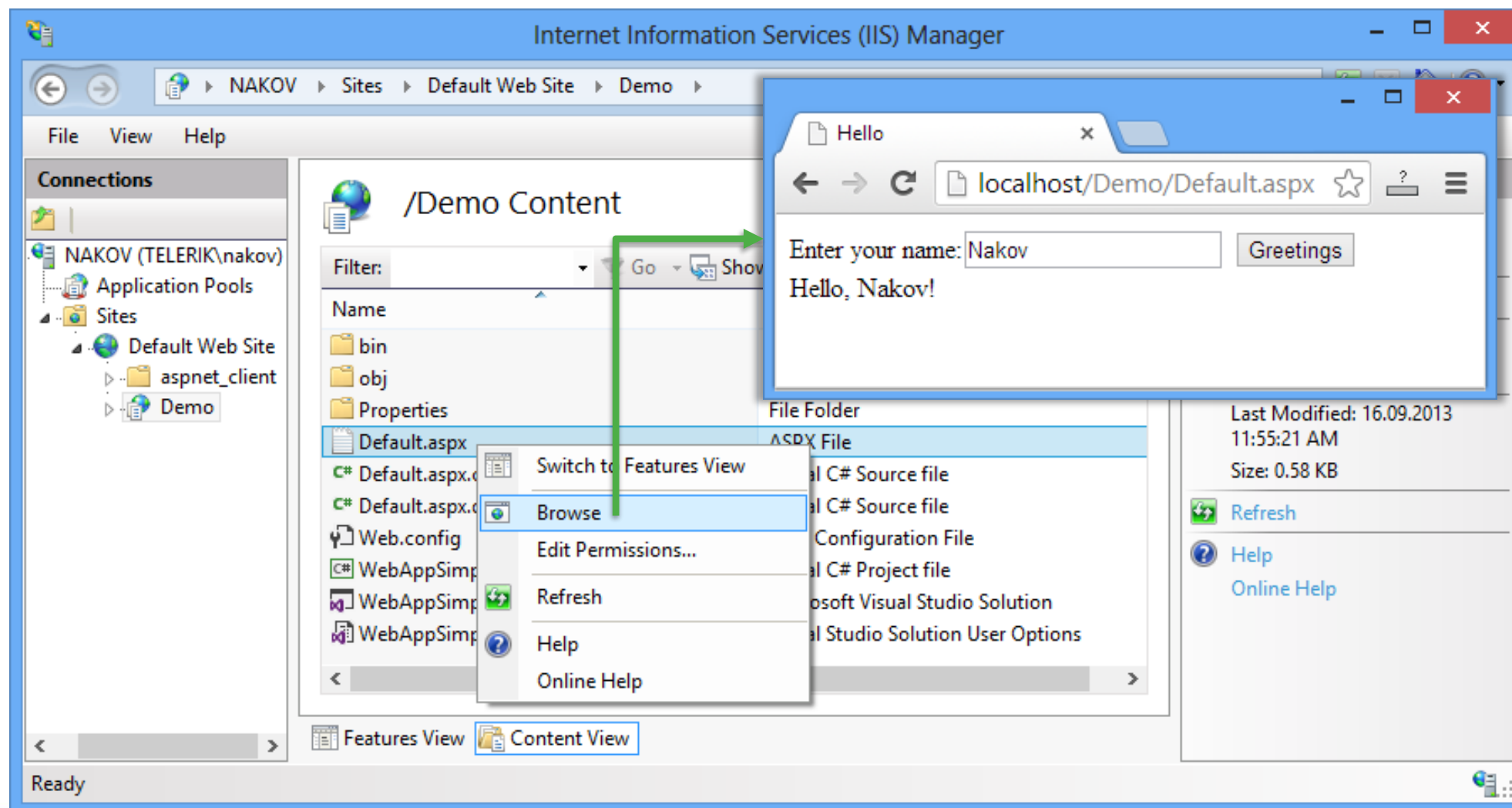
Pass-through authentication

Connect as... Test Settings...

☐ Enable Preload

OK Cancel

Creating an Application in IIS (3)



What Files to Deploy in the Production IIS?

- Files to copy to the IIS application directory:
 - Views, pages, controls: *.cshtml, *.aspx, *.Master, *.ascx
 - Resources: *.jpg, *.png, *.gif, *.css, *.js, fonts, ...
 - Compiled C# files: bin*.dll
 - Config files: Web.config, Global.asax
- Don't deploy these files:
 - Source code: *.cs, *.csproj, *.sln
 - Databases: *.mdf / *.ldf (deploy separately in SQL Server)



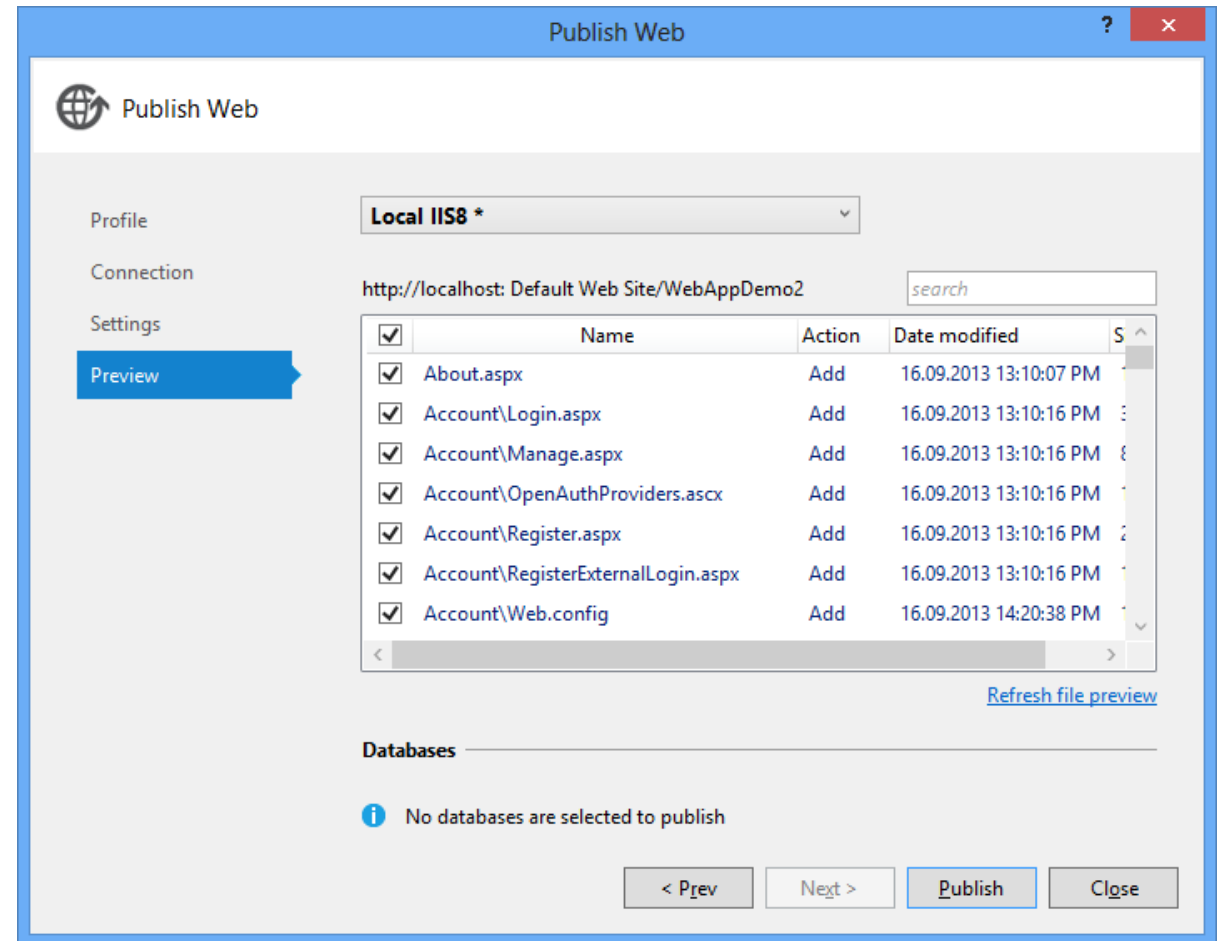
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WEB PUBLISHING FROM VISUAL STUDIO

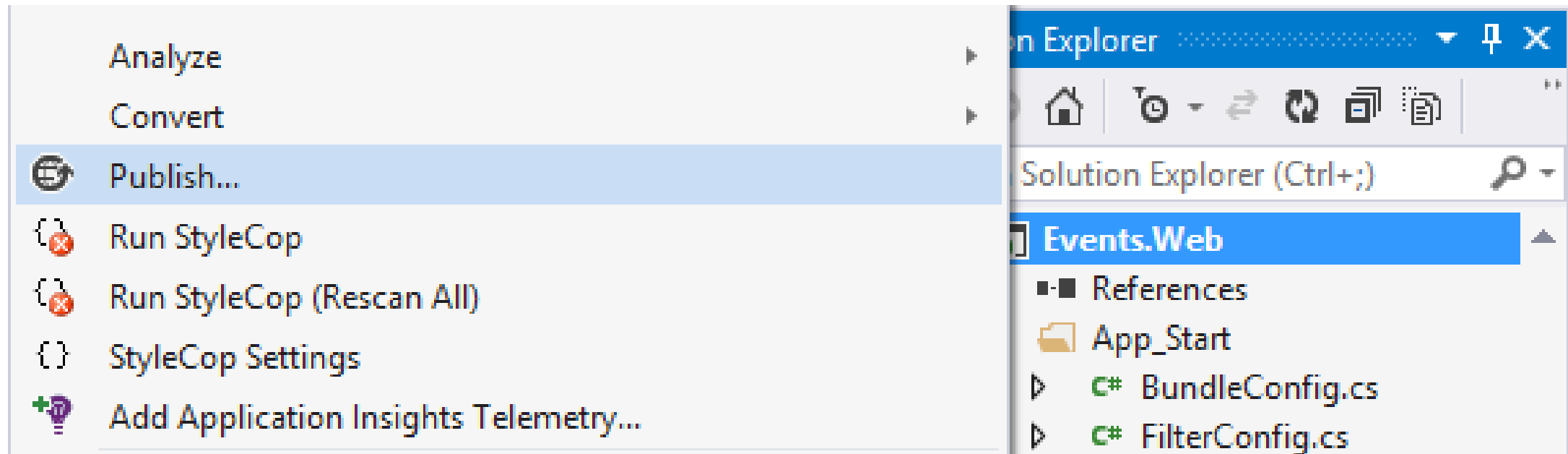
Publish Web App from VS to IIS

Web Publishing in Visual Studio

- Visual Studio provides a Web Publishing Wizard
 - Used to deploy ASP.NET Web apps to remote IIS
 - Supports local deploy (in the file system), Web deploy, deploy package, FTP
 - Uses pre-configured publish profiles

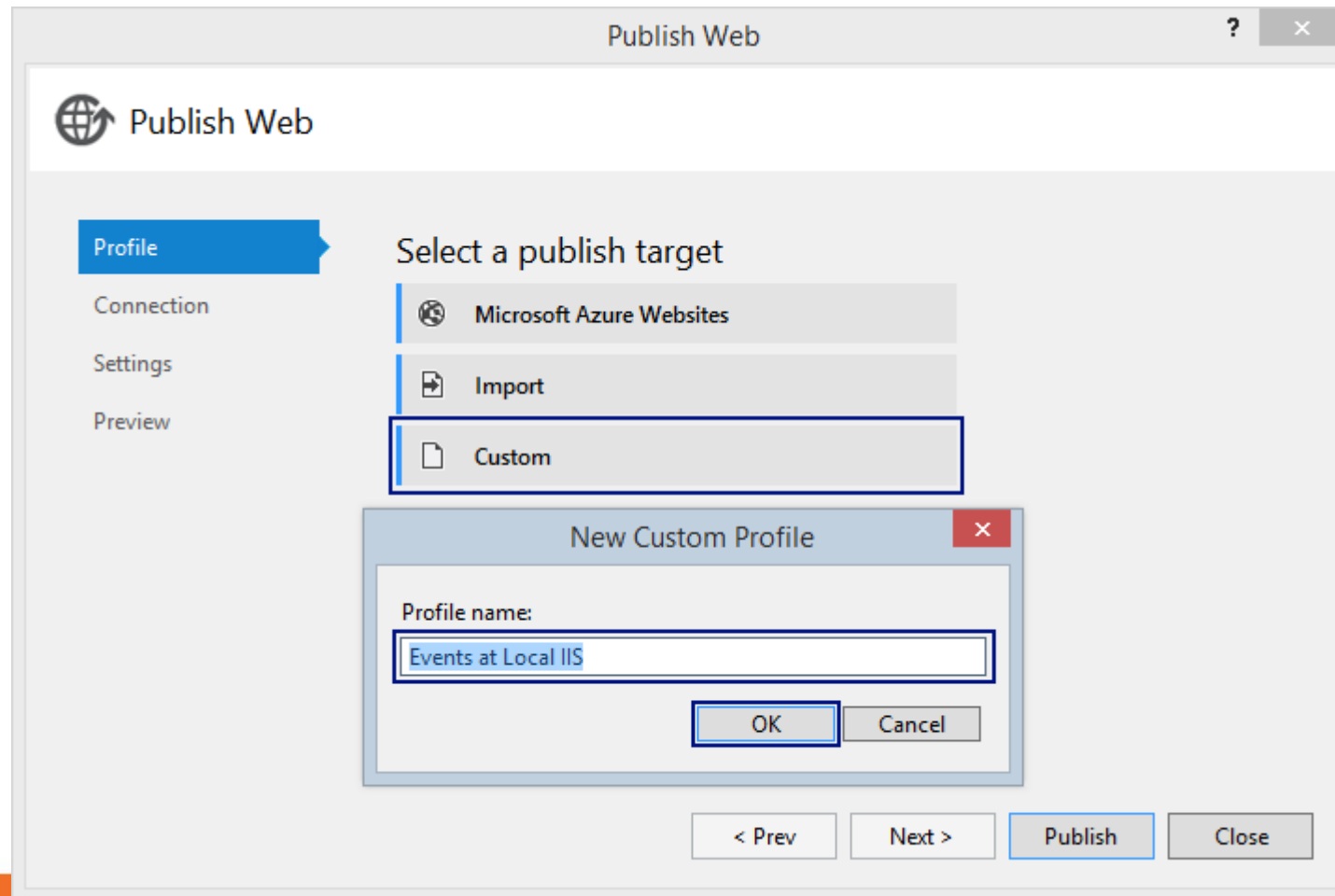


- Click on the Web project and choose [Publish...]



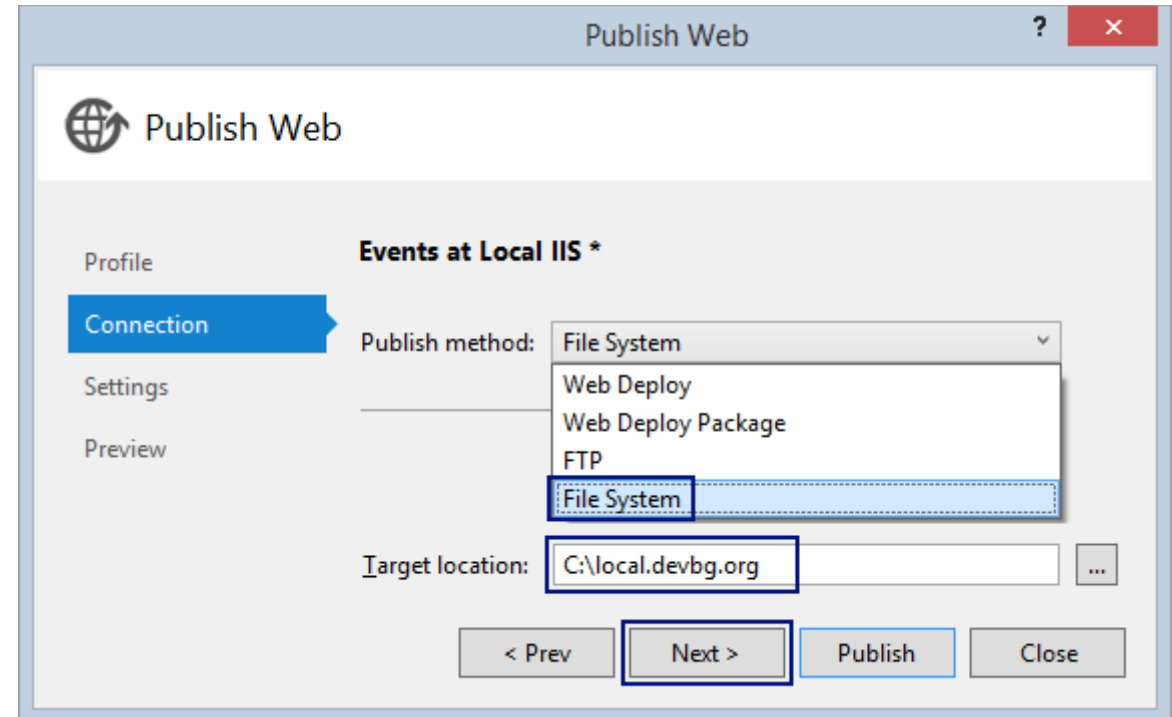
Web Publishing in Visual Studio (3)

- Create a New Custom Profile




Web Publishing in Visual Studio (4)

- Web Deploy: **deploy to IIS**
 - Remote deploy requires IIS Web Management Service (WMSvc)
- Web Deploy Package:
 - Create a ZIP package for later deployment to IIS
- FTP: **deploy with FTP upload**
- File System: **deploy to a local folder**



Web Publishing in Visual Studio (5)

Publish Web

 Publish Web

Profile


Connection

Settings

Preview


Events at Local IIS *

Configuration: Release

 **File Publish Options**

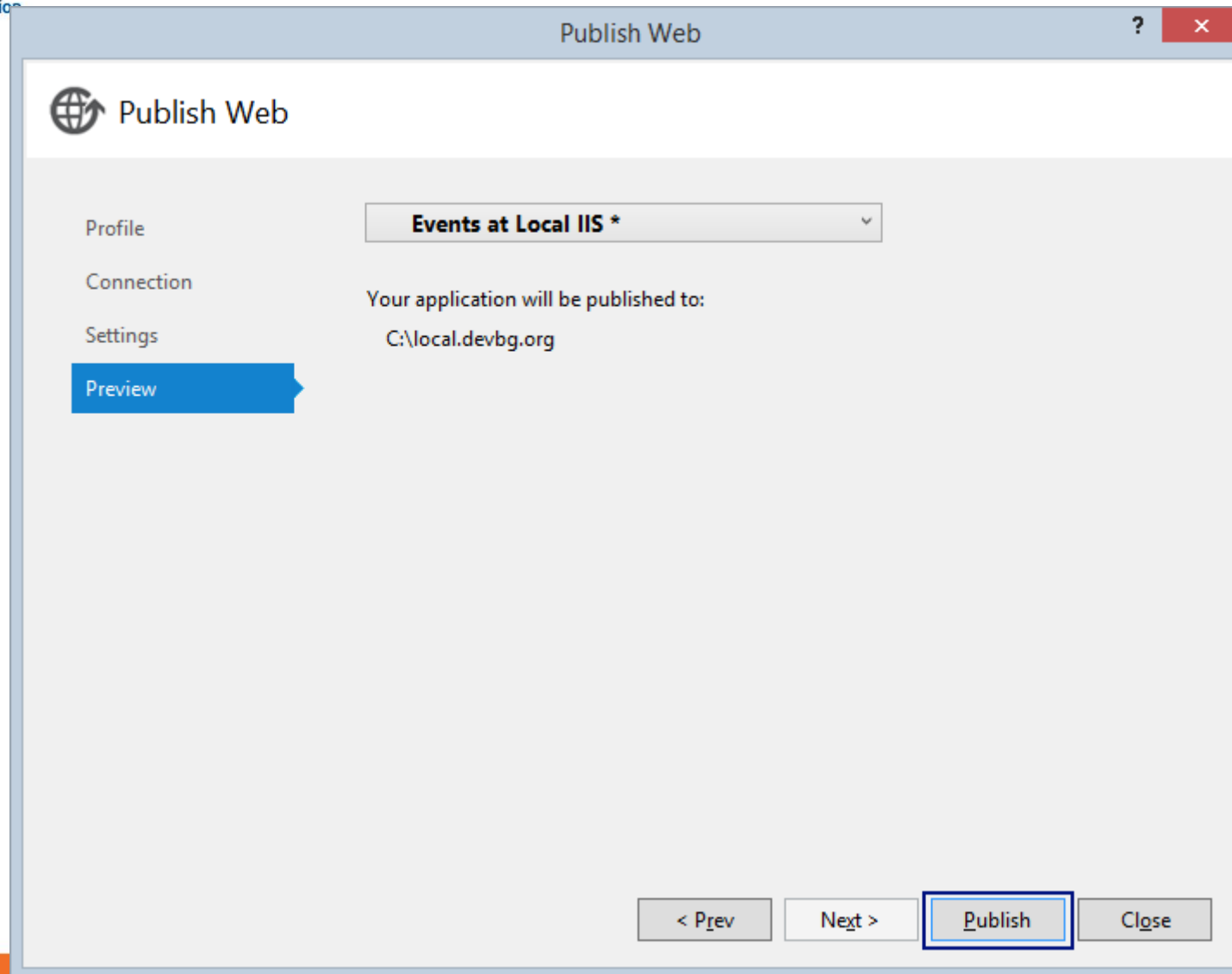
- ☐ Delete all existing files prior to publish
- ☐ Precompile during publishing [Configure](#)
- ☐ Exclude files from the App_Data folder

Databases

 Database publishing is not supported for this publish method.

< Prev Next > Publish Close

Web Publishing in Visual Studio (6)



- Visual Studio can directly deploy a Web application to IIS
 - Use the Web Publish Wizard → Web Deploy
 - Remote IIS deploy requires
 - IIS Web Management Service (WMSvc) running at the remote host
 - Proper firewall configuration: open TCP port 8172
 - Local IIS deploy requires Visual Studio running as Administrator



Publish Web



Publish method:	Web Deploy
<hr/>	
Server:	http://localhost
Site name:	Default Web Site/Events



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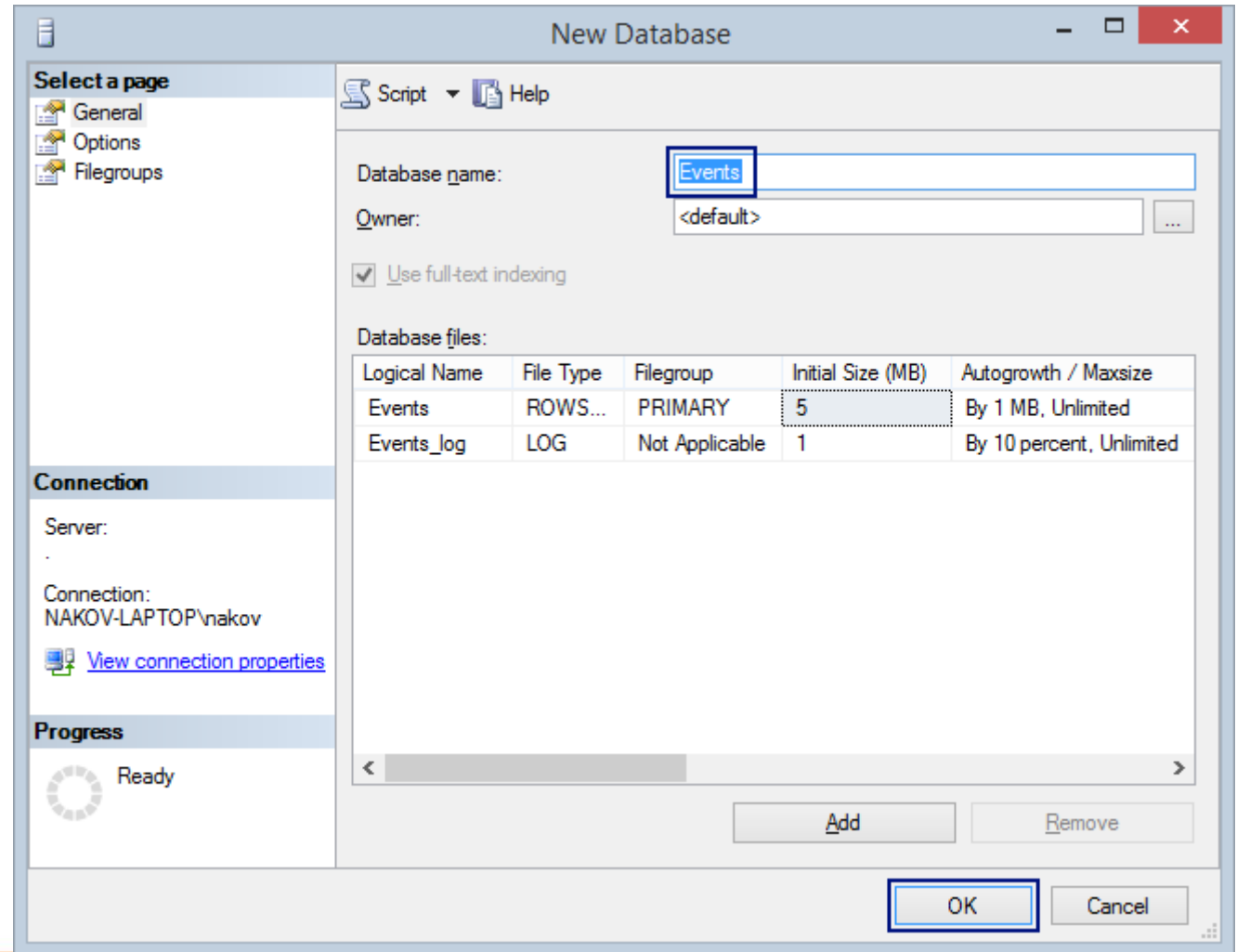
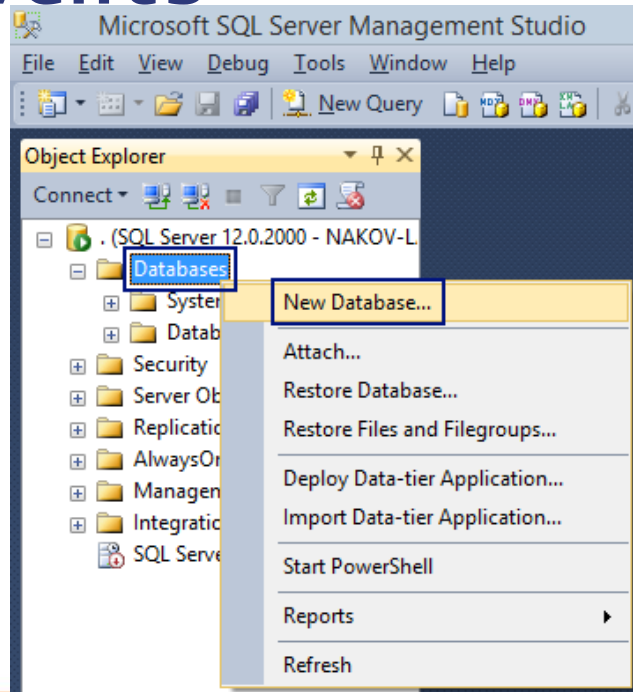
DEPLOYING DATA-DRIVEN APPLICATIONS IN IIS

Configuring IIS to Access SQL Server

- Typically in IIS your application runs under the user **"IIS APPPOOL\DefaultAppPool"** (or you app pool's user)
 - This user cannot login in SQL Server (can't establish connection)
 - This user has no permissions for your database in SQL Server
- To access the SQL Server DB from IIS:
 1. Configure the database connection string in **Web.config**
 2. Create a SQL Server login **"IIS APPPOOL\DefaultAppPool"**
 3. Assign **"db_owner"** database role for this login for your DB

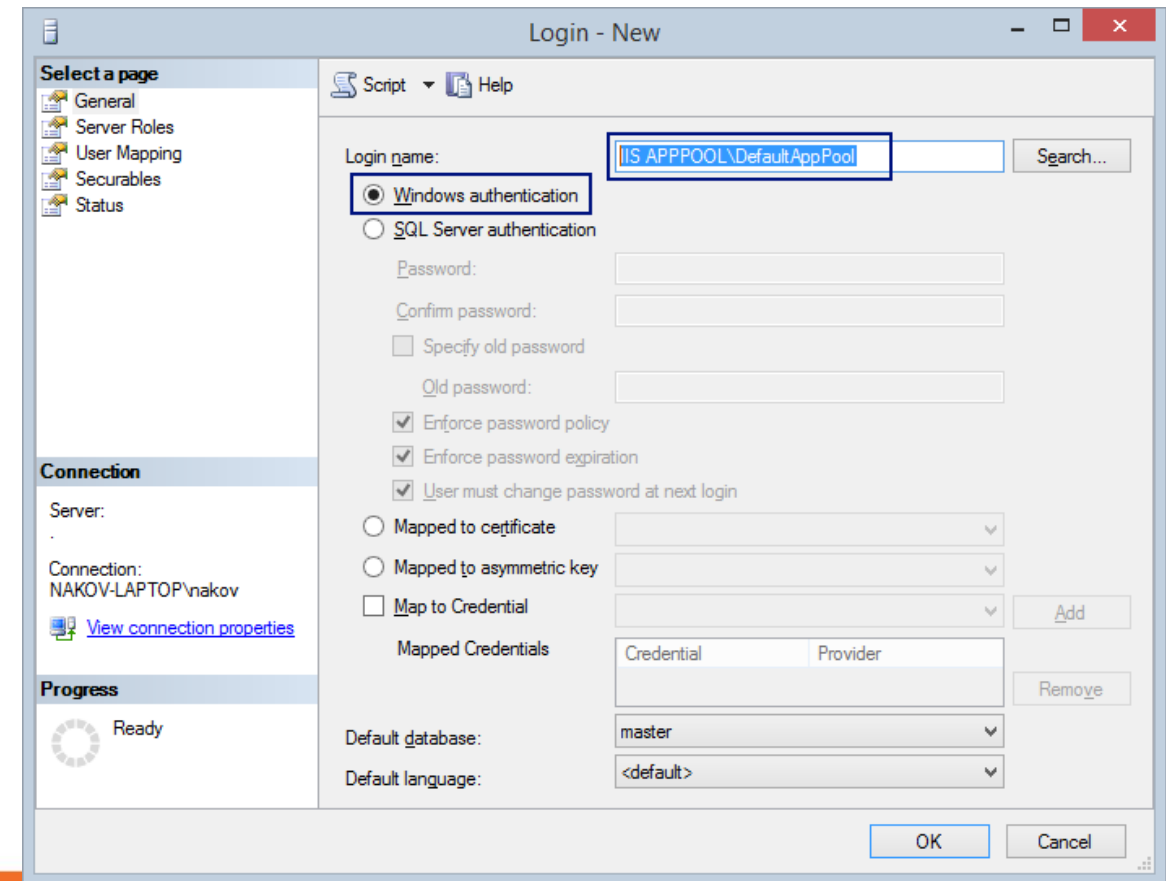
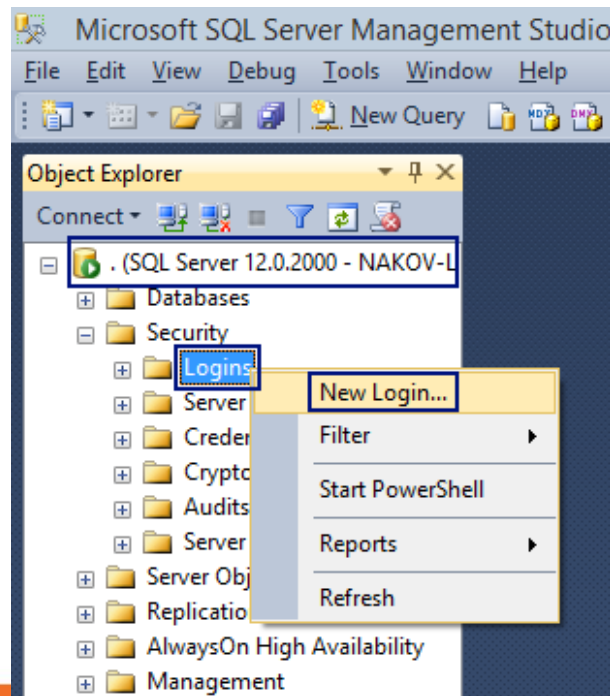
Step 1: Create a Database

- Create a new database for your Web application in SQL Server, e.g. "Events"



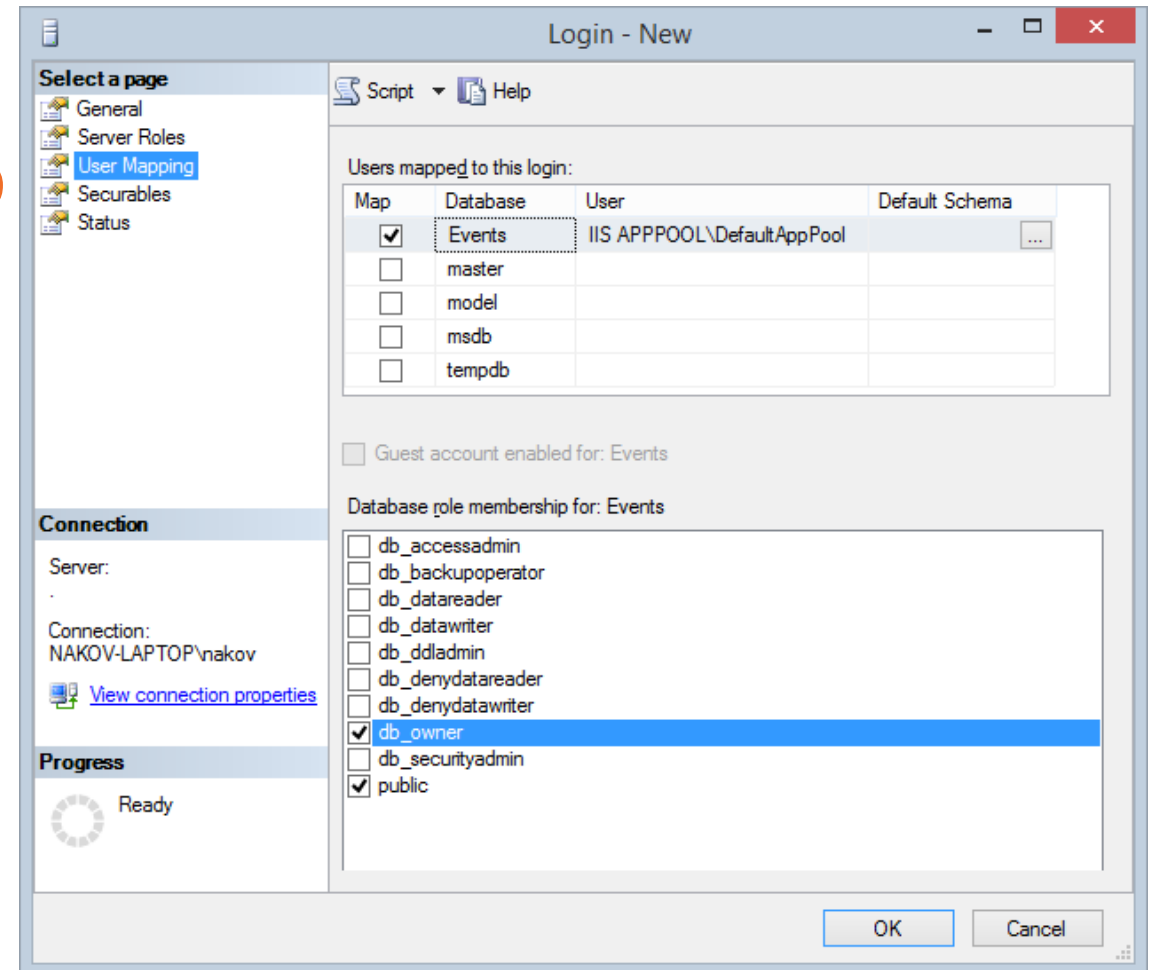
Step 2: Create IIS Login in SQL Server

- Create a new login for the "IIS APPPOOL\DefaultAppPool" Windows user in SQL Server



Step 3: Assign Permissions to Access the DB

- Assign permissions for the new SQL Server login "IIS APPPOOL\DefaultAppPool" to access your Web app DB
 - Select your Web application's database, e.g. "Events"
 - Assign role "db_owner" (full access)
- That's all, enjoy!



What Happened in the SQL Server?

- A Windows user "IIS APPPOOL\DefaultAppPool" was created in the "Events" database with "db_owner" role:

The screenshot displays the SQL Server Enterprise Manager interface. On the left, the 'Databases' folder is expanded, showing 'System Databases', 'Database Snapshots', 'Events', 'Database Diagrams', 'Tables', 'Views', 'Synonyms', 'Programmability', 'Service Broker', 'Storage', 'Security', 'Users', 'Roles', and 'Schemas'. The 'Events' database is selected, and its 'Users' folder is expanded, showing 'dbo', 'guest', 'IIS APPPOOL\DefaultAppPool', 'INFORMATION_SCHEMA', and 'sys'. The 'IIS APPPOOL\DefaultAppPool' user is highlighted.

Two dialog boxes are open, both titled 'Database User - IIS APPPOOL\DefaultAppPool'. The first dialog box shows the 'General' tab with the following fields:

- User type: Windows user
- User name: IIS APPPOOL\DefaultAppPool
- Login name: IIS APPPOOL\DefaultAppPool
- Default language: (empty)
- Default schema: dbo

The second dialog box shows the 'Membership' tab with the following fields:

- Database role membership: db_owner (checked)

The 'db_owner' role is selected in the 'Database role membership' list.

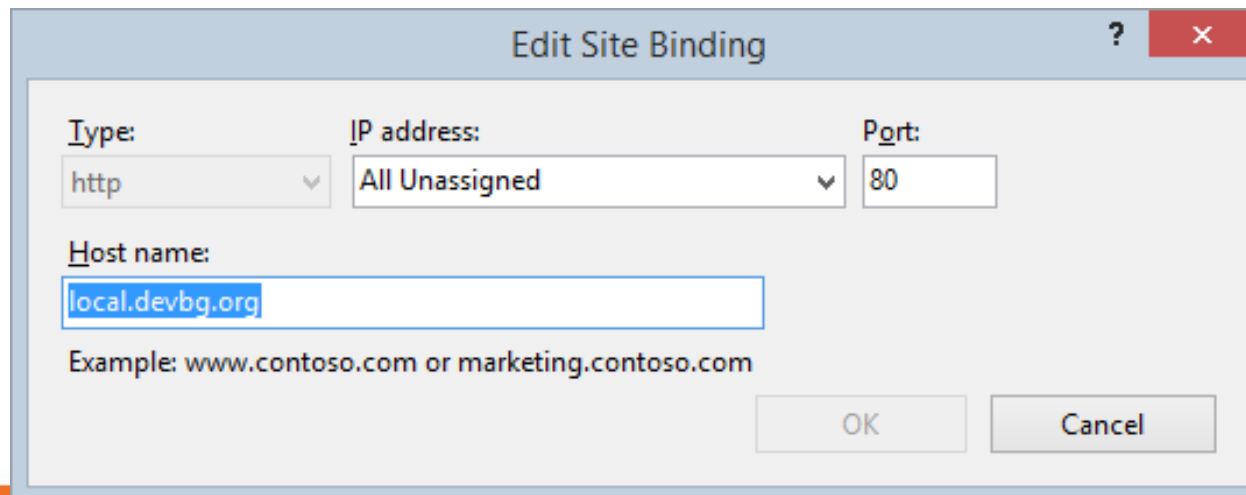


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CONFIGURING DOMAINS + SSL IN IIS

Configuring a Domain in IIS

- Assign the server IP address for your domain name in the DNS
 - From the admin panel of your domain hosting provider
 - E.g. assign `greenwich.vn` == `217.174.159.195`
- Assign the host name in the Web site binding in IIS:



Dialog box titled "Edit Site Binding" with fields for configuration:

- Type:
- IP address:
- Port:
- Host name:
- Example: `www.contoso.com` or `marketing.contoso.com`

Buttons: OK, Cancel

Configuring SSL in IIS

- To configure SSL in IIS, you need to have a server SSL certificate

Add Site Binding

Type: **https** IP address: **All Unassigned** Port: **443**

Host name: **local.devbg.org**

☐ Require Server Name Indication

SSL certificate:

local.devbg.org (selected)
Not selected
IIS Express Development Certificate
local.devbg.org

Select... View...

OK Cancel

Requesting New SSL Certificate

The image displays two overlapping screenshots of the Internet Information Services (IIS) Manager console on a Windows system.

The background screenshot shows the main IIS Manager interface for the 'NAKOV-LAPTOP' server. The 'Connections' tree on the left has 'NAKOV-LAPTOP (NAKOV-LAPTOP)' selected. The main pane shows the 'NAKOV-LAPTOP Home' page with various features like ISAPI Filters, Logging, MIME Types, Output Caching, Request Filtering, and Server Certificates. The 'Server Certificates' feature is highlighted with a blue dashed border.

The foreground screenshot shows the 'Server Certificates' feature selected. The main pane displays the 'Server Certificates' management page. A context menu is open over the 'IIS Express Development Certif...' entry in the table, with 'Create Certificate Request...' highlighted. The table shows the following information:

Name	Issued To
IIS Express Development Certif...	localhost

The 'Actions' pane on the right lists the following options:

- Import...
- Create Certificate Request...
- Complete Certificate Request...
- Create Domain Certificate...
- Create Self-Signed Certificate...
- Enable Automatic Rebind of Renewed Certificate

Requesting New SSL Certificate (2)

Request Certificate

Distinguished Name Properties

Specify the required information for the certificate. State/province and City/locality official names and they cannot contain abbreviations.

Common name: local.devbg.org

Organization: local.devbg.org

Organizational unit: local.devbg.org

City/locality: Sofia

State/province: BG

Country/region: BG

Previous Next Finish Cancel

Request Certificate

File Name

Specify the file name for the certificate request. This information can be sent to a certification authority for signing.

Specify a file name for the certificate request

C:\local.devbg.org.csr

```
-----BEGIN NEW CERTIFICATE REQUEST-----
MIIDXzCCAsgCAQAwDELMAkGA1UEBhMCkxkCzAJBgNVBAGMAkJHMQ4wDAYDVQQH
DAVTb2ZpYTEYMBYGA1UECgwPbG9jYWwuzGV2Ymcub3JnMRgwFgYDVQQLDA9sb2Nh
bC5kZXZiZy5vcmcxGDAWBgNVBAMMD2xvY2FsLmRldmJnLm9yZzCBnzANBgkqhkiG
9w0BAQEFAAOBjQAwYkCgYEAat4KuTLA5t8eZVp1QqXU40NrhCEXHTlaJuueQ3Guf
9AQkhWACx7tk8uUwAQsuaQPnS+Hu/mHynJU3LeIVHf82T/5tel2Hy74sD19p7BcN
Rf2SQIbidEivmbifZtN9eqFiVt1Aqs60hb7opLdX0mEyfYcnrLVx2ED4iPHxSii
Dg0CAWEAAaCCAAUwGgYKKwYBBAGCNw0CAzEMFgo2LjIuOTIwMC4yMEEGCSsGAQQB
gjcVFDE0MDICAQUMDE5ha292LUxhcHRvcAwSTkFtLT1YtTEFQVE9QXG5ha292DATJ
bmV0TWdyLmV4ZTB5BgorBgEEAYI3DQICMWQwYgIBAR5aAE0AaQBjAHIAbWZAG8A
ZgB0ACAAUgBTAEEAIABTAEEMAaABhAG4AbgBLAGwAIBABDAHIAeQBWAHQAbwBnAHIA
YQBwAGgAaQBjACAAUABYAG8AdgBpAGQAZQByAWEAMIHPBgkqhkiG9w0BCQ4xgcEw
gb4wDgYDVROPAQH/BAQDAGTWMBMGA1UdJQQMMAoGCCsGAQUFBwMBMHGCSsGSIb3
DQEJDWRrMGkwDgYIKoZIhvcNAwICAQCAMAA4GCCqGSIb3DQMEAgIAgDALBglghkgB
ZQMEASowCwYJYIZIAWUDBAETMasGCWCGSAFlAwQBAjALBglghkgBZQMEAUwBwYF
Kw4DAGcwCgYIKoZIhvcNAwcwHQYDVRO0BBYEFHPO9B8lQFkj00UEepNY+1QUwIW2
MA0GCSqGSIb3DQEBBQUAA4GBAIV/8N7hkQfgSu6AoLJu87AftC5URJ+Eglr3h57Z
Cf9x79hjf19pU128Ry8qEZioU+/9BmHSHK6onmkjPho9gOcFaDalrd4AB5ulzcA
F77xq3PRXf2+Q1F7A2NgZkAVrNLXuyhoFA/jLpv+oU01AQZJZx0Abz0M2XmsZNY0
MYCj
-----END NEW CERTIFICATE REQUEST-----
```


Requesting New SSL Certificate (2)

- Sign the CSR to issue the certificate
 - Different SSL providers have different domain validation process
 - Comodo Instant SSL provide 90-days free SSL certificates:
<https://www.instantssl.com/free-ssl-certificate.html>
 - Once the domain ownership is verified, provider will issue the certificate (typically X.509 **.crt** file)
- You can self-sign the CSR (e.g. by OpenSSL)
 - The certificate will be invalid, but can be used for testing purposes

Self-Signing a CSR with OpenSSL

- Your CSR can be signed by yourself, using OpenSSL:

```
# Generate a private key for the signing process
```

```
openssl genrsa -passout pass:foobar -out server.key 1024
```

```
# Sign the CSR with the private key to obtain the .CER file
```

```
openssl x509 -req -days 3650 -in local.devgb.org.csr -signkey  
server.key -passin pass:foobar -out local.devgb.org.crt
```

```
# Export the certificate with private key as PKCS#12 (pfx file)
```

```
openssl pkcs12 -export -in local.devgb.org.crt -inkey server.key  
-passin pass:foobar -out local.devgb.org.pfx -passout  
pass:foobar -name "local.devgb.org"
```

Summary

- IIS is the Microsoft's Web server
 - Hosts static Web sites and ASP.NET Web applications
- Visual Studio has very powerful Web Publishing Wizard
 - Deploy to directory, local or remote IIS
- To access SQL Server from IIS, create a new login and give permissions to your database
- To use SSL, you need to request, issue and install a certificate