

## VDP301 Smart Client: Real World ClickOnce

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## About Brian

- Chief Architect, IDesign Inc. ([www.idesign.net](http://www.idesign.net))
- Microsoft Regional Director / MVP
- Writing
  - *Data Binding with Windows Forms 2.0*, Addison Wesley, January 2006
  - *Smart Client Deployment with ClickOnce*, Addison Wesley, Dec 2006
  - MSDN Magazine, MSDN Online, CoDe Magazine, The Server Side .NET, asp.netPRO, Visual Studio Magazine
- Speaking
  - Microsoft TechEd US, Europe, Malaysia, Visual Studio Connections, DevTeach, INETA Speakers Bureau, MSDN Webcasts
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## Agenda

ClickOnce Overview

ClickOnce Publishing

ClickOnce Deployment and Permissions

ClickOnce Administration

## Quick Intro to ClickOnce

Smart Client deployment technology

Automatic deployment

Automatic / on-demand update

Trustworthy deployment mechanism

Secure deployment

At deployment

At runtime

Best of two worlds:

Rich client user experience

Ease of maintenance and deployment  
of web applications

## How ClickOnce Works

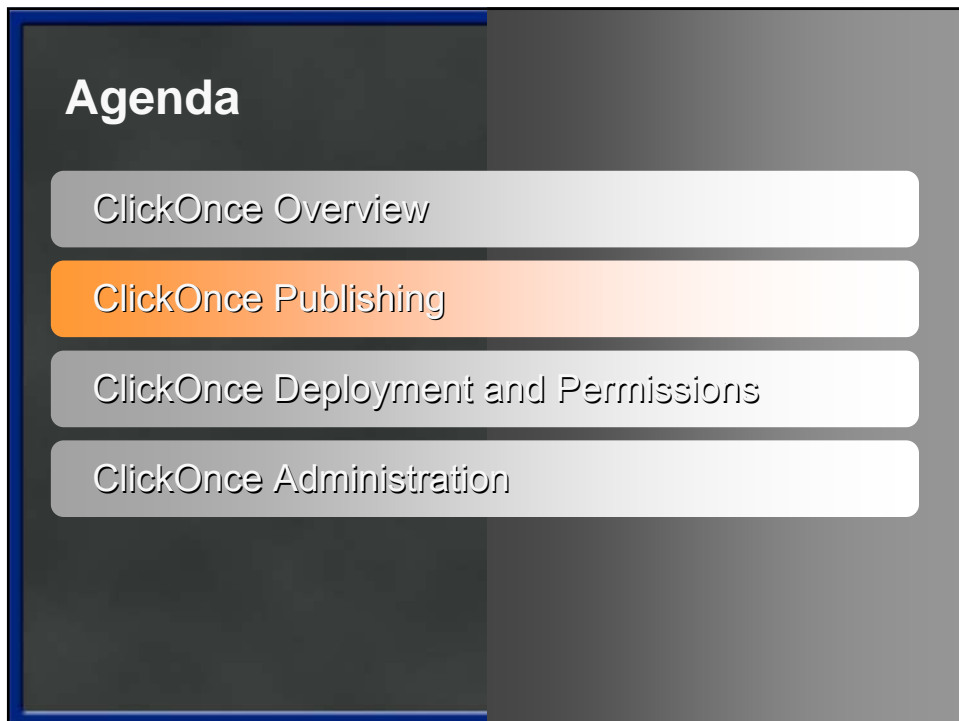
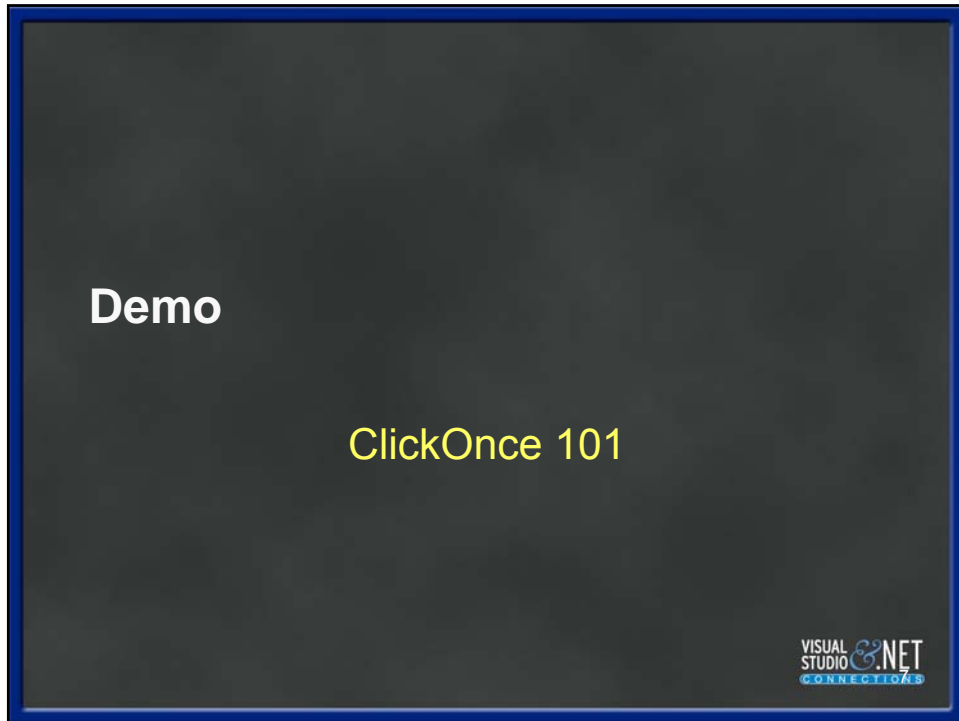
- Design/Build/Test Client App
- Publish it to deployment server
  - Microsoft Visual Studio wizard
- Provide link to users
- User clicks on link
  - App downloads and caches on user machine
  - App executes in secure sandbox (if configured for partial trust)
  - App updates based on update policy if new version available



## ClickOnce Deployment

- Two deployment modes
  - Launched (only available online)
    - Like No-Touch Deployment in .NET 1.X
    - Must be connected every time app runs
    - Files cache on client machine
    - No other artifacts added to machine
    - Always runs most current version
  - Installed (available online or offline)
    - Supports disconnected operation
    - Files cache on client machine
    - Start menu shortcut added
    - Add/Remove Programs Control Panel item added
    - Default mode





## ClickOnce Publishing

### Server Side Files

- **Deployment manifest (.application file)**
  - Describes application publication
  - Application name, publisher, version
  - Install mode, deployment provider, update policy
  - Path to application manifest (with hash)
  - Digital signature
- **Application manifest (.manifest file)**
  - Application files
    - Name, size, hash, relative path
  - Permissions required
  - Digital signature
- **Application files**



## ClickOnce Publishing

### Visual Studio publishing structure

- **Deployment and application manifest generated based on project file, publish, security, and signing settings**
- **Publish location root folder files:**
  - Default deployment manifest (<appname>.application)
  - Version specific deployment manifest (<appname\_major\_minor\_build\_revision>.application)
  - Publish.htm test deployment page
  - Setup.exe bootstrapper
- **Application version folder**
  - Application manifest (<appname>.exe.manifest)
  - Application files (with .deploy extension added)



## Demo

### ClickOnce Publishing Artifacts



## ClickOnce Publishing

### Moving into QA/production

- **New location only:**
  - Copy folder structure from Visual Studio publication to target machine
  - Edit deployment manifest to update deployment provider URL (Start location in Mage)
  - Re-sign manifest
- **Change of app files and location:**
  - Copy files to desired folder structure
  - Update application file references within application manifest (Mage)
  - Re-sign application manifest
  - Update application manifest reference in deployment manifest
  - Update deployment provider URL in deployment manifest
  - Re-sign deployment manifest



## Administrative ClickOnce Management - MAGE

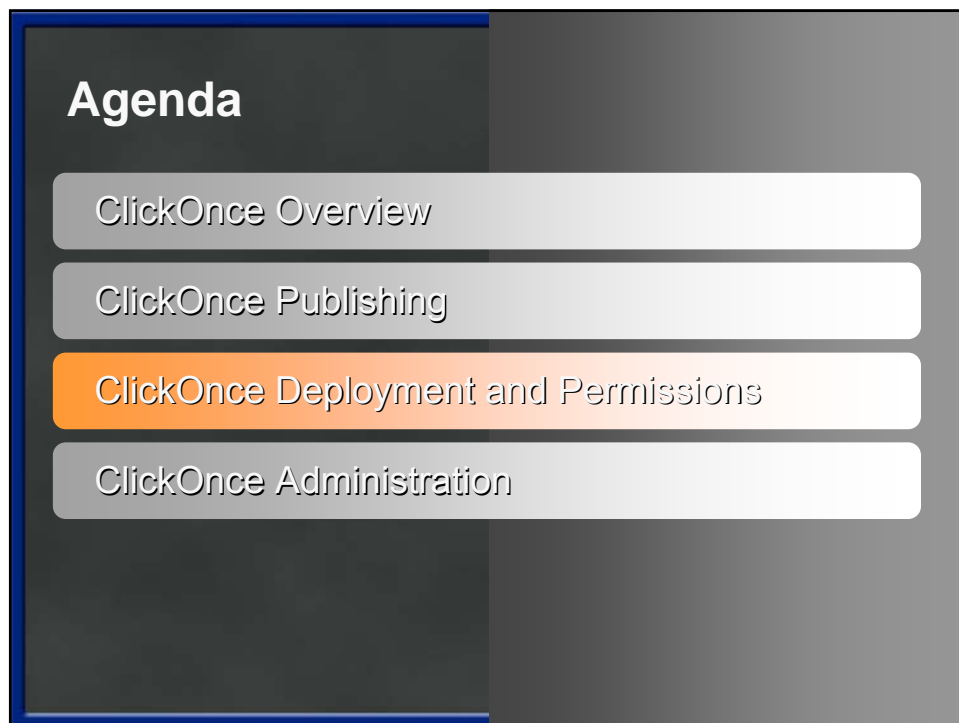
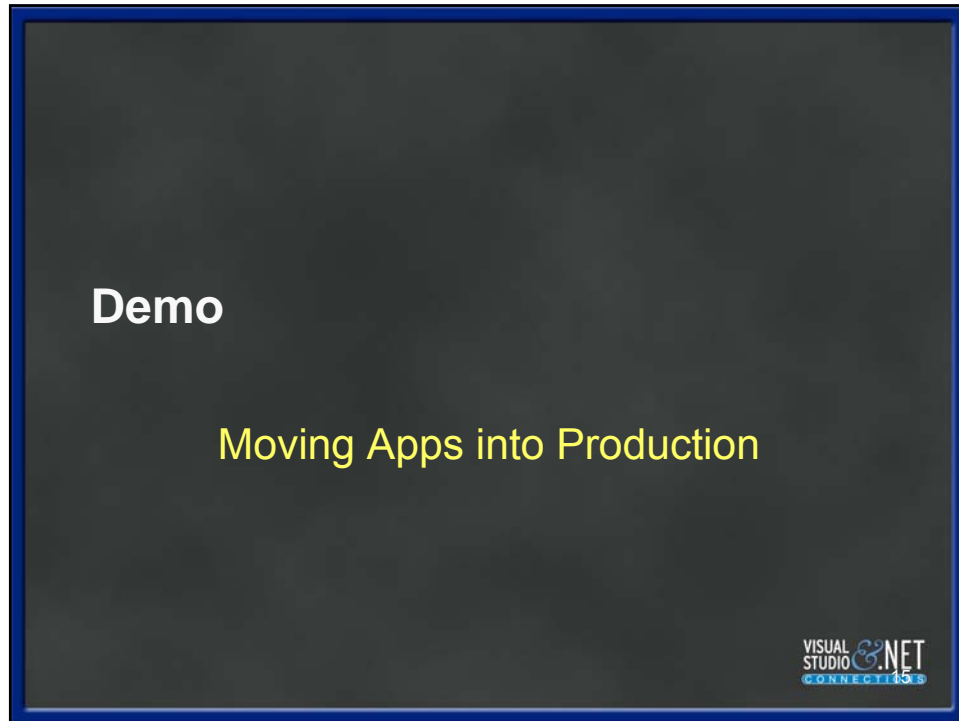
- MAnifest Generator and Editor
- Admin editing of manifests through GUI
- Signing of manifests



## Manifest Manager Utility

- Custom IDesign Tool
- Available through the Smart Client Software Factory site
  - Also in demo code
- Simplifies common deployment tasks





## ClickOnce Deployment

### Client side processing

- Application executable and supporting files downloaded and cached on client
- Placed under user profile
  - Isolated by user
  - Isolated by application
  - Isolated by version
- Cannot perform any custom install steps
  - Use Bootstrapper for pre-requisites
- Manifests are validated
  - Provides authentication and tamper detection



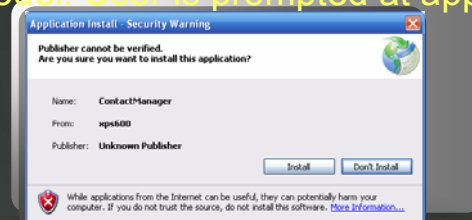
## ClickOnce Execution Protections

- User assumed to be non-administrator
- Protected by Code Access Security (CAS)
- Permissions determined by:
  - Address of deployment manifest (origin)
  - Code Access Security policy for origin
  - Application manifest permission specs
  - User prompting or trusted publishers
- ClickOnce creates Application Trust



## User Prompting Permission Elevation

- Application manifest specifies required permissions
- Runtime evaluates launch zone
- If required permissions greater than CAS granted permissions based on zone – need permission elevation
- Default model: User is prompted at app launch



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## Trusted Publisher Permissions

- Prevent user prompting
- Enterprise environment
  - Admins can configure certificates one time on all client machines
- Install trusted publisher certificate
  - Certmgr management console or command line
  - Trusted Publishers store
  - Signing authority must be in Trusted Root
- ClickOnce application manifests signed by trusted publisher get requested permissions – no user prompting

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## Controlling User Prompting

### Registry key

- **HKLM\Software\Microsoft\.NETFramework\Security\TrustManager\PromptingLevel**
- **String values:**
  - Internet
  - LocalIntranet
  - MyComputer
  - TrustedSites
  - UntrustedSites
- **Values:**
  - Enabled
  - Disabled
  - AuthenticodeRequired



## User Prompting Reg Key Values

- **Meaning:**
  - Enabled – Can prompt regardless of who signed the manifest
  - Disabled – If it needs to prompt, can't run
  - AuthenticodeRequired – Can only prompt if signed by a trusted root certificate
- **Defaults:**
  - "Internet" – "Enabled"
  - "LocalIntranet" – "Enabled"
  - "MyComputer" – "Enabled"
  - "TrustedSites" – "Enabled"
  - "UntrustedSites" – "Disabled"



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## Tracking Application Usage

- **Identifying user**
  - Intranet: Windows identity
  - Custom application authentication
  - Query string parameters
  - Client proxy
- **Server interception**
  - Log files
  - Publish ClickOnce application under ASP.NET site
    - Add custom HTTP Module to detect requests for .application, .manifest, .deploy files
    - Log client identity



## Securing Server Application Files

- **Intranet Clients**
  - Secure files based on ACLs
  - Optionally add a custom module/handler for HTTP requests for ClickOnce files
    - Custom authorization rules
    - Re-routing user groups to versions
- **Internet Clients**
  - No clean/easy solution at this time
  - Query string parameters
  - Custom client proxy



## Resources

- **Smart Client Deployment with ClickOnce**, Brian Noyes, Addison-Wesley, Dec 2006
- *ClickOnce Deployment Guidance Community Resource Kit*
- *Administering ClickOnce Deployments*
- *Configuring ClickOnce Trusted Publishers*, Brian Noyes, MSDN Online, April 2005  
<http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwinforms/html/clickonctrustpub.asp>
- *Automated Smart Client Deployment*, Today and Tomorrow, Brian Noyes, The Server Side .NET, April 2005  
<http://www.theserverside.net/articles/showarticle.tss?id=AutomatedSmartClient>
- *Deploy and Update Your Smart Client Projects from a Single Server*, Brian Noyes, MSDN Magazine, May 2004  
<http://www.msdn.microsoft.com/msdnmag/issues/04/05/ClickOnce/default.aspx>
- **Advanced .NET 2.0 Master Class – 4-8 Dec, Reston VA**
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