



Building Custom Tasks for ArcGIS Server .NET Web Applications

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Agenda

Please!
Turn **OFF** cell phones
and paging devices



- Task framework overview
- Creating custom tasks
 - Server control tasks
 - User control tasks
 - Integrating into Visual Studio & Manager
- Extending out-of-the-box tasks
- Creating custom task results
- Integrating Silverlight
- Best practices

- We will answer questions at the end

Please complete the session survey!

Demo - Tasks

- **Web Mapping Application with Tasks Workflow**

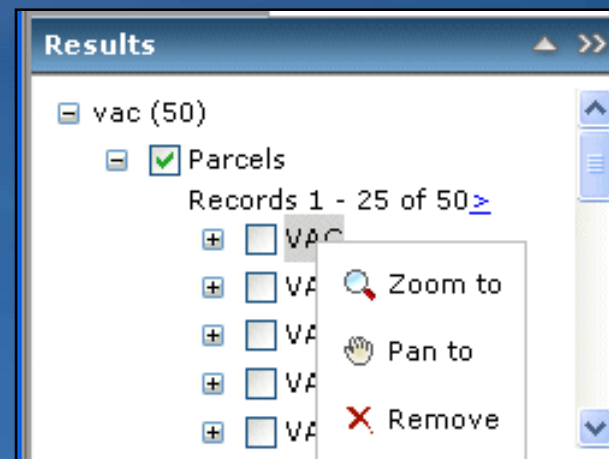
Tasks

- Visual components designed to perform a set of related actions and generate results



- Encapsulate a workflow

- UI for gathering input
- Perform some action based on inputs
- Generate results

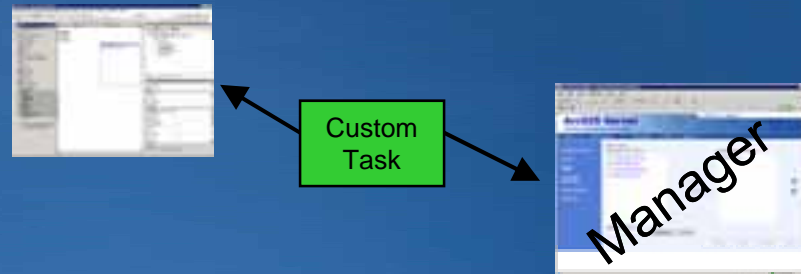


Web ADF Tasks in the box

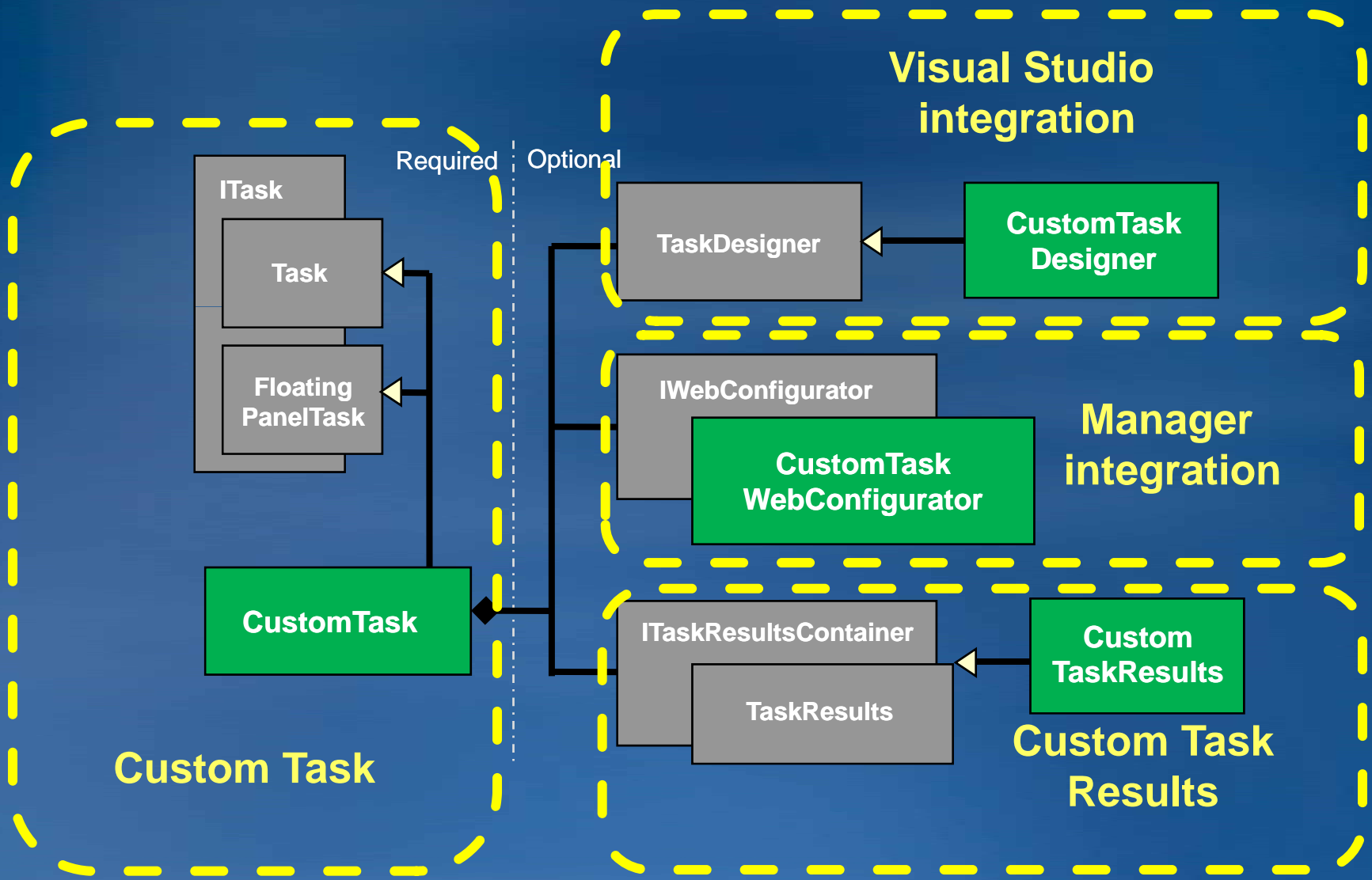
- **Search**
 - Search Attributes of a layer
- **Find Address**
 - Use locator services to perform geocoding tasks
- **Find Place**
 - Gazetteer search using ArcWeb
- **Query**
 - Perform queries against layer attributes
- **Geoprocessing**
 - Gather inputs for published Geoprocessing tools and models and execute using this task
- **Editor**
 - Web based geodatabase editing (versioned and non-versioned edits are allowed)
- **Print**
 - Simple printing that provides web printing for the web application

The ADF Task Framework

- Utilized by out-of-the-box ADF Tasks
- Extensible Framework provides for:
 - Organization of tasks
 - Feedback when a task is executing
 - Management of results
 - Display
 - Visualization on Map
 - Delete, Re-run
 - Distribution and configuration of tasks in Visual Studio and Manager



The ADF Task Framework



TaskManager control

- Organizes tasks in a Web application
- Generates hierarchical XML at run time
 - Can be bound to ASP.NET menu control
 - BuddyControl property controls binding



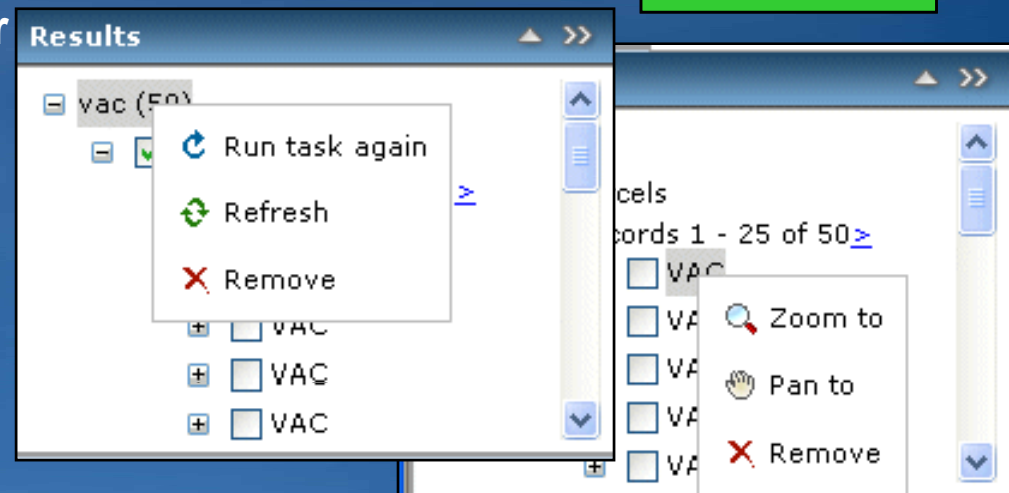
TaskResults control

- Results presented as nodes in tree view
- Result Context menu
 - Re-run task
 - Remove results
- Feature Context menu
 - Zoom to feature
 - Pan to feature
 - Highlight feature on hover
 - Remove feature

Design time



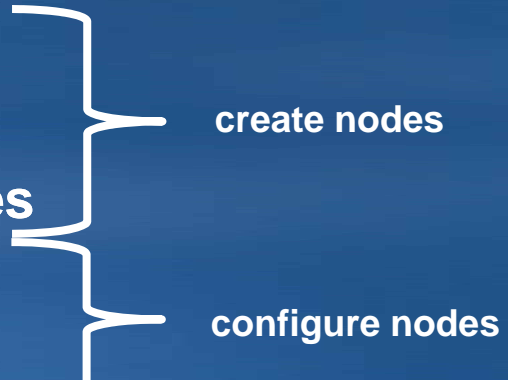
Run time



Working with TaskResults

- Displays results of tasks as nested nodes
- Three supported result types:
 - SimpleTaskResult
 - Header and body
 - DataSet
 - Graphics layers or data tables
 - Each DataTable added as a node. If DataTable is GraphicsLayer, rendered in Map.
 - TaskResultNode
 - Used to package diverse result types

TaskResults Methods

- **One-step use**
 - **DisplayResults** – creates and configures nodes for datasets
 - **Customized node creation:**
 - **CreateTaskResultsNode**
 - **CreateDataTableNode**
 - **CreateAndAddDataRowNodes**
 - **SetupTaskResultNode**
 - **SetupContextMenu**
- 
- The diagram uses curly braces to group the methods under 'Customized node creation'. The top three methods (CreateTaskResultsNode, CreateDataTableNode, and CreateAndAddDataRowNodes) are grouped under the label 'create nodes'. The bottom two methods (SetupTaskResultNode and SetupContextMenu) are grouped under the label 'configure nodes'.

Using TaskResultNode

- **GraphicsLayerNode**
 - Create node from Web ADF GraphicsLayer, add to map
- **FeatureNode**
 - Create node from a DataRow with Web ADF geometry
- **MapResourceNode**
 - Create node from a map resource definition, add to map

- **ContextMenus**
 - Preconfigured for node type and content
 - Accessible via TaskResults properties
 - e.g. GraphicsLayerContextMenu



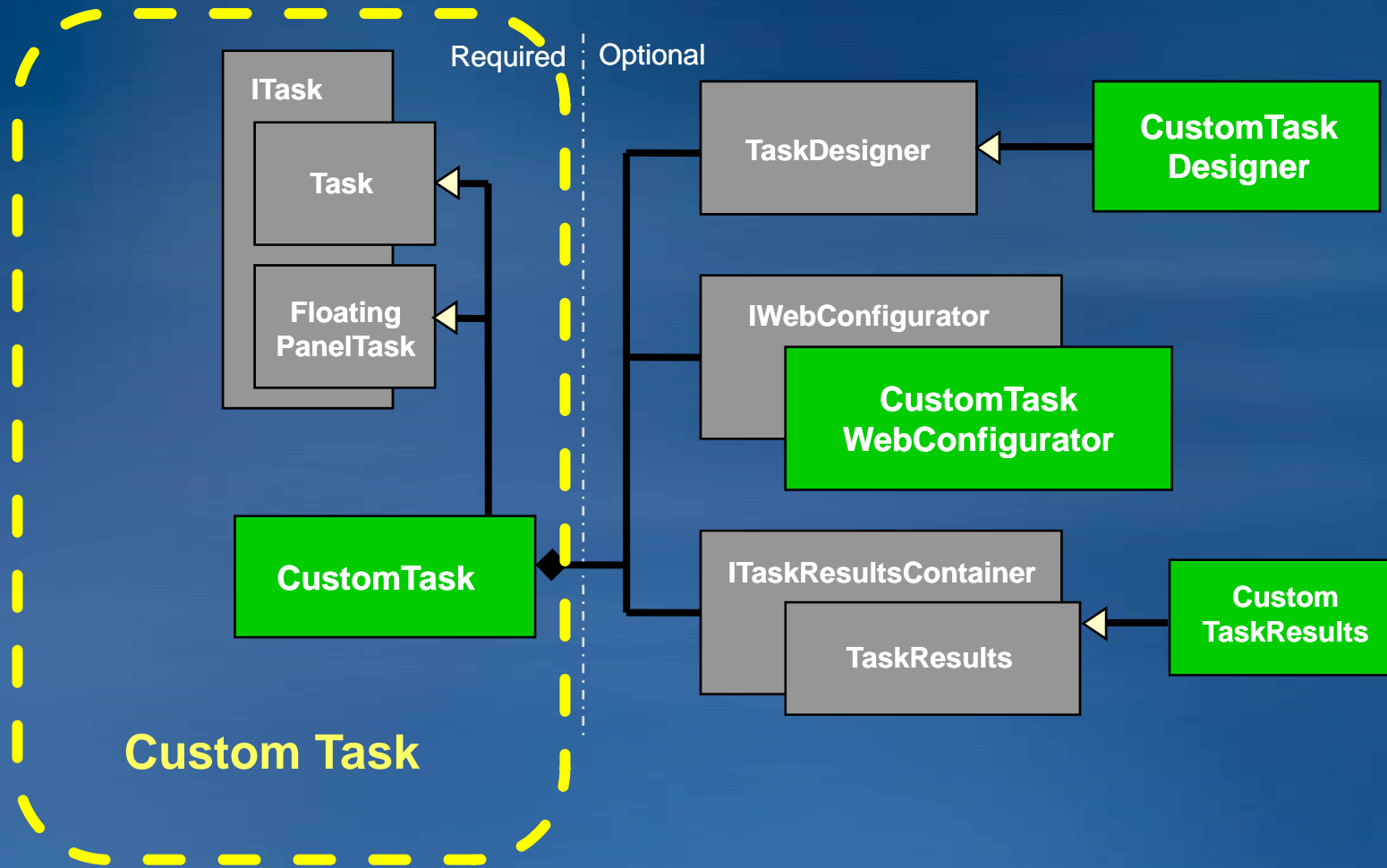
Leveraging the Task Framework

- **Entry points**
 - Add results directly to the TaskResults container
 - Create custom tasks
 - User control tasks
 - Server control tasks
 - Extend existing tasks to modify behavior

Demo

- **Custom Tool - Adding task results**

Creating Custom Tasks



User Control Tasks

- **Easiest way to create a task**
 - Drag-and-drop to create UI
 - Add code for behavior

- **At 9.3.1.**
 - Redistributable
 - Configurable in Manager

User Control Task Implementation

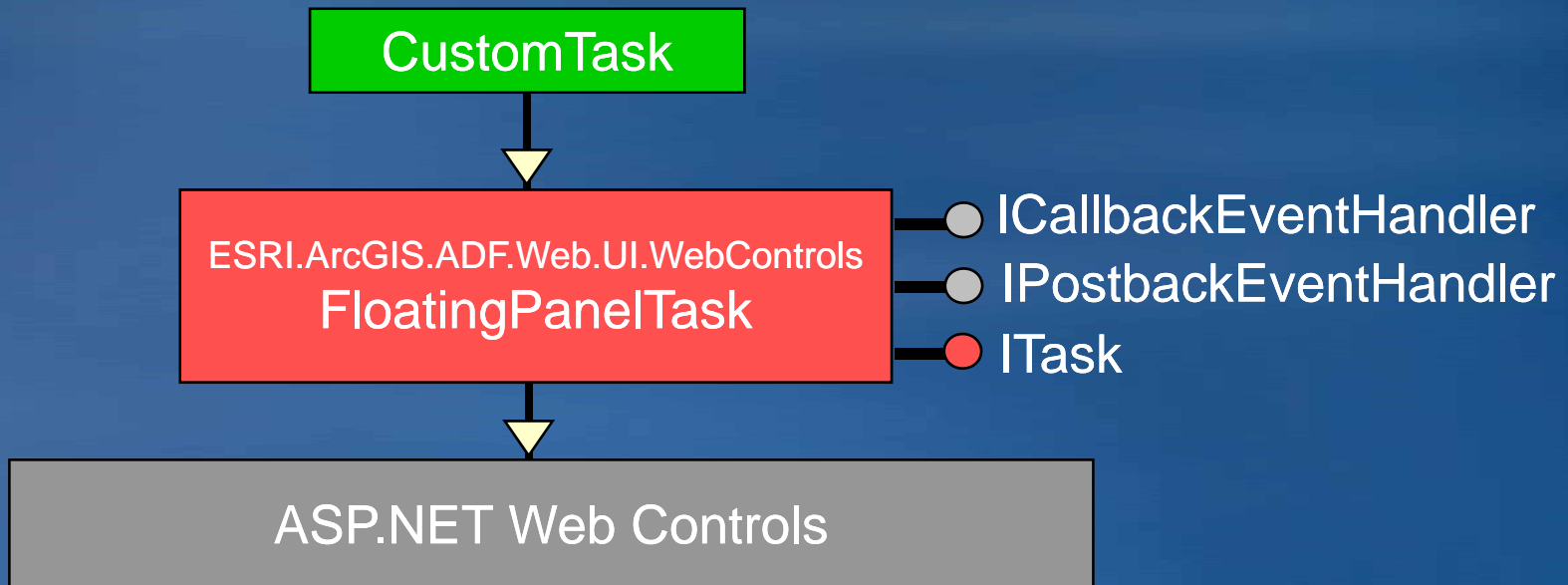
- Create user control
- Inherit from `UserControlTaskPanel`
 - Implement `ExecuteTask`
 - Use input parameter
 - Return result as output
 - Call `Start` on execute button click
- In your web application
 - Add a `UserControlTask` to your `TaskManager`
 - Add your user control task panel (.ascx) to your application
 - Point `UserControlTask` to your panel

Demo - User Control Tasks

- Simple Task
- Find Near Task

Server Control Task

- You are creating a custom composite control!
 - Extend FloatingPanelTask abstract base class
 - Implements ITask which defines Web Task contract



Key methods and properties

Methods

- **CreateChildControls** – create the visual interface
- **GetCallbackResult** – parse input, return callback results
- **ExecuteTask** – execute the task and generate results

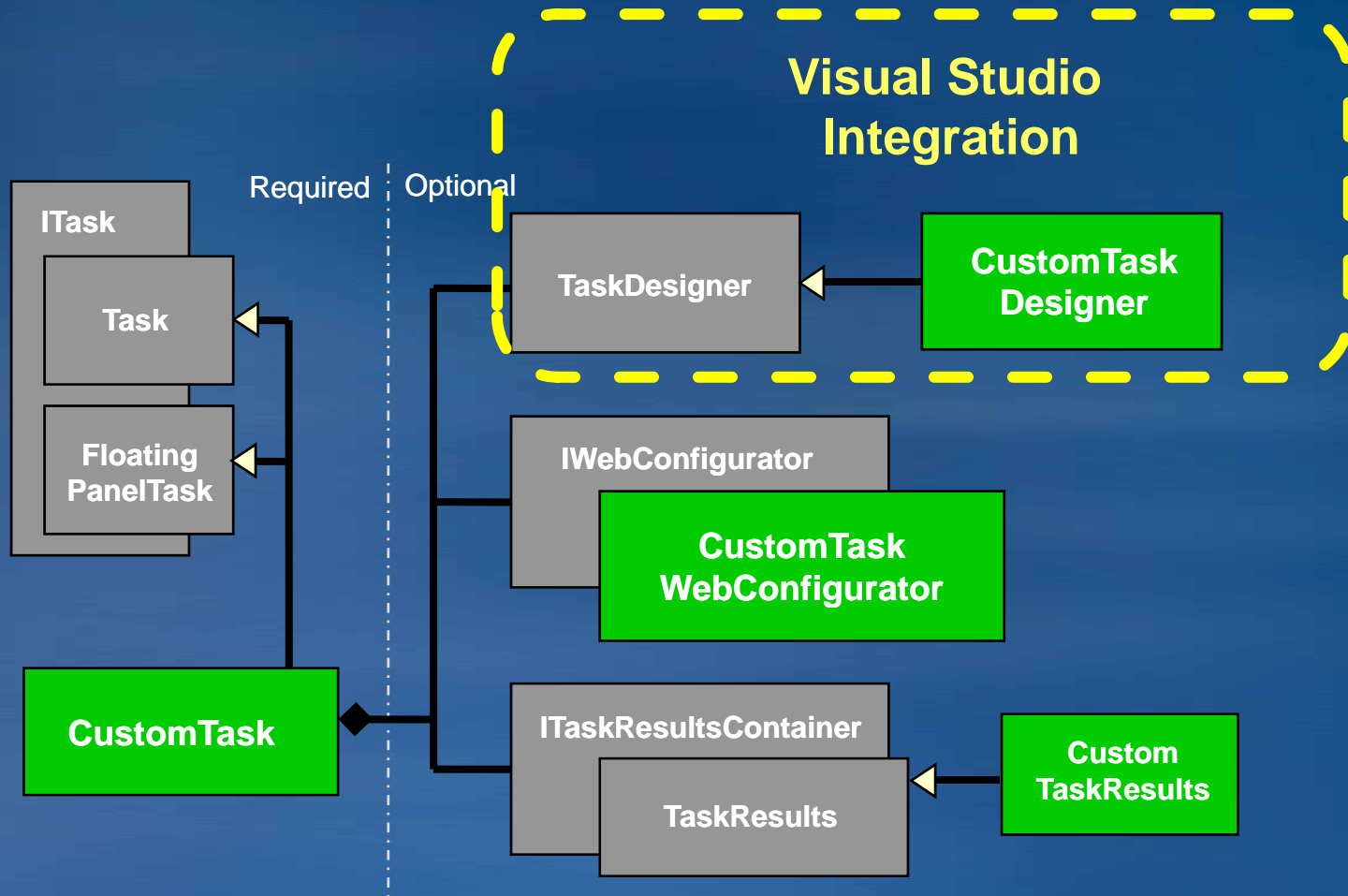
Properties

- **Input** – store input data from the user
- **Results** – after task execution, generate results for use in a TaskResults control
- **CallbackResults** – collection of results designed to update browser content using Web ADF JavaScript

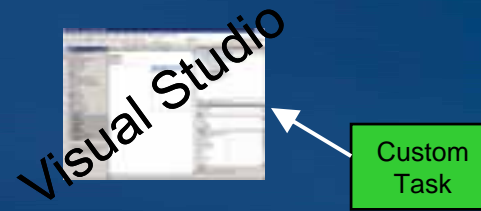
Demo – Server Control Task

- Simple Task

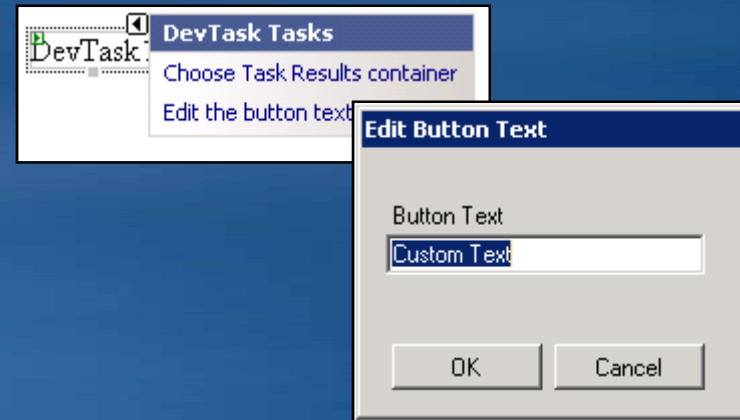
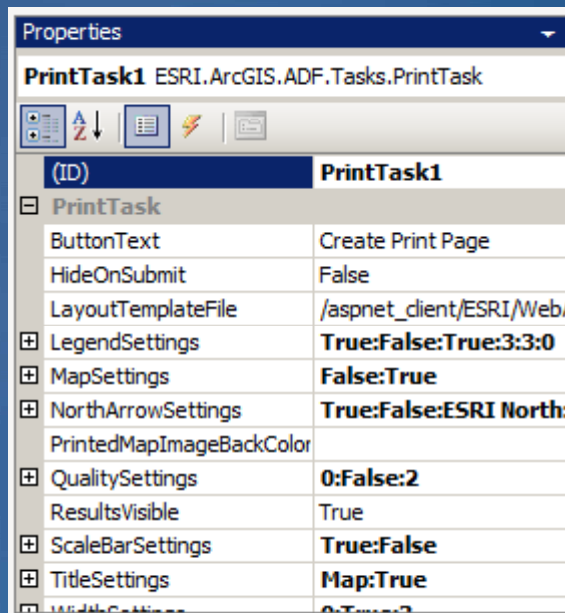
Visual Studio Integration



Visual Studio Integration



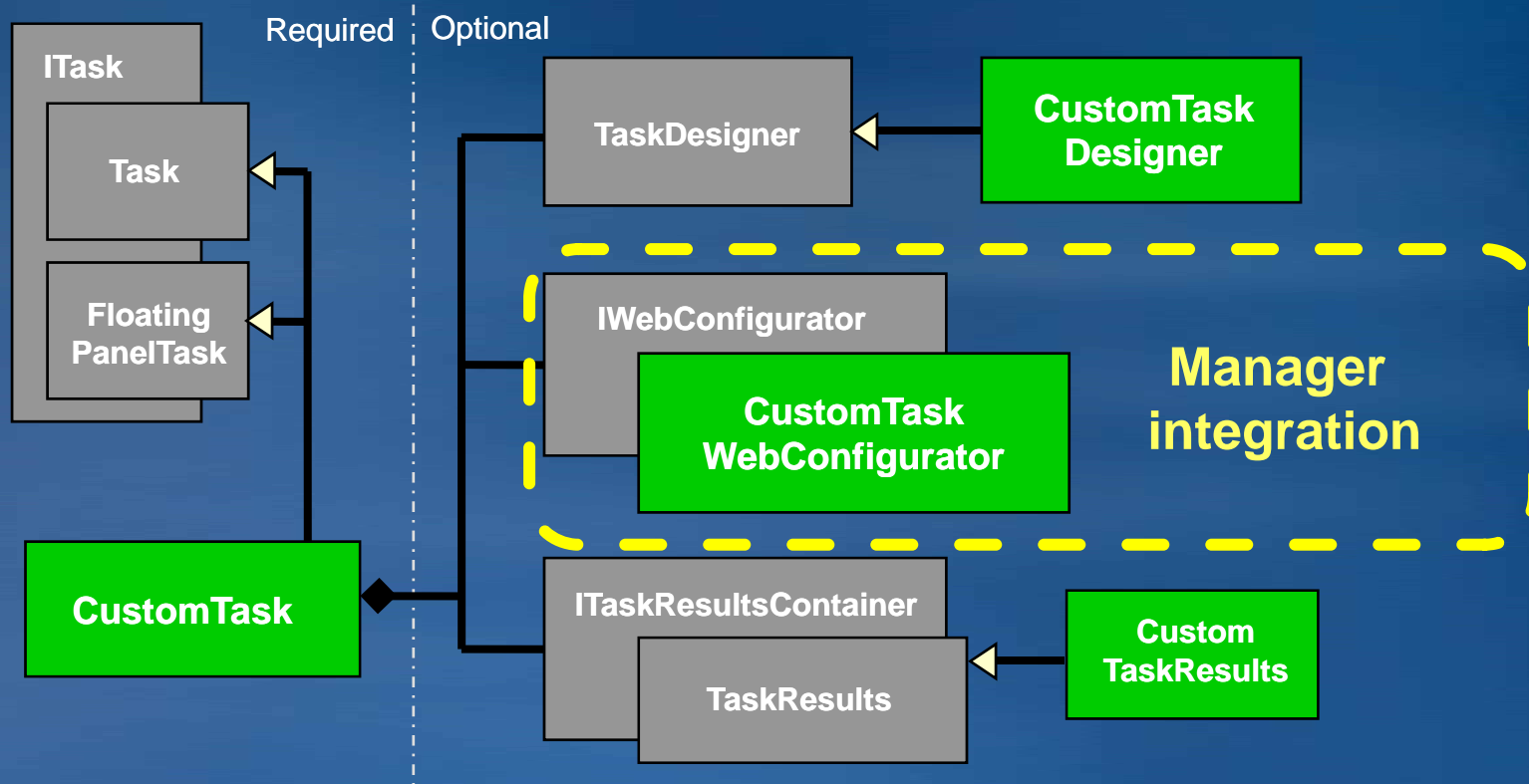
- Expose custom properties
- Extend TaskDesigner to manage smart tags
- Create a custom WinForm dialog for developer input



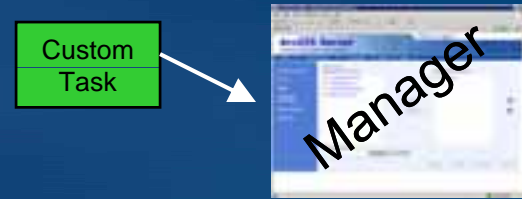
Demo - Visual Studio Integration

- Design-time support

Manager Integration



Manager Integration



- **Create a custom User control to be rendered at runtime in Manager**
 - Provides UI to configure task in Manager
- **Implement IWebConfigurator interface**
 - Generates markup for configured task
- **Can implement web configurator as server control**

IWebConfigurator implementation

- **Properties**

- **ControlToConfigure**: returns an instance of the Task
- **AdditionalControls**: returns other controls in same Page as the Task
- **ValidateResources**: determine if a required resource is available

- **Methods**

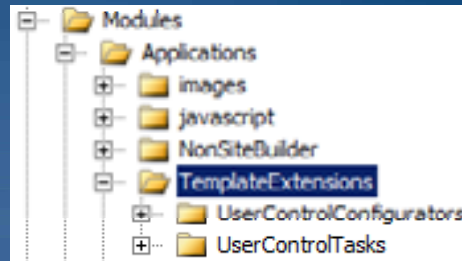
- **GetGISResourceItemDependencies** – reset task if dependent resource is removed

- **Event Handlers**

- **WebConfigurationCompleteEventHandler**: write markup to page

Register with Manager

- Add user control task and configurator to Manager



- Modify Tasks.xml

– Located in <ArcGIS Instance>\Manager\App_Data

Tasks.xml

```
<Task Name="UserControlTask" DisplayName="Simple Task"
  Type="ESRI.ArcGIS.ADF.Web.UI.WebControls.UserControlTask,
ESRI.ArcGIS.ADF.Web.UI.WebControls, Version=9.3.1.3000, Culture=neutral,
PublicKeyToken=8fc3cc631e44ad86" TagPrefix="esriTasks"
  TaskControl="SimpleTask/SimpleTask.ascx"
  UserControlConfigurator="SimpleTaskWebConfig/SimpleTaskWebConfigurator.ascx
"/>
```

Demo - Manager Integration

- **Configure the task inside ArcGIS Server Manager**

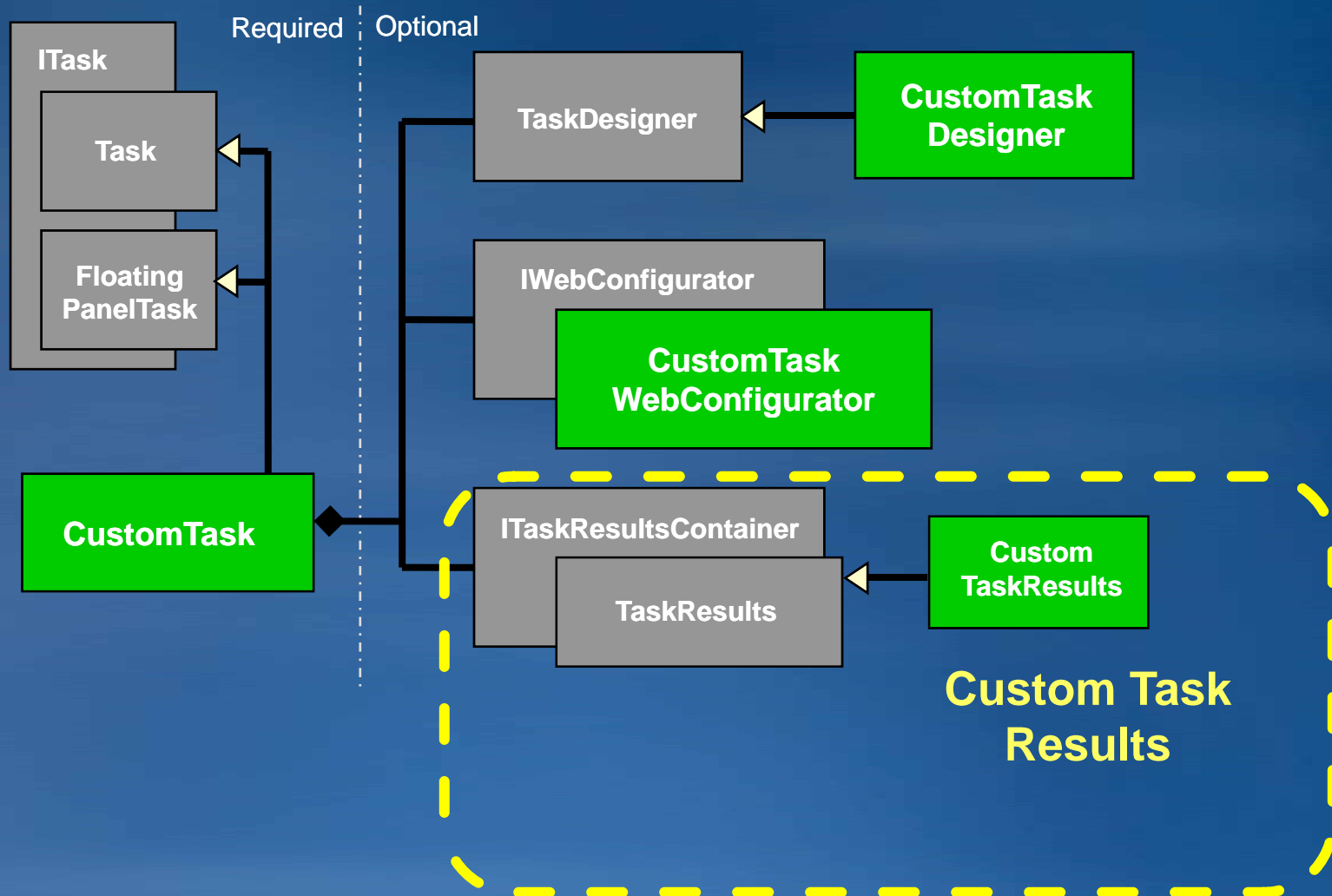
Extending Out of the box Tasks

- **All out of the box tasks are extensible**
- **Typical extensibility points**
 - **Change input processing**
 - **Change results**
 - **Graphic layer rendering**
 - **Custom context menus**
 - **Node click behavior**
 - **Change UI**

Demo - Extending Tasks

- Change results – Print task templates
- Change UI – Query Attributes task with Silverlight

Custom Task Results



Custom Task Results

- **Two ways to create custom task results**
 - Extend ADF TaskResults control
 - Create your own by implementing ITaskResultsContainer
- **Methods**
 - **DisplayResults**: Display the results from a task execution
 - **StartActivityIndicator**: Display an indicator image showing that a task is executing.

Demo: Custom Task Results using Silverlight

- **Displaying results in table view using Silverlight**

Best Practices

- **Create custom tasks with user controls rather than server controls**
- **Start with UserControlTaskPanel or FloatingPanelTask base classes**

Summary

- **Extensible task framework**
- **At 9.3.1 it is very easy to create and distribute custom tasks using UserControl**
- **Rich user experience by integrating Silverlight**

In Conclusion...

- **All sessions are recorded and will be available on EDN**
 - Slides and code will also be available
- **Please fill out session surveys!**
- **Still have questions?**
 - Tech talk
 - Demo Theatres
 - Meet the Team