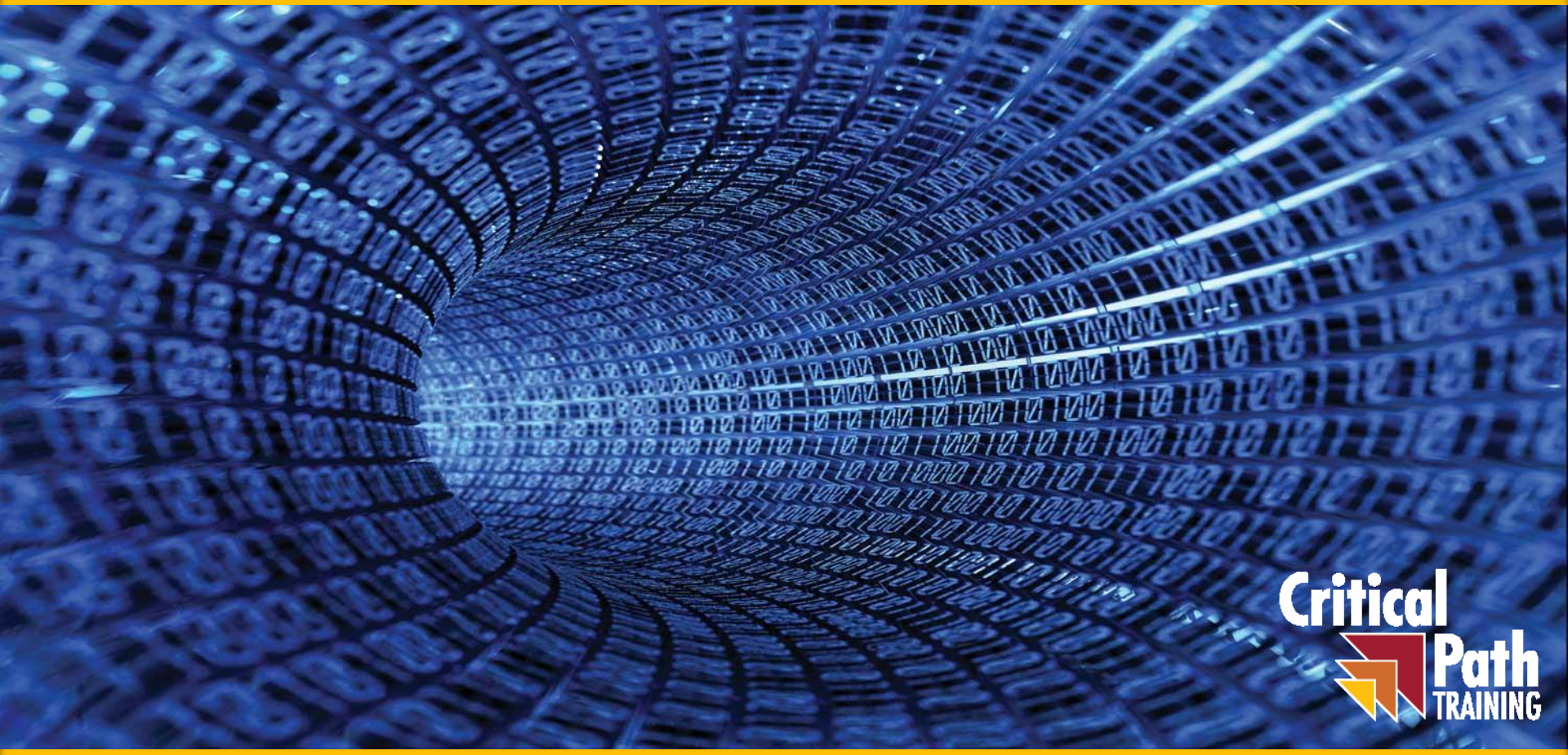
Developing Custom Web Services using Web API 2



Agenda

- Understanding API Controllers and Call Routing
- Creating RESTful Web Services
- Custom Routing Schemes and Attribute Routing
- Developing OData Controller
- Cross-Origin Resource Sharing (CORS)

Introducing WebAPI

- Framework and tooling for building RESTful services
- Part of ASP.NET MVC
  - Uses Controller and Routing paradigm
- Tooling, wizards, scaffolding
  - Simplified creation of REST and OData services
  - Simplified use of Entity Framework to wrap database operations
- Can be a stand-alone service or part of an app
  - When added to an app, you perform additional manual modifications to Global.asax

Controllers

- Controllers inherit from `ApiController`

```
public class ValuesController : ApiController
```

- By default methods are mapped to HTTP verbs

```
public IEnumerable<string> Get() {}

public string Get(int id) {}

public void Post([FromBody]string value){}

public void Put(int id, [FromBody]string value){}

public void Delete(int id){}
```

Routing

- Routes are controlled through maps

```
config.Routes.MapHttpRoute(
    name: "DefaultApi",
    routeTemplate: "api/{controller}/{id}",
    defaults: new { id = RouteParameter.Optional }
);
```

- Router makes decisions if information is missing
  - Similar to MVC
- By default methods are mapped to HTTP verbs

Responding

- Content Negotiation is automatic
  - `accept: "application/json"`
  - `accept: "application/xml"`
- Return `IQueryable` to support query syntax

```
public IQueryable<string> Get()
{
    var d = new List<string>() {"a", "b" };
    return d.AsQueryable();
}
```

- Return `HttpResponseMessage` for headers and status

```
public HttpResponseMessage Get(int id)
{
  return Request.CreateResponse<string>(HttpStatusCode.OK, data[id - 1]);
}
```

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- ✓ Introducing WebAPI
- Calling API Controllers from MVC Apps
- Creating a RESTful Service
- Creating an OData Service
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Scenarios to Consider

- Additional API Controllers NOT Required
  - You don’t require JavaScript access to the data
  - App has direct EF access to database anyway
- Additional API Controllers MAY be Required
  - You require JavaScript access to the data
  - Data source cannot be accessed directly using EF
  - Want to support clients outside of the App

Calling with Managed Code

```
public ActionResult Index()
{
    StringBuilder url = new StringBuilder();
    url.Append(Request.Url.Scheme)
        .Append("://")
        .Append(Request.Url.Host)
        .Append(":")
        .Append(Request.Url.Port)
        .Append("/api/values");

    HttpWebRequest apiRequest = (HttpWebRequest)HttpWebRequest.Create(url.ToString());
    apiRequest.Credentials = CredentialCache.DefaultCredentials;
    apiRequest.Method = "GET";
    apiRequest.Accept = "application/xml";

    HttpWebResponse apiResponse = (HttpWebResponse)apiRequest.GetResponse();
    XDocument responseDoc = XDocument.Load(apiResponse.GetResponseStream());
    XNamespace ns = "http://schemas.microsoft.com/2003/10/Serialization/Arrays";
    List<string> values = (from v in responseDoc.Descendants(ns + "string")
                           select  v.Value ).ToList();

    ViewBag.Values = values;
    return View();
}
```

Calling with JavaScript

```
(function () {
    "use strict";

    jQuery(function () {

        jQuery.ajax({
            url: "../api/values",
            type: "GET",
            headers: {
                "accept": "application/json",
            },
            success: function (data, status, jqXHR) {
                alert(data[0]);
            },
            error: function (jqXHR, status, message) {
                alert(JSON.stringify(jqXHR));
            }
        });

    });

}());
```


DEMO
Calling API Controllers from MVC Apps

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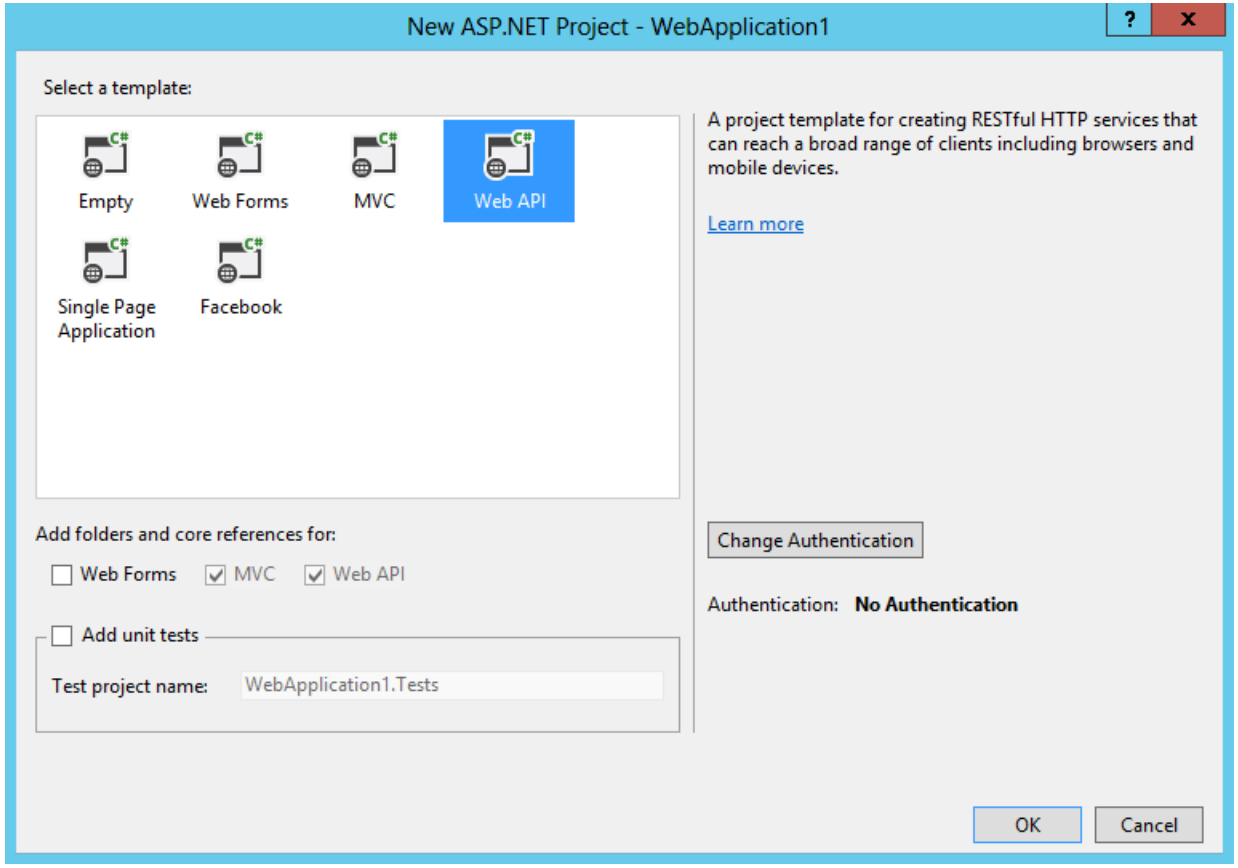
Creating a Stand-Alone RESTful Service




DEMO
Creating and Testing a RESTful Service

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OData Query Options

- $select
- $filter
- $orderby
- $top
- $skip
- $expand

Controllers

- Controllers inherit from `ODataController`

```
public class ContactsController : ODataController
```

- Methods are mapped to HTTP verbs just like `ApiController`
- Content Negotiation is automatic
- `IQueryable` generated by default

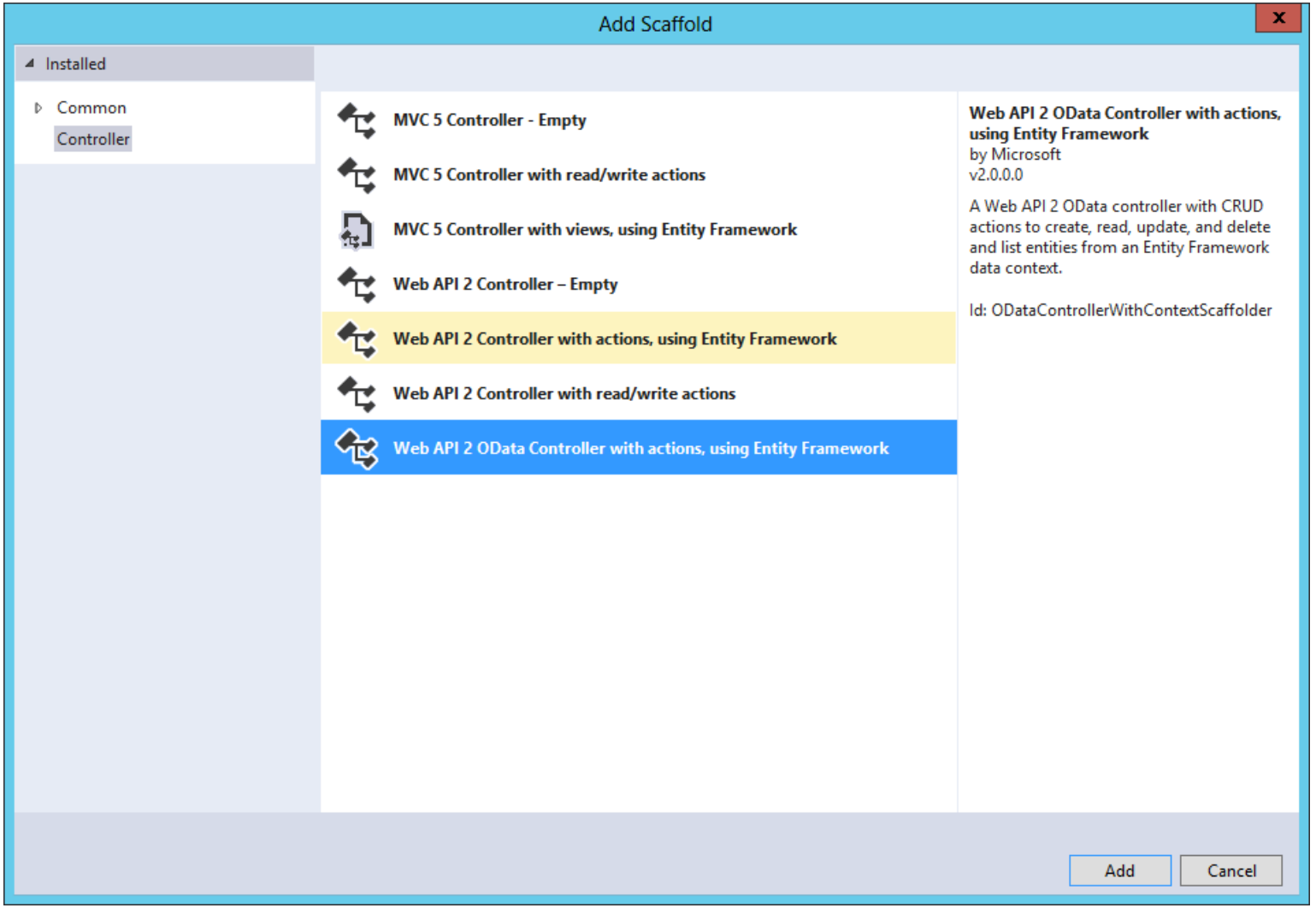
Routing

- Routes are controlled through maps

```
ODataConventionModelBuilder builder = new ODataConventionModelBuilder();
builder.EntitySet<Contact>("Contacts");
builder.EntitySet<Company>("Companies");
config.Routes.MapODataRoute("odata", "odata", builder.GetEdmModel());
```

- Router makes decisions if information is missing
- By default methods are mapped to HTTP verbs

Adding an OData Controller




DEMO
Creating and Testing an OData Service

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- ▪ Using Cross-Origin Resource Sharing

Cross-Origin Resource Sharing

- Allows JavaScript to make a call across domains
- Superior to JSONP, which only supports GET
- Supported in current versions of all major browsers
- Browser and resource exchange headers
  - Origin header from browser contains origin requesting
  - Access-Control-Allow-Origin header returned from resource if call is allowed
- Enabling in WebAPI2
  - Install Microsoft ASP.NET WebAPI2 CORS NuGet Package
  - Enable CORS in WebApiConfig
  - Use `[EnableCors]` attribute in controllers


DEMO
Cross-Origin Resource Sharing

Summary

- ✓ Introducing WebAPI
- ✓ Calling API Controllers from MVC Apps
- ✓ Creating a RESTful Service
- ✓ Creating an OData Service
- ✓ Using Cross-Origin Resource Sharing