ODATA UNLEASHED!
Let’s Learn How to Exploit It
About me 😊

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- Software Architect

- Graduated in Computer Sciences – 2002
- Working in SAP Labs Israel since 2003
- Core expertise in Java, Eclipse and Android
This session

- Introduction to OData
- OData Development Tools for Eclipse
- Toss in a demo to make it look longer 😊
- OData Development Tools contribution to Eclipse
- Ask questions any time
Technology Tipping Point Requires New IT Approach

New devices and experiences
Consumer innovations in the enterprise

Growing new communities of agile developers
Expansion of business data and decision makers

Simple access to complex enterprise systems
Manage and control mission critical systems AND deploy innovative solutions
What is OData?

**Clients**
- MOBILE DEV
  - Windows Phone (WP)
  - Android
  - iOS
- APP DEV
  - Silverlight
  - .NET
  - HTML5
  - JavaScript
- WEB CMS
  - Joomla
  - Drupal

**HTTP RESTFUL**
- GET
- POST
- PUT
- DELETE

**Servers**
- CUSTOM SERVERS
  - .NET servers
  - Java
  - PHP
  - Node.js
- DATABASES
  - SQL Server
  - MySQL
  - Azure Data
- CLOUD APPLICATIONS
  - App Engine
  - Azure
  - SAP

**Consumers**
- Clients
- Producers

**ATOM JSON**
What is OData?
“SQL for the web” metaphor

OData can be used to access table-like structures similar to the way SQL does

- Entity Data Model (EDM) to describe OData Services
- Each entity can support Create, Read, Update, and Delete (CRUD) operations
- Can navigate relationships
What is OData?
“SQL for the web” metaphor

<table>
<thead>
<tr>
<th>OData</th>
<th>SQL/Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>OData Service</td>
<td>Database Schema</td>
</tr>
<tr>
<td>Entity Type</td>
<td>Database Table</td>
</tr>
<tr>
<td>Function Import</td>
<td>Stored Procedure</td>
</tr>
<tr>
<td>GET method</td>
<td>SELECT statement</td>
</tr>
<tr>
<td>POST method</td>
<td>INSERT statement</td>
</tr>
<tr>
<td>PUT method</td>
<td>UPDATE statement</td>
</tr>
<tr>
<td>DELETE method</td>
<td>DELETE statement</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
What is OData?

OData in Design-time (Model)
What is OData?

OData in Design-time (Entity Data Model)

- **EntityTypes** – data model definitions (for example customer, product), structured types consisting of list of properties (simple or complex)
- **Complex Types** - structured types also consisting of a list of properties but with no key
- **EntitySets** – collections of Entities
- **Associations** - define the relationship between two or more Entity Types
- **Navigation Properties** - special properties on Entity Types which are bound to a specific association and can be used to refer to associations of an entity
What is OData?

OData in Design-time (the metadata of OData)
What is OData?

OData in Run-time

- GET http://odata.netflix.com/v2/Catalog/Genres
- GET http://odata.netflix.com/v2/Catalog/Genres('Romantic%20Movies')
- GET http://odata.netflix.com/v2/Catalog/Genres('Romantic%20Movies')/Titles
- GET http://odata.netflix.com/v2/Catalog/Titles('ApSU3')

http://odata.netflix.com/v2/Catalog/People?$filter=Name%20eq%20'christopher%20nolan'

http://odata.netflix.com/v2/Catalog/People?$filter=Name%20eq%20'christopher%20nolan'&$expand=Awards,TitlesDirected&$format=json
Why OData?
Why OData?

- The OData Protocol is different from other REST-based web service approaches in that it provides a uniform way to describe both the data and the data model.
OData Development Tools for Eclipse

Motivation

- Lower the barrier for developers to produce and consume OData
- Enable developers to extend the tools for different environments (Android, PHP)
OData Development Tools for Eclipse

Features

- Model new OData services
- Visualize and explore existing OData services
- Consume existing OData services in Java
  - Starter Application
  - Semantic Proxies
  - Java Client Library
OData Development Tools for Eclipse

Extensibility

- Extend the existing Java Toolkit
  - Starter Applications

- Create new consumption Toolkits
  - Starter Applications
  - Semantic Proxies

- Add support for additional model import sources (e.g. Excel spreadsheet, Database schema, etc.)
Demo
SAP plans to contribute these tools to the Eclipse community

We are looking for mentors from Eclipse Architecture Council
Stuff I Didn’t Cover

- How to create OData Producer
- Advanced OData features
  - Service Operations (Function Import)
  - URI query options ($top, $orderby, $expand etc.)
  - Batch operations
- Security
## URI Conventions

<table>
<thead>
<tr>
<th>URI</th>
<th>Used for</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>$links</td>
<td>Get all associations between entries</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/SupplierParts(1L)/$links/part">http://localhost:8080/odata_example/odatajpa.svc/SupplierParts(1L)/$links/part</a></td>
</tr>
<tr>
<td>$orderby</td>
<td>Order data based on desc or asc (default) options</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/SupplierParts?$orderby=quantity">http://localhost:8080/odata_example/odatajpa.svc/SupplierParts?$orderby=quantity</a> desc</td>
</tr>
<tr>
<td>$top</td>
<td>Return first N items of the set</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/SupplierParts?$orderby=quantity">http://localhost:8080/odata_example/odatajpa.svc/SupplierParts?$orderby=quantity</a> desc&amp;$top=4</td>
</tr>
<tr>
<td>$skip</td>
<td>Skip the first N records of the entity set and get next</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/SupplierParts?$skip=2&amp;$top=2">http://localhost:8080/odata_example/odatajpa.svc/SupplierParts?$skip=2&amp;$top=2</a></td>
</tr>
<tr>
<td>$filter</td>
<td>Select only subset of entities that match the predicates provided – rich set of operators and functions</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/SupplierParts?$filter=(quantity">http://localhost:8080/odata_example/odatajpa.svc/SupplierParts?$filter=(quantity</a> gt 200 and quantity lt 300) or shipperId eq 10</td>
</tr>
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# URI Conventions

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<td>$expand</td>
<td>Eagerly load associations inline</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/Supplier?$expand=supplierParts">http://localhost:8080/odata_example/odatajpa.svc/Supplier?$expand=supplierParts</a></td>
</tr>
<tr>
<td>$format</td>
<td>Specify what media type to be used for response (Atom/Xml/Json)</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/Supplier?$expand=supplierParts&amp;$format=Json">http://localhost:8080/odata_example/odatajpa.svc/Supplier?$expand=supplierParts&amp;$format=Json</a></td>
</tr>
<tr>
<td>$select</td>
<td>Return only subset of properties</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/Supplier?$select=supplierCity">http://localhost:8080/odata_example/odatajpa.svc/Supplier?$select=supplierCity</a>, supplierId</td>
</tr>
<tr>
<td>$inlinecount</td>
<td>Response should include the count on entities after applying $filter. Valid values are allpages/none</td>
<td><a href="http://localhost:8080/odata_example/odatajpa.svc/Supplier?$inlinecount=allpages">http://localhost:8080/odata_example/odatajpa.svc/Supplier?$inlinecount=allpages</a>&lt;br&gt;&lt;m:count&gt;16&lt;/m:count&gt;</td>
</tr>
</tbody>
</table>
Batch Operations

- OData supports executing multiple operations sent in a single HTTP request through the use of Batching.
- The batch requests can be sent as POST with the path containing $batch.
- OData Batch Request is represented as a Multipart MIME v1.0 message.
The future of OData

- Currently the standard is continuing to evolve
- The Open Data Protocol specification is currently available under the Microsoft Open Specification Promise (OSP), allowing third parties, including open source projects, to build Data Services for any runtime as well as clients to consume such services.
- OASIS Technical committee is in the process to standardize OData as an OASIS standard: https://www.oasis-open.org/committees/odata/
Want to know more?

Thank you

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