

# Revit Server REST API

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# Overview

- Revit Server REST API
- REST = Representational States Transfer
  - Used to establish communications between client and server based on HTTP protocol
  - Style rather than standard - “RESTful”
  - Simple, yet powerful
  - Widely used as a lightweight alternatives to other types of web services
- Administrative tasks with Revit project files
  - Query information (e.g., server, folders, project, history)
  - Manage data  
(e.g., create/delete folders, move a project file, (un)lock a server)
  - Currently, no functionality to upload a project file 🙅

# Motivations and Objectives

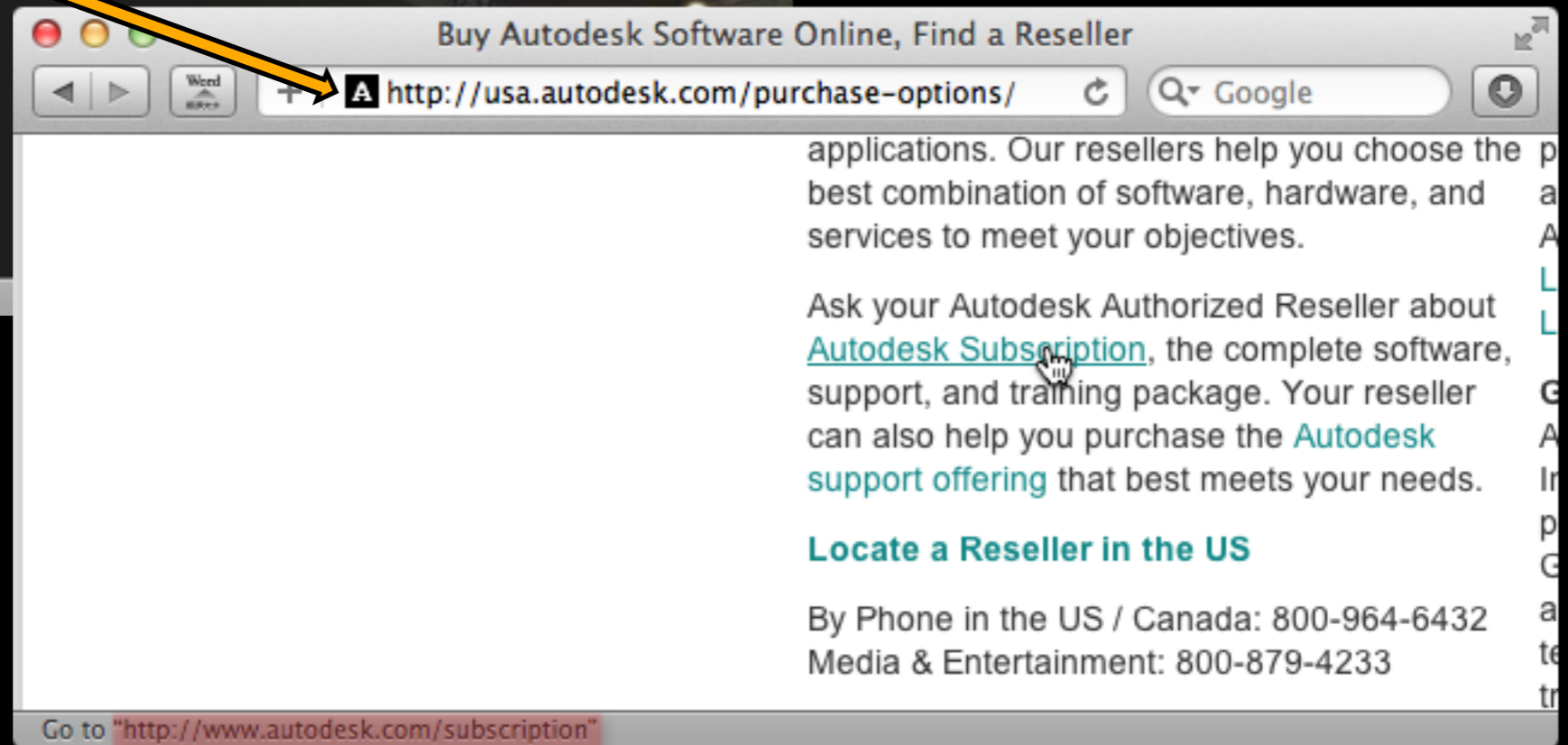
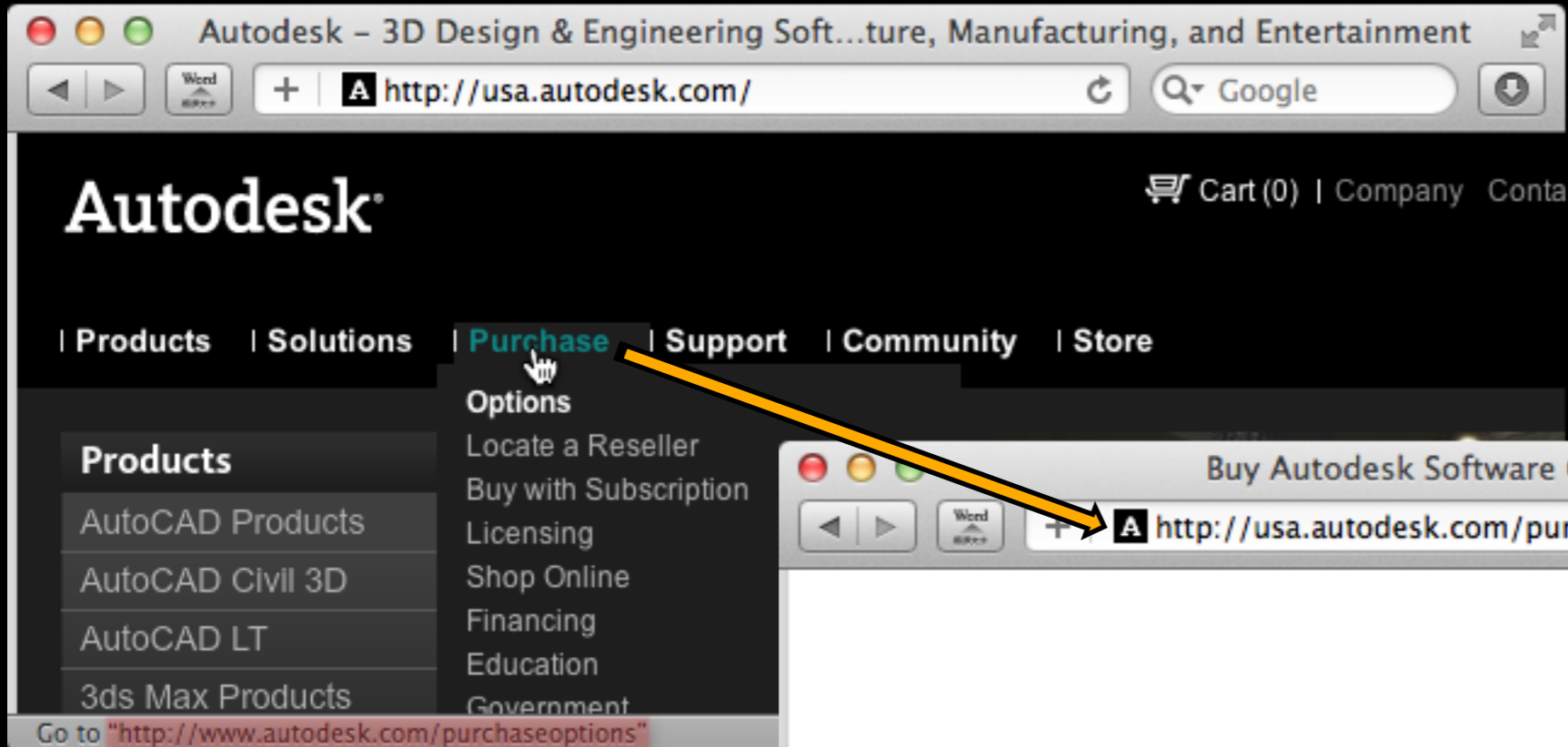
- Revit Server API - easy or difficult?
  - Very simple if you are familiar with server application
  - May feel foreign if your experience so far is limited to Revit API or desktop application
  - Overall relatively simple
- Cloud and mobile
  - Direction we are all heading, no doubt
  - How do we get started?
- Learning REST
  - Good starting point
  - Not limited to Revit Server API

# Topics

- HTTP requests
- RESTful web service
- Revit Server REST API
- Example 1: Windows Client
- Example 2: iOS Client

# HTTP Requests

- World Wide Web (WWW)
  - Web of resources
  - Resources reference each other
  - Resources can be of many types (e.g., documents, images, services, html pages)
- URI identifies resources (Uniform Resource Identifier)
- HTTP used to access resources (HyperText Transfer Protocol)
  - 9 methods (a.k.a., verbs):  
**GET, HEAD, OPTIONS**, POST, PUT, DELETE, TRACE, CONNECT, PATCH



## HTTP verbs

- **GET**, HEAD, OPTIONS, POST, PUT, DELETE, etc.

Demo: http requests in action

# RESTful Web Services

## Why REST?

REST as a lightweight alternatives to other types of Web services

Sample request form:

SOAP

```
<?xml version="1.0"?>  
<soap:Envelope xmlns:soap="http://www.w3.org/2003/12/soap-envelope">  
  <soap:Body pb="http://www.adesk.com/memberdb">  
    <db:GetDeveloperDetails>  
      <db:DeveloperID>12345</db:DeveloperID>  
    </db:GetDeveloperDetails>  
  </soap:Body>  
</soap:Envelope>
```

REST

```
http://www.adesk.com/memberdb/DeveloperDetails/12345
```

# SOAP vs. RESTful

## SOAP

- used only POST, now uses GET, too
- all data is in the xml message
  - resource to access
  - function to execute

## REST

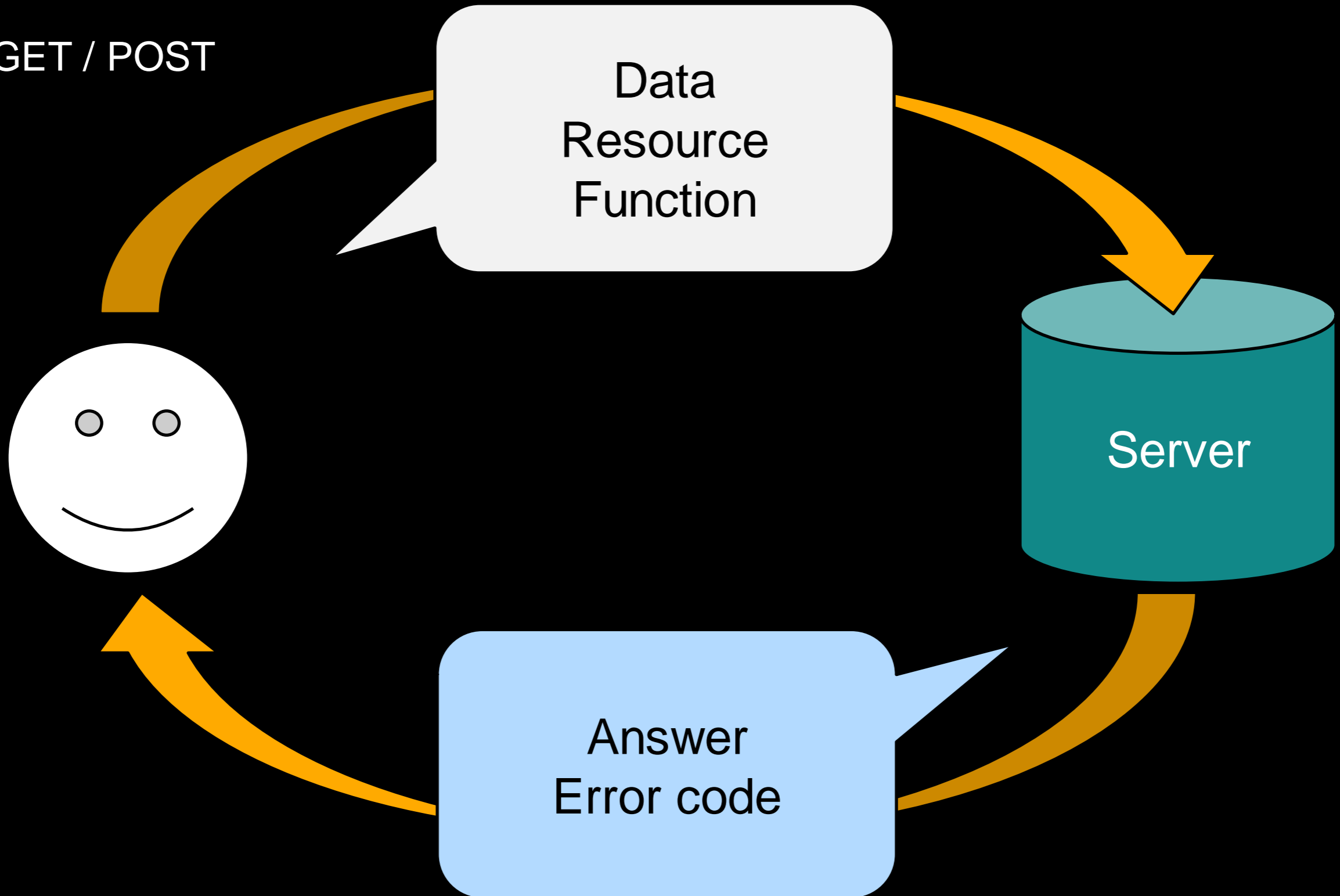
- uses GET, POST, PUT, DELETE
- resource is identified by URI
- function is identified by the HTTP verb



# SOAP

http://<web service>

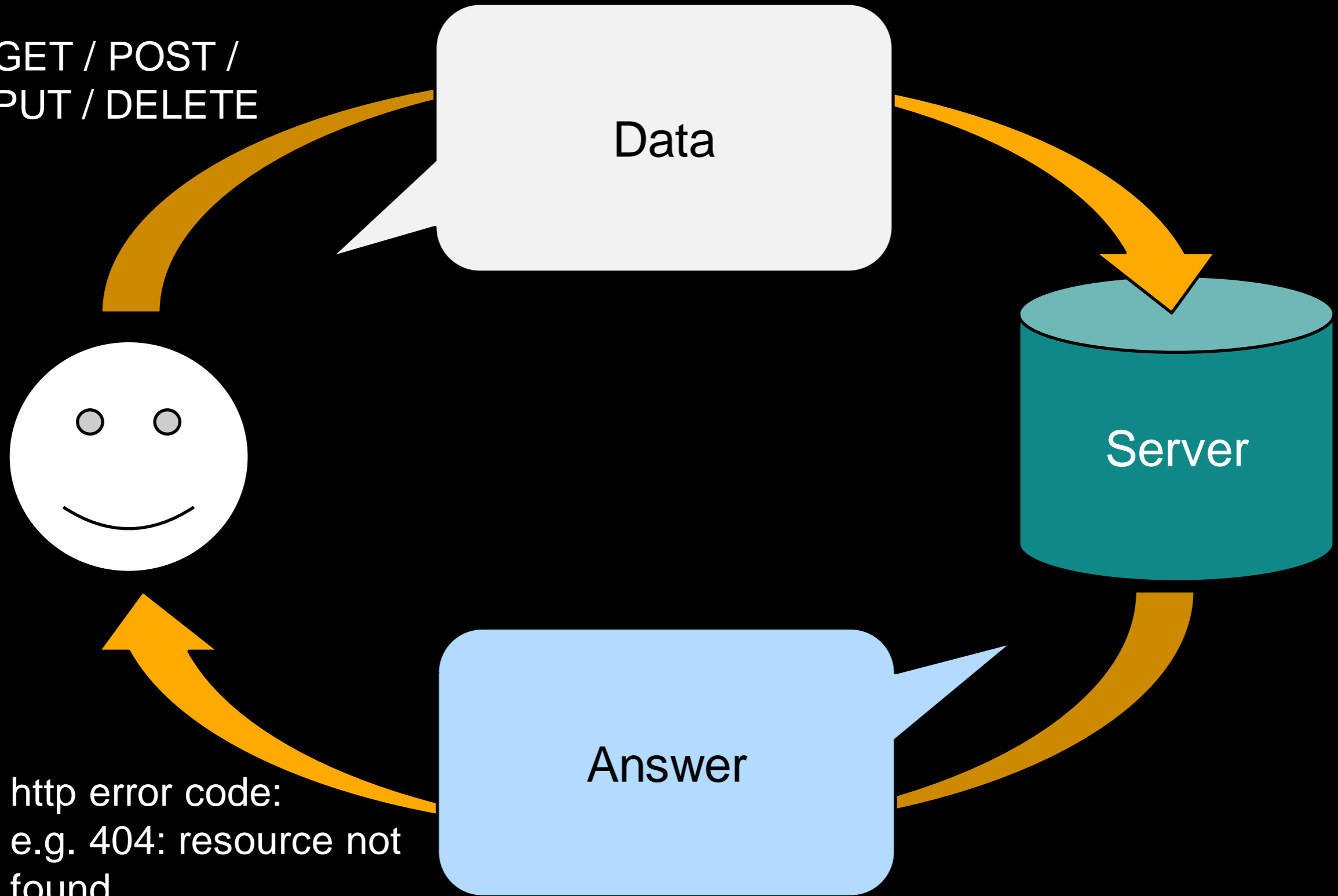
GET / POST



# RESTful

http://<web service>/<resource>/<function>

GET / POST /  
PUT / DELETE



http error code:  
e.g. 404: resource not  
found

# Systems Using RESTful Services

- [Yahoo!](#)
- Twitter
- Facebook
- Dropbox
- Microsoft SkyDrive
- Google Drive
- Amazon services
- Windows Azure Storage Services
- ...

# RESTful Services

Request and Response; e.g., query a info. about the .rvt file

## Request

```
GET / 00CentralModel.rvt/modelInfo
User-Name: Tester
User-Machine-Name: TestMa
Operation-GUID: 45FB8158-
```

```
HTTP/1.1 200 OK
Content-Length: 281
Content-Type: application/json; charset=utf-8
{
  "Path":"00CentralModel.rvt",
  "DateCreated":"\\Date(1320977094080)\\",
  "DateModified":"\\Date(1321330137000)\\",
  "LastModifiedBy":"Alice",
  "ModelGUID":"ee4ac20b-22d3-4de8-9060-ed363b97ade0",
  "ModelSize":4134630,
  "SupportSize":1573147
}
```

# Common Request Headers for Revit Server

```
GET / 00CentralModel.rvt/modelInfo
User-Name: Tester
User-Machine-Name: TestMachine
Operation-GUID: 45FB8158-8BE3- ...
```

## User-Name

- Specifies the user name of the client. It is used to form an application-level session token.  
Supported value: string

## User-Machine-Name

- Specifies the machine name of the client. It is used to form an application-level session token.  
Supported value: string

## Operation-GUID

- Specifies a GUID for the request. It is used for server-side logging and diagnostics, so a unique GUID for every request is preferred. Supported value: GUID in string format



# Common Response Headers

```
HTTP/1.1 200 OK
```

```
Content-Length: 281
```

```
Content-Type: application/json; charset=utf-8
```

```
{
```

```
  "Path": "00CentralModel.rvt",
```

```
  ...
```

```
}
```

## Content-Length

- Describes the length in bytes of the response body. Supported value: integer in string format

## Content-Type

- Describes the representation and syntax of the response body. Supported value: application/json, image/png  
Condition: Required by the APIs that return data.

## Location

- Returns a new URI that can be used to request a representation of the newly created object. Supported value: absolute URI.  
Condition: Required by the APIs that create new objects.

# Common Status Codes

```
HTTP/1.1 200 OK
Content-Length: 281
Content-Type: application/json; charset=utf-8
{
  "Path":"00CentralModel.rvt",
  ...
}
```

Status Code	Description
200 OK	The request has succeeded.
201 Created	The request has been fulfilled and resulted in a new object being created.
400 Bad Request	The request could not be understood by the server due to incorrect syntax or invalid parameter values.
404 Not Found	The object specified in the request's URL could not be found.
405 Method Not Allowed	The method (GET, PUT, DELETE, POST) specified in the request is not allowed for the request's URL.
414 Request-URI Too Long	Path of the object specified in the request's URL is longer than the server supports.
500 Internal Server Error	The server encountered an unexpected condition which prevented it from fulfilling the request.
501 Not Implemented	The server does not support the functionality required to fulfill the request.
503 Service Unavailable	The server is currently unable to handle the request due to a temporary overloading or maintenance of the server.

# Revit Server API

http://<web service>/<resource>/<function>

http://<host>/RevitServerAdminRestService/AdminRestService.svc/|Folder|SubFolder|File/history

| = %7C in URL Encoding

(<http://dl.dropbox.com/u/46210021/How%20to%20use%20the%20Public%20folder.txt>)

curl

http://10.211.55.11/RevitServerAdminRestService2013/AdminRestService.svc/serverProperties

-H "User-Name: Adam"

-H "User-Machine-Name: AdamPC"

-H "Operation-GUID: 11111111-1111-1111-1111-111111111111"

-V

> GET

/revitserveradminrestservice2013/adminrestservice.svc/serverproperties  
HTTP/1.1

> User-Agent: curl/7.21.4 (universal-apple-darwin11.0) libcurl/7.21.4  
OpenSSL/0.9.8r zlib/1.2.5

> Host: 10.211.55.11

> Accept: \*/\*

> User-Name: Adam

> User-Machine-Name: AdamPC

> Operation-GUID: 11111111-1111-1111-1111-111111111111

>

< HTTP/1.1 200 OK

< Content-Length: 136

< Content-Type: application/json; charset=utf-8

< Server: Microsoft-IIS/7.5

< X-Powered-By: ASP.NET

< Date: Wed, 09 May 2012 19:23:13 GMT

<

\* Connection #0 to host 10.211.55.11 left intact

\* Closing connection #0

```
{"MachineName":"ADAMNAGYA9D4","MaximumFolderPathLength":98,"MaximumModelNameLength":40,"ServerRoles":[0,1,2],"Servers":["adamnagya9d4"]}
```

# Information Querying APIs

URL	Description
GET /serverProperties	query the server's properties
GET/{folderPath}/contents	query the content of a folder
GET/{folderPath}/DirectoryInfo	query the folder directory information
GET /{modelPath}/history	query the submission history of a model
GET /{modelPath}/modelInfo	query the file information of a model
GET /{modelPath}/projectInfo	query the project information of a model
GET /{modelPath}/thumbnail?width= {width}&height={height}	get the thumbnail of a model



# Data Managing APIs

URL	Description
PUT <code>/{objectPath}/lock</code>	lock the server, a folder or a model
DELETE <code>/{objectPath}/lock?objectMustExist={objectMustExist}</code>	Unlocks the server, a folder, or a model
DELETE <code>/{objectPath}/inProgressLock</code>	Cancel the in-progress locking operation on the server, a folder, or a model
GET <code>/{folderPath}/descendent/locks</code>	Gets the lock information of the descendents of a folder
DELETE <code>/{folderPath}/descendent/locks</code>	Unlocks all locks of the descendents of a folder.
PUT <code>/{folderPath}</code>	Creates a new folder
DELETE <code>/{objectPath}?newObjectName={newObjectName}</code>	Rename or delete a folder or model
POST <code>/{folderPath}/descendent?sourceObjectPath={sourceObjectPath}&amp;pasteAction={pasteAction}&amp;duplicateOption={duplicateOption}</code>	Copies or moves a folder or a model to another folder

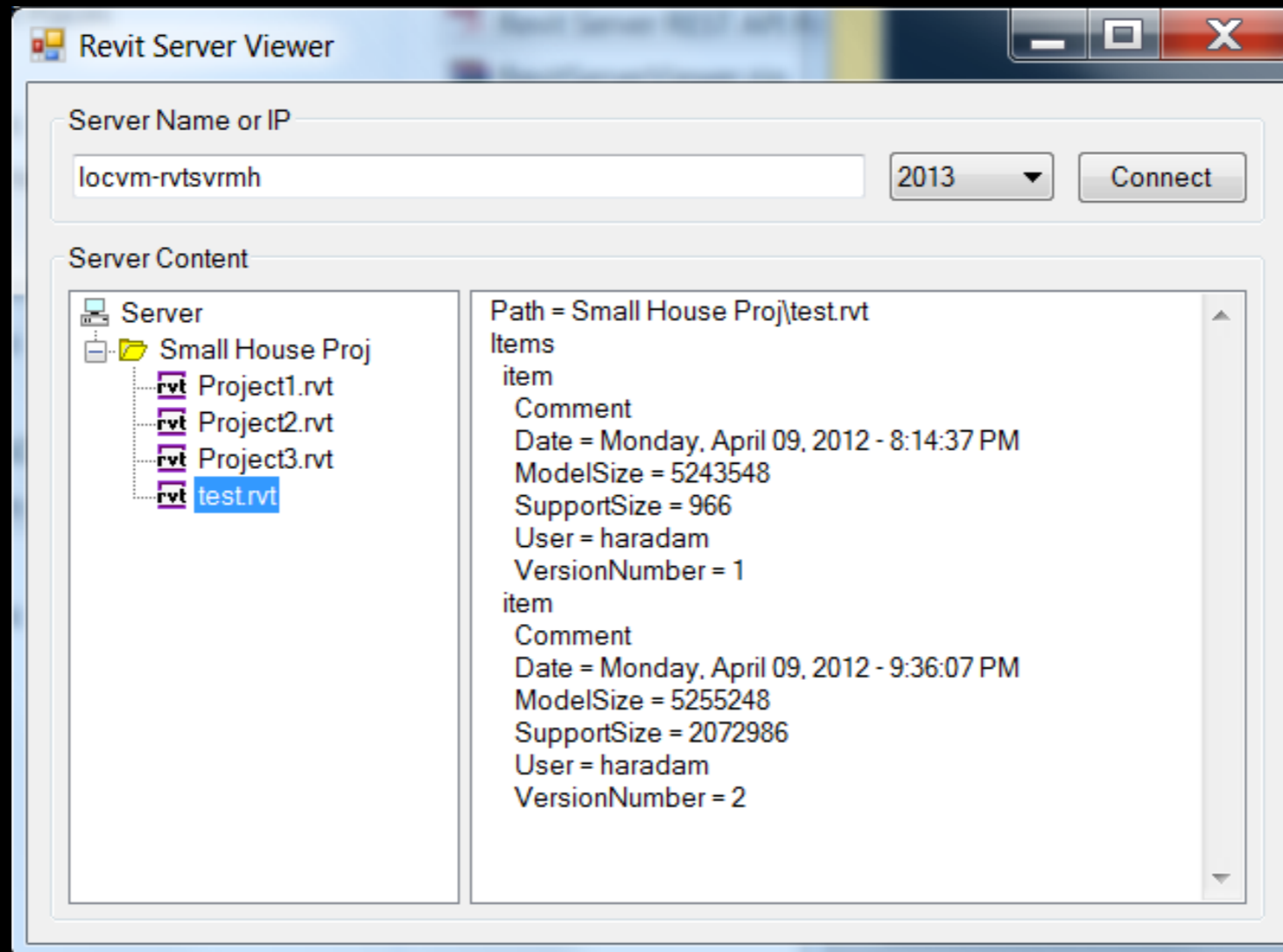
# Using REST in C#

```
static string HttpGet(string url)
{
    HttpRequest req = WebRequest.Create(url) as HttpRequest;

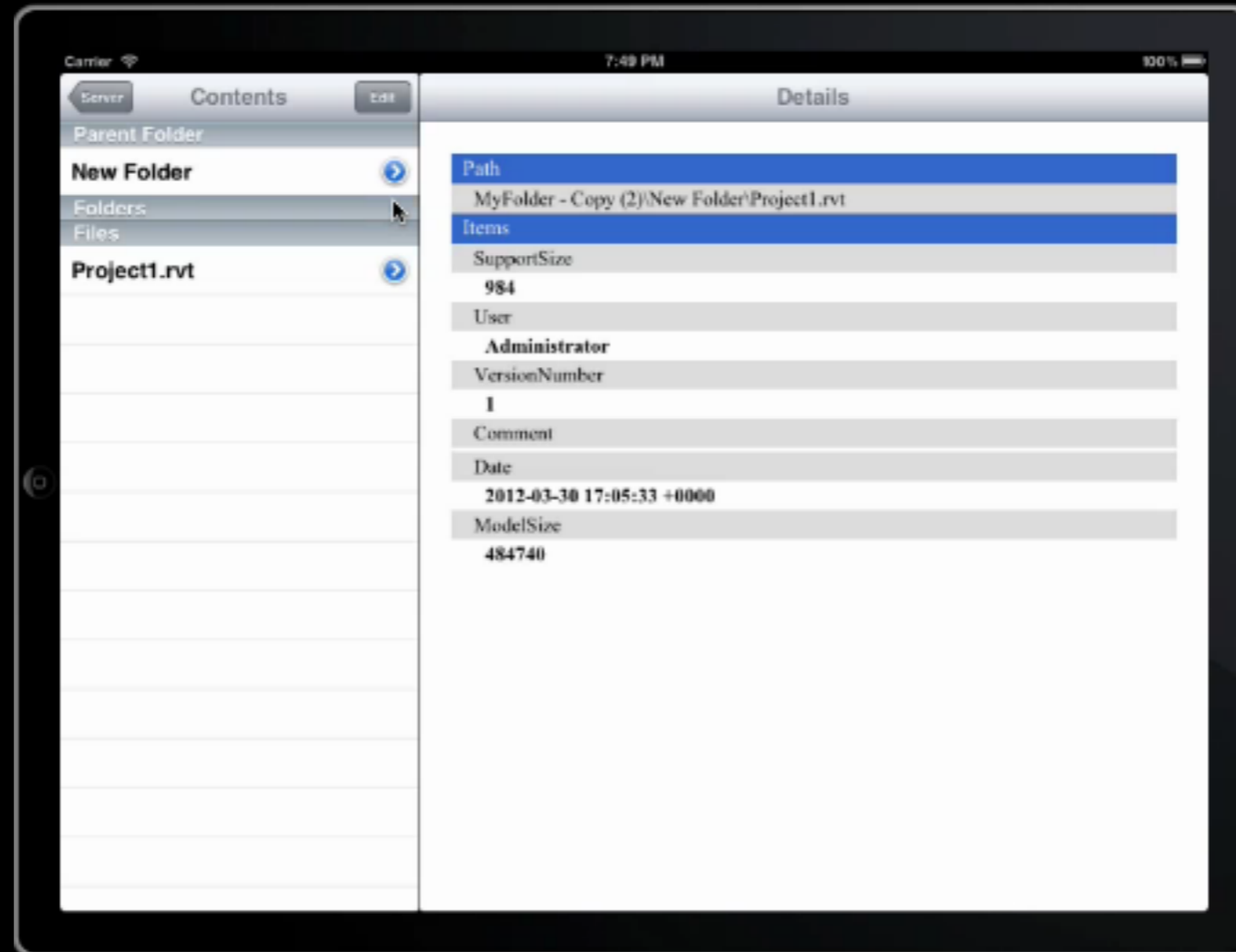
    string result = null;

    using (HttpWebResponse resp = req.GetResponse() as HttpWebResponse)
    {
        StreamReader reader = new StreamReader(resp.GetResponseStream());
        result = reader.ReadToEnd();
    }
    return result;
}
```

# Windows Sample



# iOS Sample



# References

## Revit Server REST API

- Under <Revit SDK>\Revit Server SDK\
  - Revit Server REST API Reference.pdf
  - Getting Started with Revit Server REST API.rtf
  - RevitServerViewer sample

## REST general

- Many resources available out there. e.g.,
  - “A Brief Introduction to REST”  
<http://www.infoq.com/articles/rest-introduction>
  - “REST for the Rest of Us”:  
[http://developer.mindtouch.com/REST/REST for the Rest of Us](http://developer.mindtouch.com/REST/REST%20for%20the%20Rest%20of%20Us)
  - “RESTful Web services: The Basics”  
<https://www.ibm.com/developerworks/webservices/library/ws-restful/>
  - [http://en.wikipedia.org/wiki/Representational state transfer](http://en.wikipedia.org/wiki/Representational_state_transfer)



# Summary

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# Q&A

Any questions?

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