



The future runs on System z

IBM CICS Transaction Server for z/OS V4.1

Web 2.0



Agenda

- **What is Web 2.0?**
 - Concepts
 - RESTful Services
 - Applicability to CICS
- **What is an Atom Feed?**
 - Atom Syndication Format
 - Atom Publishing Protocol
- **Resource definitions**
 - URIMAP
 - ATOMSERVICE
 - TSQ, File and Service Routine support
 - Configuration file
 - SPI
- **Application Programming Interface**
 - EXEC CICS
 - JCICS
- **Security**
- **Monitoring and Statistics**
- **Summary**

Web 2.0 Definitions

- **Google:**

- A perceived ongoing transition of the World Wide Web from a collection of websites to a full-fledged computing platform serving web applications to end user. Ultimately Web 2.0 services are expected to replace desktop computing applications for many purposes.

- **Tim O'Reilly (the person who coined the term):**

- The business revolution in the computer industry caused by the move to the Internet as platform, and an attempt to understand the rules for success on that new platform.

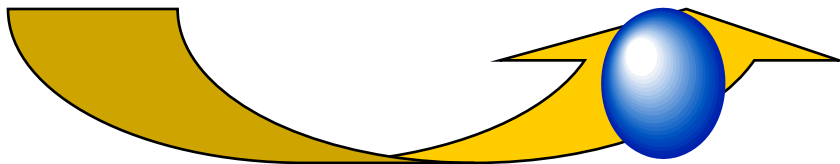
- **Tim O'Reilly**

- A true Web 2.0 application is one that gets better the more people use it.

Web 2.0 Progression

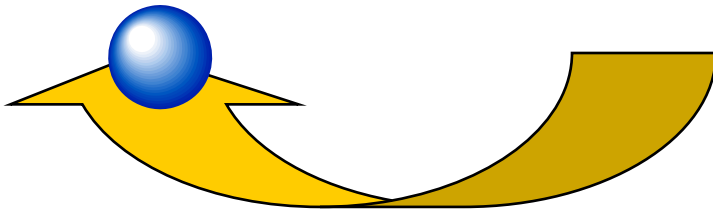
Client/User

Server



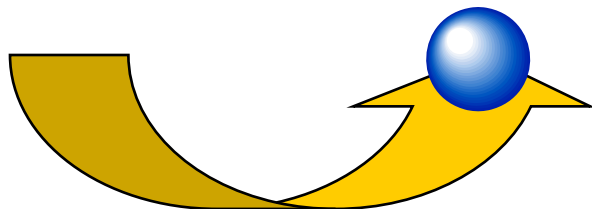
Mainframe computing

“Dumb” green screen clients
Omnipotent big mainframe servers



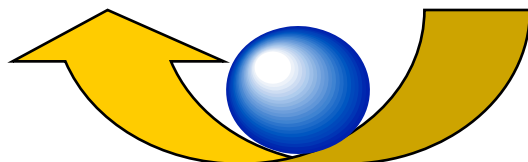
Client-server computing

“Smart” Personal Computer clients
Simple file and information servers



Web (1.0) computing

Light Web Browser clients
Rich application and information servers



Web 2.0 computing

Rich Internet Application clients
Lighter application and information servers

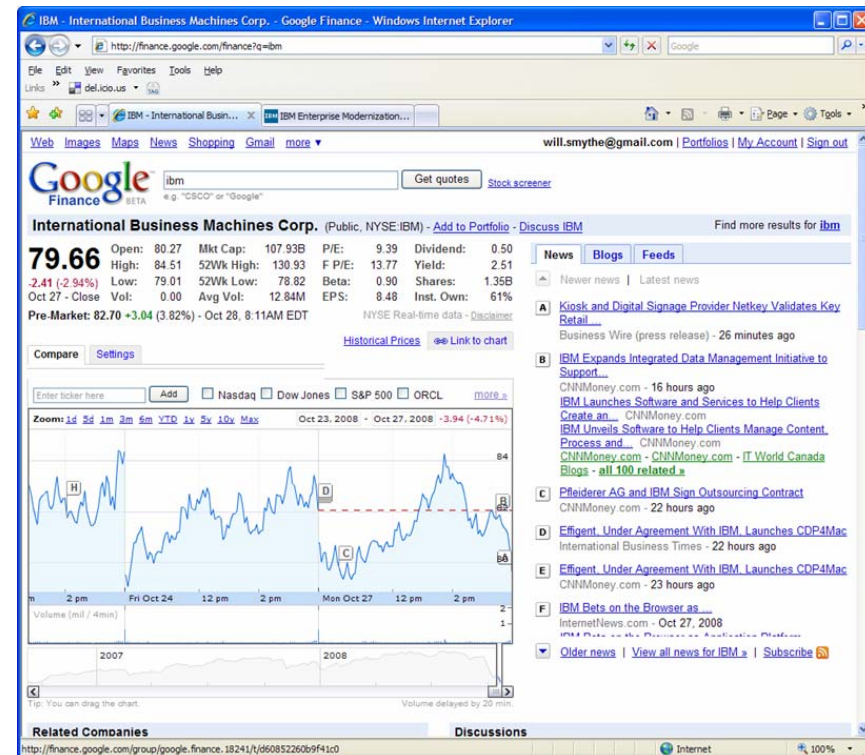
Web 2.0: Philosophy – not just Technology

- **An important trend in delivering software applications**
- **An enabler for richer web applications**
 - New business models
 - Peer-to-peer user participation
 - New technologies
 - Interactive filtering, presentation, data entry
- **A combination of core technology components**
 - Rich user experience (maps, grids, animation, D&D, etc)
 - Loose-coupling, composite applications via reuse and “mash-ups”
 - Technologies (SOAP, REST, AJAX, JSON, ATOM, Java, PHP, Dojo, Ruby, Python, Perl, etc)



Web 2.0 Application Characteristics

- Rich user experience with minimal page transitions
- Dynamic content
- Data asynchronously retrieved via REST or SOAP service calls
- Client-side validation
- User encouraged to add value
- Simplified user interface
- Integration of relevant data from multiple sources



RESTful Interfaces

- **Representational State Transfer**

- Nouns (URLs) indicate what is being worked on
- Verbs (GET, PUT, POST, DELETE) indicate the action to be performed (List, Create, Read, Update, Delete)

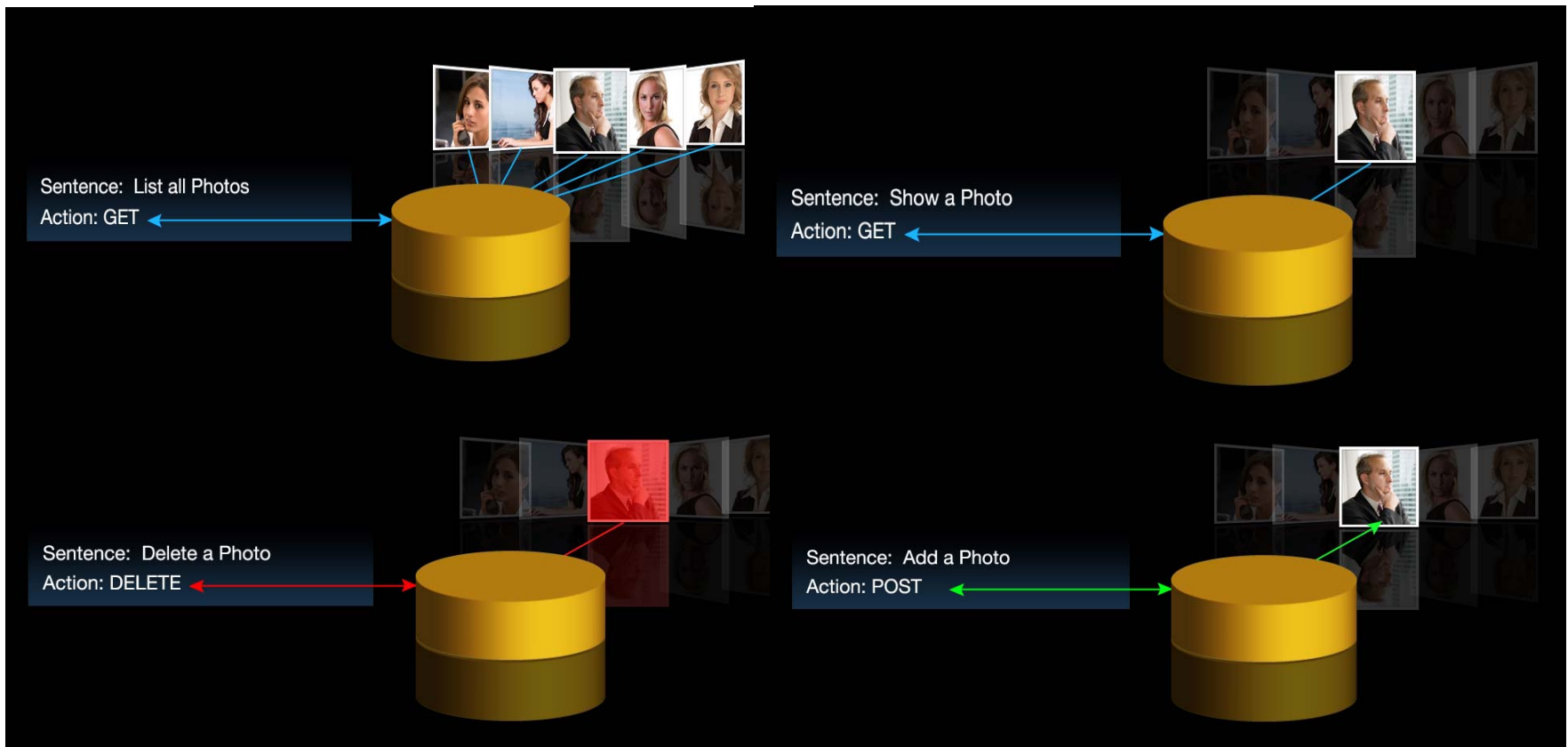
- **Format of results is not defined**

- Popular formats of returned data are XML and JSON

RESTful Interfaces...

A RESTful Web service is formed like a sentence – it simplifies how developers access services

- Verb = HTTP Action (GET, POST, PUT, DELETE)
- Noun = the URI of the Service (the document)
- Adjective = MIME type of the resulting document



REST Simple Sample

- **Request**



```
GET /mortgage/231677 HTTP/1.1
Host: www.example.com
Accept-Language: en
Charset: UTF-8
```

- **Response**

or



```
HTTP/1.1 200 OK
Language: en_us
Charset: UTF-8
Content-Type: text/json
{"principle":"238000","rate":"3.5","type":"5/1 ARM"}
```

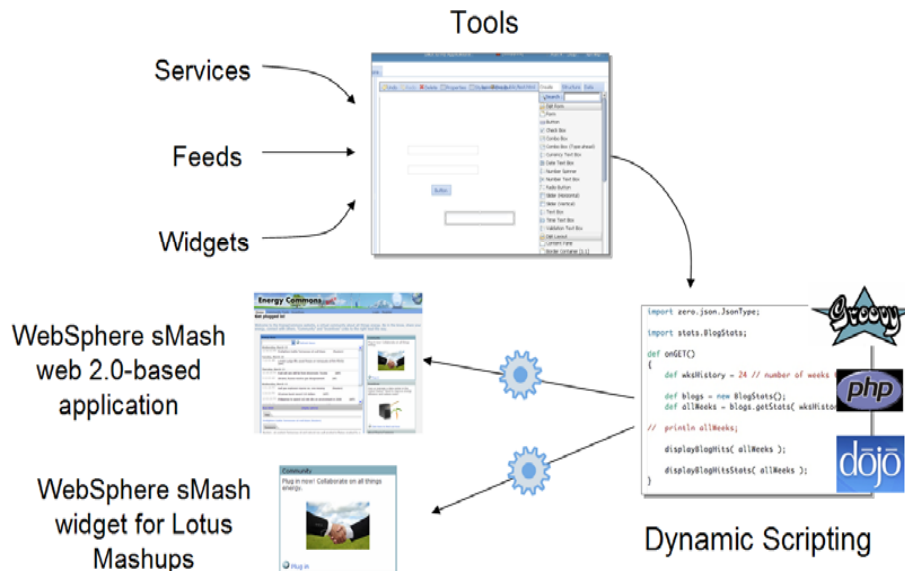


```
HTTP/1.1 200 OK
Language: en_us
Charset: UTF-8
Content-Type: text/xml
<mortgage><principle>238000</principle><rate>3.5</rate><type>5/1 ARM</type></mortgage>
```

WebSphere sMash for quickly delivering Web 2.0 applications

WebSphere sMash

WebSphere sMash for web 2.0-based application based on situational needs



Improves developer productivity and efficiency through the support of dynamic scripting languages

Leverages Web 2.0 technologies for service invocation, service composition and data interchange

Visual tools for developers to build Widgets for use in Lotus Mashups

What does this mean to CICS?

■ **CICS and Web 2.0**

- Enable CICS applications in Mashups
- Enable CICS applications to be Web Feeds
- Build RESTful access to CICS applications
 - CICS system management RESTful API

What is an Atom Feed?

- **Atom feeds are the basis for other Web 2.0 technology**

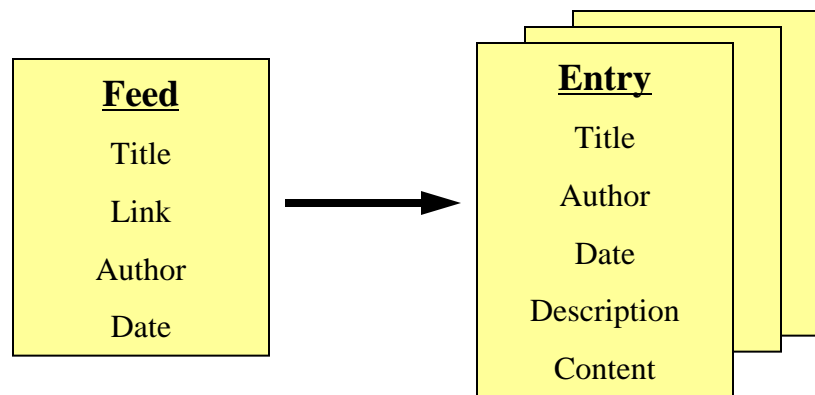
- **What is an Atom Feed?**
 - Protocol and XML format for content publishing
 - Provide XML based feed of updated content
 - Process is known as syndicating a feed
 - Follow-on to Really Simple Syndication (RSS)
 - Simple publish/subscribe implementation
 - Polling model

 - Described by two Internet Request for Comments
 - The Atom Syndication Format
 - Targeted at producing feeds
 - RFC4287: (Dec 2005) <http://www.ietf.org/rfc/rfc4287.txt>

 - The Atom Publishing Protocol
 - Targeted to creating and updating resources
 - RFC5023: (Oct 2007) <http://www.ietf.org/rfc/rfc5023.txt>

What is The Atom Syndication Format?

- **Atom Feed Document is a representation of a feed**
 - XML based document format
 - Describes a list of related information known as a feed
 - Has metadata about some or all of the feed items
 - Feeds are composed of a number of items, called entries
- **Atom Entry Document represents one Atom Entry**
 - Each entry has attached metadata

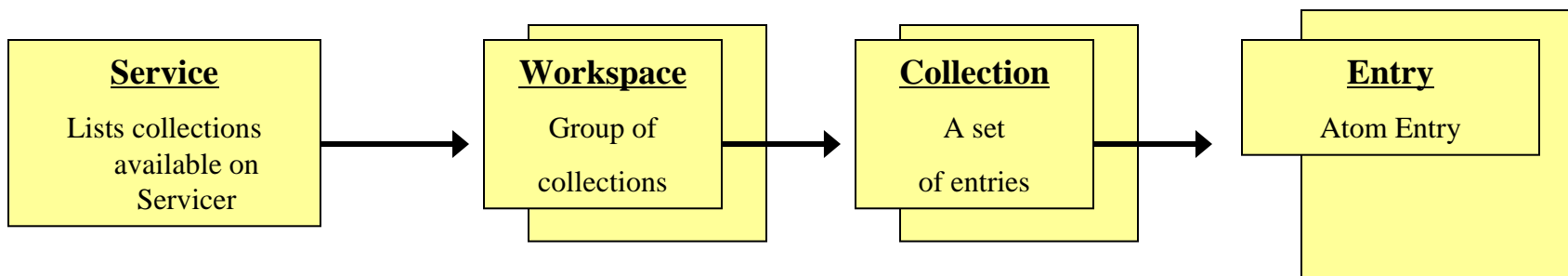


What is The Atom Syndication Format?

```
<?xml version="1.0" encoding="utf-8"?>
  <entry xmlns="http://www.w3.org/2005/Atom" xmlns:app="http://www.w3.org/2007/app">
    <generator uri="http://www.ibm.com/cics/" version="6.6.0">CICS Transaction Server Version
    4.1.0</generator>
    <link rel="self" href="http://www.mycics.com:80/web20/myfeed/entry?s=7"/>
    <link rel="edit" href="http://www.mycics.com:80/web20/myfeed/entry?s=7"/>
    <id>tag:http://www.mycics.com/web20/myfeed,2009-01-20:tsqueue:WB20TSQ:7</id>
    <title>This is entry 7</title>
    <summary> Entry 7 is about something to do with feeds... </summary>
    <category term="Test Feeds"/>
    <rights>Copyright (c) 2009, Joe Bloggs</rights> <published>2008-12-02T15:41:00</published>
    <author>
      <name>Joe Bloggs</name> <email>JBloggs@example.com</email>
      <uri>http://www.example.com/JBloggs/</uri>
    </author>
    <contributor> <name>John Doe</name> </contributor>
    <app:edited>2009-02-02T16:29:36+00:00</app:edited>
    <updated>2009-02-02T16:29:36+00:00</updated>
    <content type="text/xml">
      <SAMPBIND xmlns="http://www.ibm.com/xmlns/prod/cics/atom/bindfile/sampbind">
        <content> Here is some content for entry 7 </content>
      </SAMPBIND >
    </content>
  </entry>
```

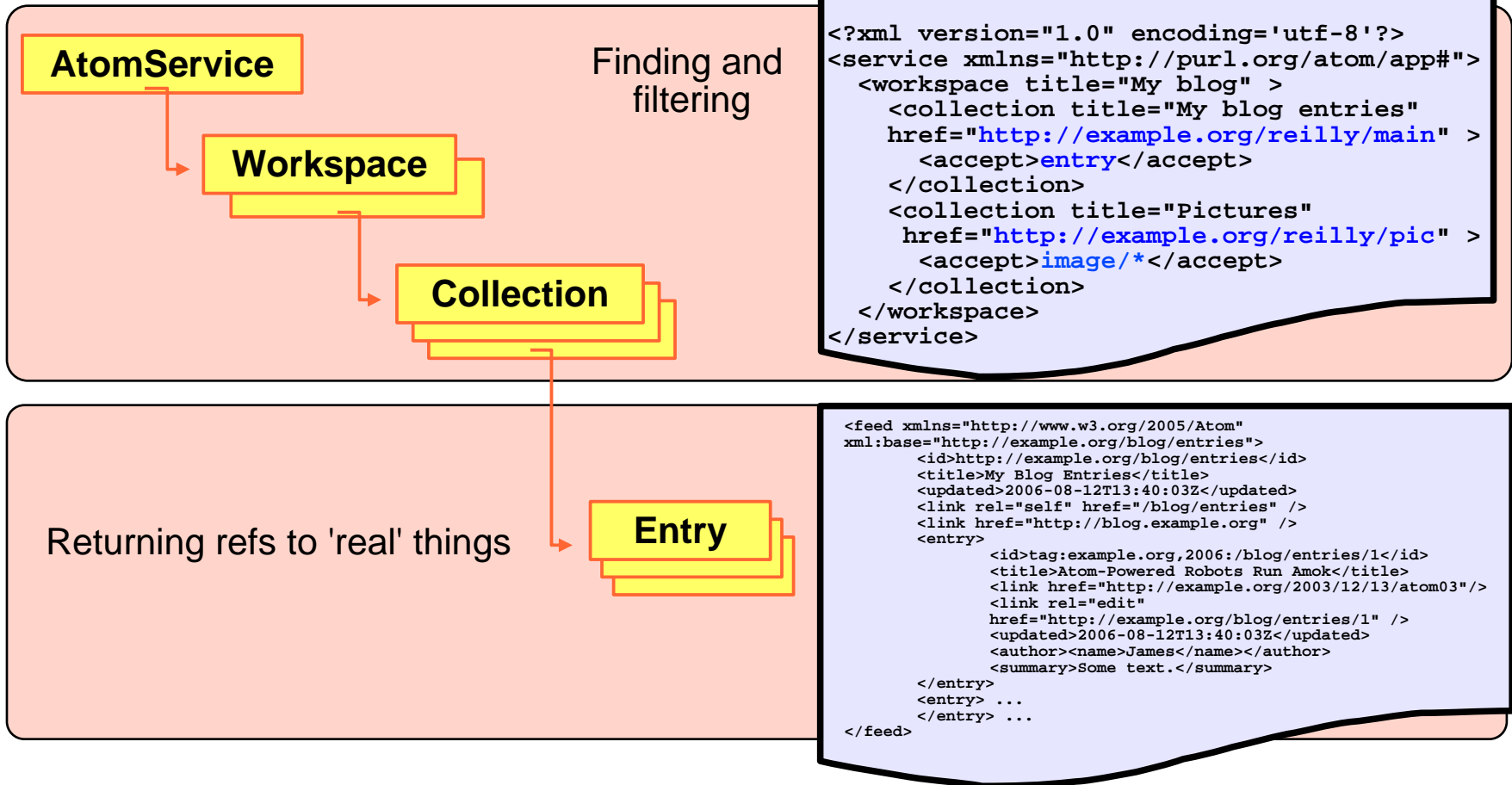
What is The Atom Publishing Protocol?

- **A protocol for publishing and editing Web data using HTTP**
 - Based on the Atom Syndication formats
 - Uses HTTP methods to manipulate data
 - GET: Retrieves a representation of an entry
 - POST: Create a new entry
 - PUT: Edit an entry
 - DELETE: Removes a entry



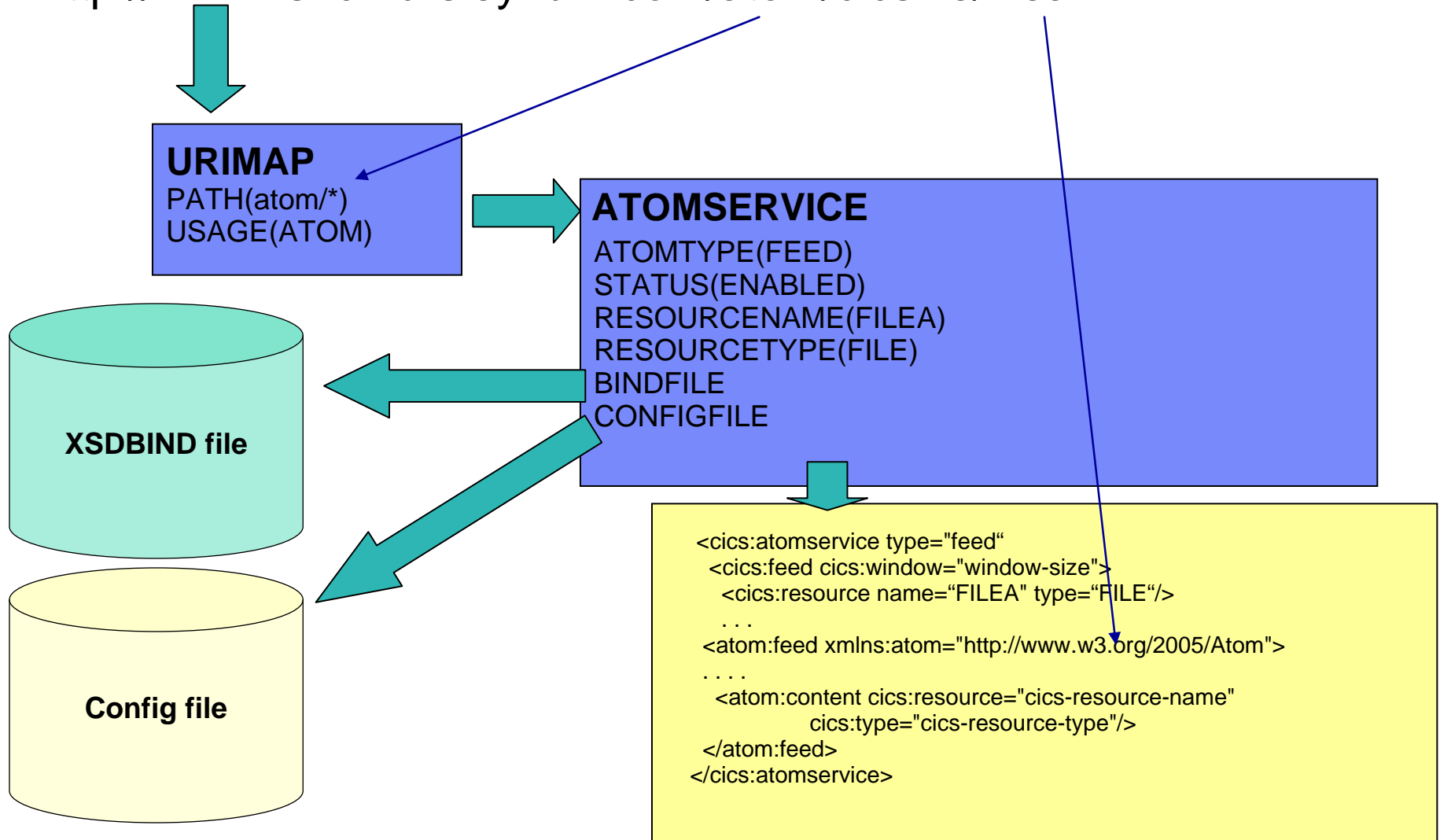
Atom Publishing Protocol

Service Document



Resource Definitions for Atom Feeds

<http://winmvs2c.hursley.ibm.com/atom/cicsfile/filea>



Resource Definitions for Atom Feeds

- **Generate Atom documents from a CICS resource**
 - URIMAP definition
 - ATOMSERVICE definition
 - Atom Configuration file
 - XML binding to describe the CICS resource format

- **URIMAP resource definition changes**
 - USAGE (ATOM)

 - ATOMSERVICE (name)

Resource Definition: ATOMSERVICE

```
>>-ATOMSERVICE ( name ) --GROUP ( groupname ) --+-----+---->
                                     '-DESCRIPTION( text ) -'
    .-STATUS ( ENABLED ) -- .
>--+-----+---CONFIGFILE ( name ) ----->
    '-STATUS ( DISABLED ) -'

    .- ATOMTYPE ( FEED ) ----- .
>--+-----+---| Resource attributes | -+-----><
    | '-ATOMTYPE ( COLLECTION ) - ' |
    +-ATOMTYPE ( SERVICE ) -----+
    '-ATOMTYPE ( CATEGORY ) -----'
```

Resource attributes

```
| -- RESOURCENAME ( name ) ----->
>--+--RESOURCETYPE ( FILE ) --BINDFILE ( name ) -----+-----|
    +-RESOURCETYPE ( PROGRAM ) --+-----+--+
    |                               '-BINDFILE ( name ) - ' |
    '-RESOURCETYPE ( TSQUEUE ) --BINDFILE ( name ) -----'
```

Resource Definitions for Atom Feeds

▪ **ATOM Configuration File**

- Specify the CICS resource attributes of the feed
- `<cics:atomservice> type=typevalue>`
 - The root element for an Atom configuration file and the type of feed
 - Feed, collection, service, category
- `<cics:feed cics:window="window-size">`
 - Describe the CICS resource that is to be published as a feed
 - Specify the number of entries that CICS is to return in each feed document
- `<cics:authority>` element in the `<cics:feed>` element
 - Company name that owns the resource
 - Date on which the company acquired ownership
- `<cics:resource> name="cics-resource-name" type="cics-resource-type">`
 - Specify the name and type of the CICS resource that is to be published
 - Tsqueue, file or program
- `<cics:bind>` element in the `<cics:resource>` element
 - The root element of the XML binding file
- `<cics:fieldnames>`
 - Identify the CICS resource field names that provide items of metadata

Resource Definitions for Atom Feeds

■ XML Binding

– CICS Utility DFHLS2SC

- Generates an XML schema and an XML binding from a language structure
- The XML binding will describe the record layout of the CICS resource used as a feed

Systems Programmer Interface for Atom Feeds

- **CREATE ATOMSERVICE**
- **DISCARD ATOMSERVICE**
- **INQUIRE ATOMSERVICE**
- **SET ATOMSERVICE**
- **INQUIRE URIMAP**

- **New CW2A Transaction ID**
 - Alias transaction for Atom feeds

Application Programming Interface

■ EXEC CICS BIF DIGEST

- Calculates the SHA-1 digest of a string of data
- Used as a strong entity tag (ETag) on an HTTP PUT

■ EXEC CICS READ QUERYPARM

- Reads name and value pairs from a query string in a URL
- Processes query string data for all HTTP methods
 - GET, POST, PUT, and DELETE
- Browsing capability
 - WEB STARTBROWSE QUERYPARM
 - WEB READNEXT QUERYPARM
 - WEB ENDBROWSE QUERYPARM

Application Programming Interface...

■ EXEC CICS ASKTIME

- ABSTIME value returned is:
 - The system time-of-day clock
 - Adjusted for leap seconds and the local time zone offset
 - Truncated to the millisecond
 - No longer rounded to 1/100 of a second

■ EXEC CICS CONVERTTIME

- Recognizes date and time stamp strings in the RFC 3339 format
 - e.g. 2003-04-01T10:01:02.498Z

■ EXEC CICS FORMATTIME

- STRINGFORMAT option now allows 'RFC3339'
- New MILLISECOND option

Application Programming Interface...

■ **New Java classes available**

- `com.ibm.cics.server.HttpRequest.getQueryParam()`
- `com.ibm.cics.server.HttpRequest.startBrowseQueryParam()`
- `com.ibm.cics.server.HttpRequest.getNextQueryParam()`
- `com.ibm.cics.server.HttpRequest.endBrowseQueryParam()`

Security

■ **Resource Security**

- Uses access resource profiles
 - RCICSRES class or WCICSRES grouping class
 - You must apply a prefix of ATOMSERVICE to the resource name
 - e.g. ATOMSERVICE.atom1

■ **Command Security**

- Uses the ATOMSERVICE resource
 - CCICSCMD class or VCICSCMD grouping class

■ **CW2A Transaction**

- Default alias transaction for Atom feeds
 - Category 2 transaction
 - Defined with RESSEC(YES) and CMDSEC(YES)
 - Defined in resource definition group DFHWEB2

Statistics

■ **ATOMSERVICE**

– Mapped by the DFHW2RDS DSECT

- ATOMSERVICE name
- XML binding file
- Atom configuration file
- ATOMSERVICE resource type
- ATOMSERVICE resource name
- ATOMSERVICE reference count and reference disabled count
- Number of GETs and POSTs for Feeds
- Number of GETs, PUTs, and DELETES for Entries
- Resource signature information

– DFH0STAT / DFHSTUP

- New ATOMSERVICE Report

Statistics

■ URIMAP

- Mapped by the DFHWBRDS DSECT
 - Usage Atom
 - ATOMSERVICE name
- DFH0STAT / DFHSTUP
 - Display new URIMAP fields that support Atom

Monitoring

- **Changed performance class group, DFHWEBB**
 - New fields
 - 408 (TYPE-A, 'BFDGSTCT', 4 BYTES)
 - Built-in function (BIF) DIGEST requests
 - 409 (TYPE-A, 'BFTOTCT', 4 BYTES)
 - Total Built-in function (BIF) requests

Summary

- **What is Web 2.0?**
 - What is an Atom Feed?
 - Atom Syndication Format
 - Atom Publishing Protocol
- **Resource definitions**
 - URIMAP
 - ATOMSERVICE
 - TSQ, File and Service Routine support
 - Configuration file
 - SPI
- **Application Programming Interface**
 - EXEC CICS
 - JCICS
- **Security**
- **Monitoring and Statistics**