OWS-6 Issues and Lessons Learned

Dr. David Burggraf
Vice President
Galdos Systems Inc

Hans Schoebach
Senior Software Architect
Galdos Systems Inc

galdos systems inc

June 16, 2009

Outline

Issues addressed in OWS-6

Change proposals
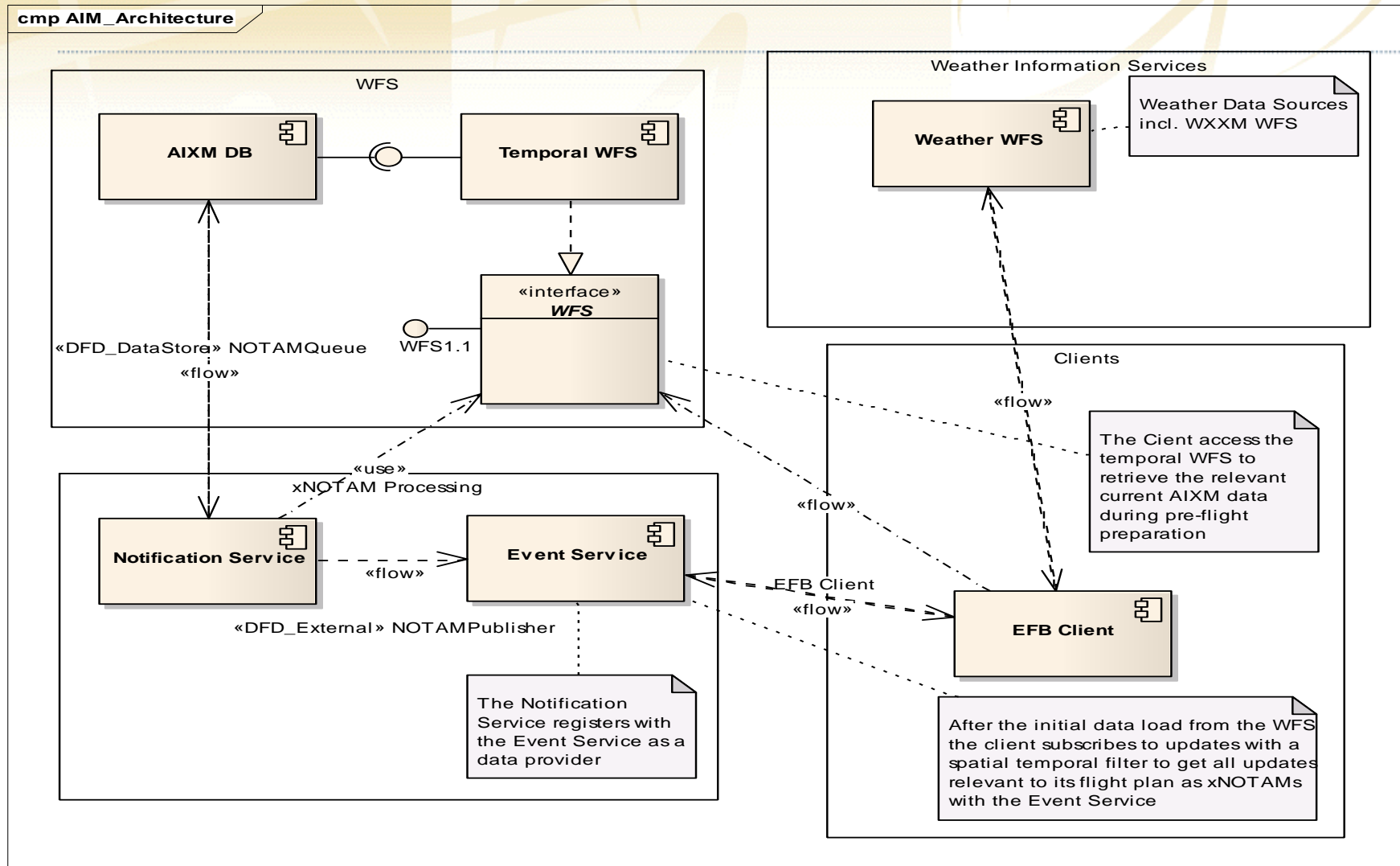
Summary and future work

Issues Identified in OWS-6

Hans Schoebach
Senior Software Architect
Galdos Systems Inc

June 16, 2009

Architecture Overview

Data Issues

- Automated data validation is critical
- Excessive overhead with SOAP/WS-Reliable Messaging/Notification (e.g bandwidth, cpu, memory)
- Feature versioning--addressed using a temporal metadata property (time of update)
- Time indeterminate values not sufficient (need "estimated", "+infinity", etc)

galdos

WFS/Filter Issues

- Identified changes to GML and FE to accommodate for the uncertainty in the end time periods of aviation data changes
  - This has been addressed in a GML change request
- Lack of support for certain queries such as: airports with 3 or more runways
- OGC Filter supports spatial and temporal filters, but has limited property filter support
  - E.g. Get all Airports
    - which is operational within flight duration (temporal)
    - Within a flight corridor (spatial)
    - with runway length > 1000m (property filter)

      Features are still returned with too much irrelevant information (metadata, etc)

galdos

Client Issues

- Clients need GML and AIXM parser tools

- Overhead of Xlink:href support

- Reliable messaging and connection issues in support of push-based event alert mechanism

- Issues of pushing notifications to clients that have dynamic IP addresses

- Issues of pushing notifications to clients behind a firewall

galdos
systems inc

Weather Issues

- Demonstrated integration of timely weather data
  - No standardized styling rules for AIXM/WXXM (e.g. SLD)
  - Needed more WXXM data to support AIM scenario

Change Proposals and Workarounds

Dr. David Burggraf
Vice President
Galdos Systems Inc

June 16, 2009

Metadata handling—enable remote references

```
<aixm:AirportHeliportUsage gml:id="VID2678448">
  ...
  <aixm:timeSlice>
   <aixm:AirportHeliportUsageTimeSlice gml:id="VID2678449">

   ...
    <aixm:timeSliceMetadata>
     <gmd:MD_Metadata>

     ...
     <gmd:dateStamp>
      <gco:DateTime>2009-01-23T10:10:00</gco:DateTime>
     </gmd:dateStamp>
     <gmd:identificationInfo>
      <gmd:MD_DataIdentification>
       <gmd:citation>
        <gmd:CI_Citation>
         <gmd:title>
          <gco:CharacterString/>
         </gmd:title>
         <gmd:date/>
        </gmd:CI_Citation>
       </gmd:citation>
      </gmd:MD_DataIdentification>
     </gmd:identificationInfo>
    </gmd:MD_Metadata>
    </aixm:timeSliceMetadata>
   </aixm:AirportHeliportUsageTimeSlice>
  </aixm:timeSlice>
</aixm:AirportHeliportUsage>
```

```
<aixm:AirportHeliportUsage gml:id="VID2678448">
  ...
  <aixm:timeSlice>
   <aixm:AirportHeliportUsageTimeSlice gml:id="VID2678449">

   ...
    <aixm:timeSliceMetadata xlink:href="..." >

   </aixm:AirportHeliportUsageTimeSlice>
  </aixm:timeSlice>
</aixm:AirportHeliportUsage>
```

AIXM Schema Change Request

galdos
systems inc

Indeterminate Temporal Values Change Request

Extend enumerated values in GML & ISO 19108 as shown in **bold**

```
<simpleType name="TimeIndeterminateValueType">
    ...
    <restriction base="string">
      <enumeration value="after"/>
      <enumeration value="before"/>
      <enumeration value="now"/>
      <enumeration value="unknown"/>
      <enumeration value="estimated"/>
      <enumeration value="+infinity"/>
      <enumeration value="-infinity"/>
    </restriction>
</simpleType>
```

error tolerance may be larger than is customary/expected

actual temporal position is far in the future and is not enumerable

actual temporal position is far in the past and is not enumerable

OGC Filter Encoding 2.0 Change Proposal

Submitted by Snowflake:

- Add a convenient temporal operator 'any interaction'

  `<fes:TemporalOperator name="AnyInteracts"/>`

- Equivalent to:

  And(

  NOT Before: (i.e. end time < start time)

  NOT Meets: (i.e. end time = start time)

  NOT After: (i.e. start time > end time)
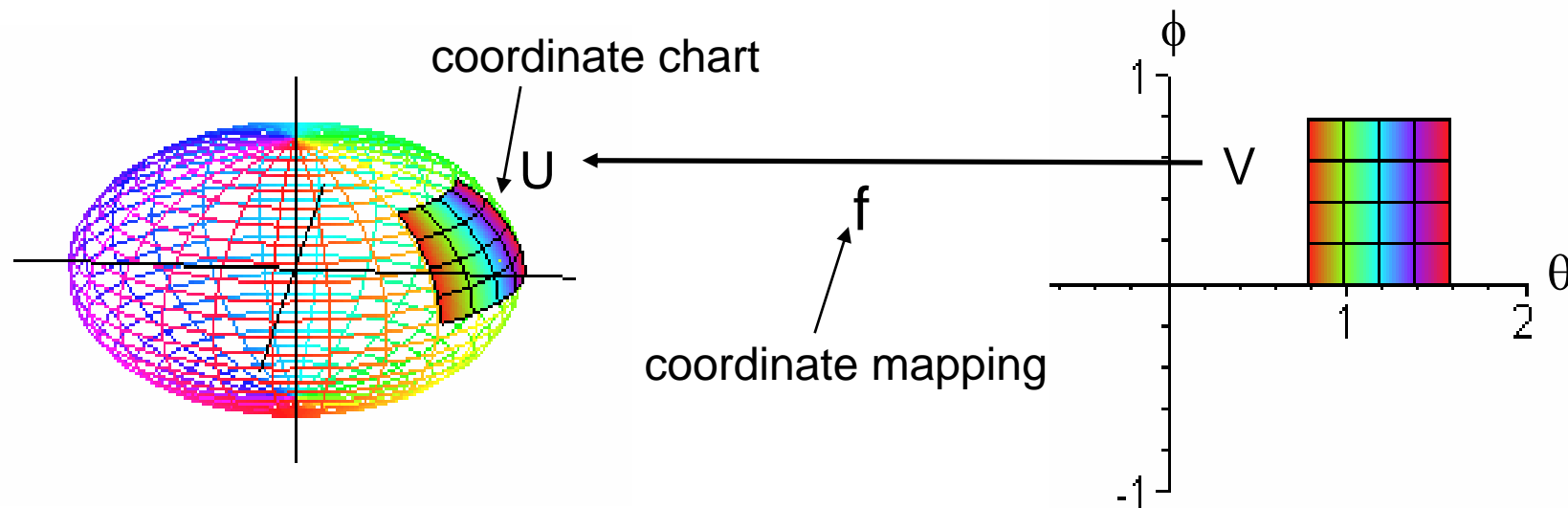
  NOT MetBy: (i.e. start time = end time)

)

galdos

Coordinate Reference System (CRS) Considerations

First a quick overview:

A CRS relates a coordinate system to the earth by a datum

M (earth model)   Coordinate System

A geodetic datum consists of an ellipsoid model and a prime meridian. The equator and prime meridian correspond to coordinate system axes.
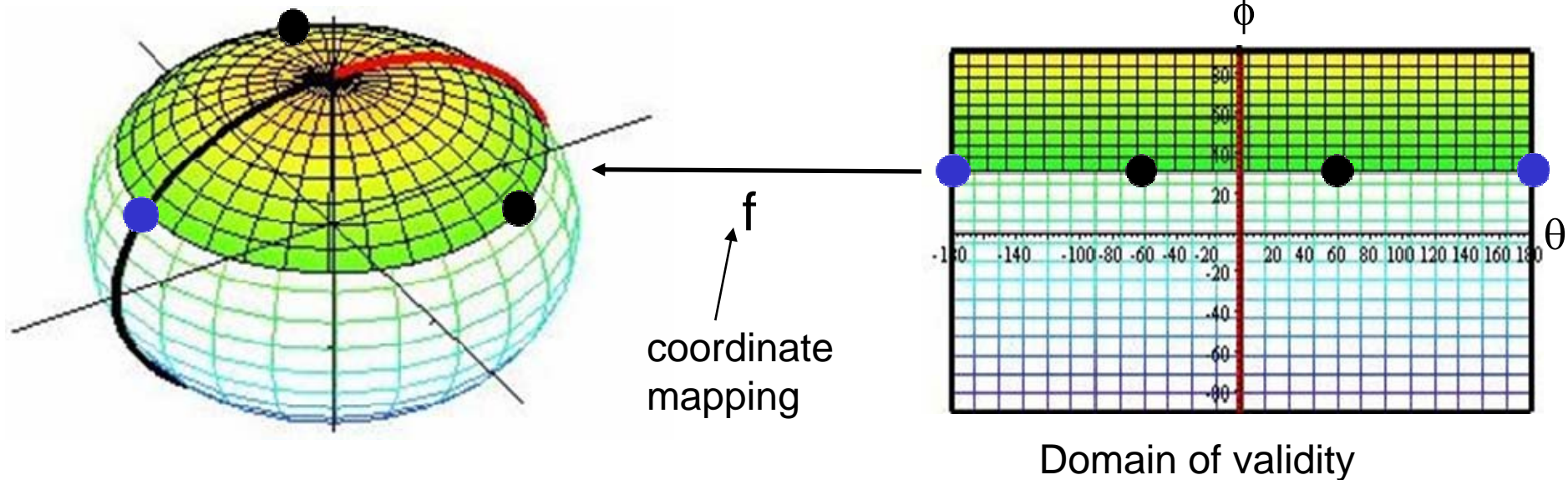
galdos
systems inc.

Coordinate Reference System (CRS) Considerations

A geodetic CRS, e.g. OGC::CRS84, relates a (lon,lat) ellipsoidal coordinate system to the earth

M (earth model)

Ellipsoidal Coordinate System

f

coordinate mapping

Domain of validity

A line of constant longitude corresponds to a meridian
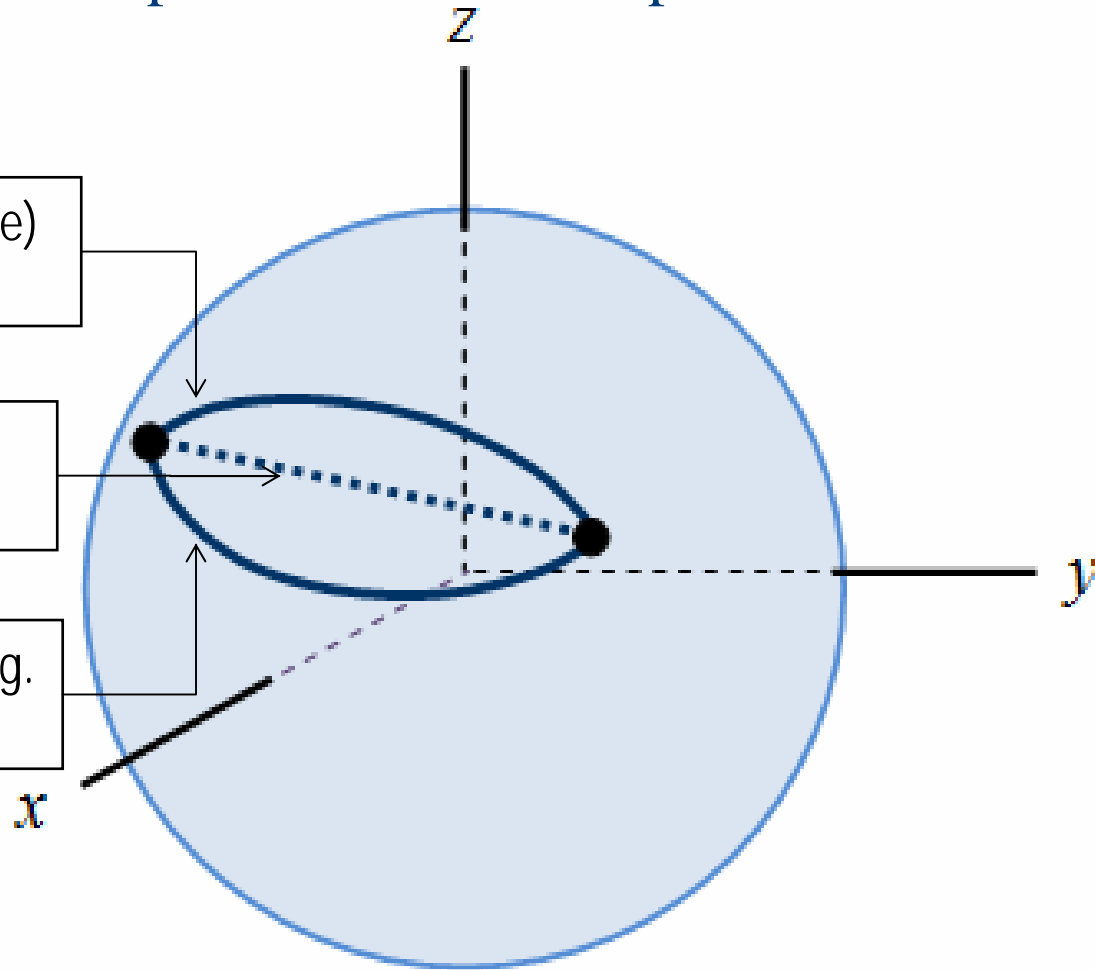A line of constant latitude corresponds to a parallel

Rhumb lines

galdos

Coordinate Reference System (CRS) Considerations

Two fixed end points, several possible curve interpolations

Geodesic curve (i.e. great circle) interpolation (i.e. GML Geodesic)

Geocentric CRS interpolation (e.g. EPSG::4978)
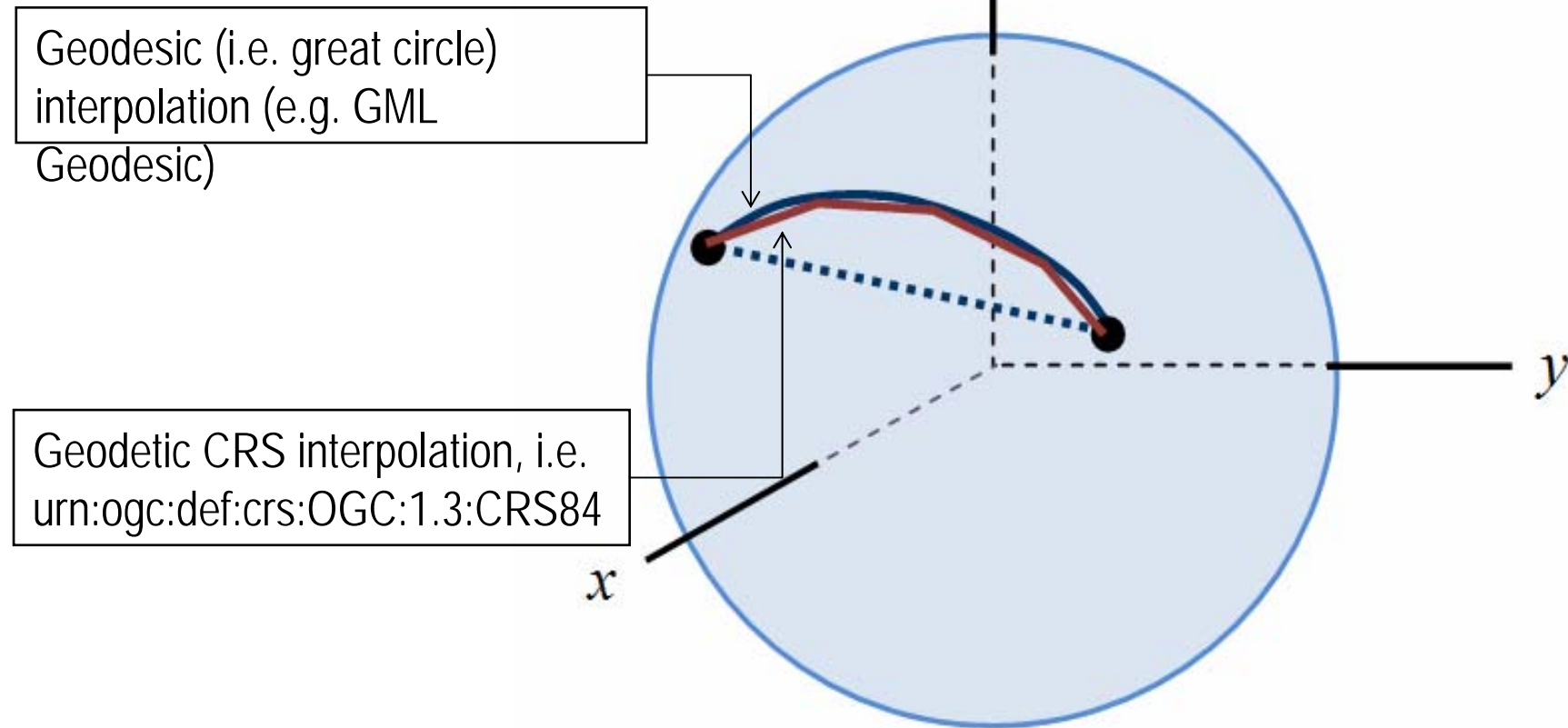
Geodetic CRS interpolation (e.g. OGC::CRS84 or EPSG::4326)

galdos
systems inc.

Coordinate Reference System (CRS) Considerations

Approximating a geodesic curve using OGC::CRS84 interpolated segments

Geodesic (i.e. great circle) interpolation (e.g. GML Geodesic)

Geodetic CRS interpolation, i.e. urn:ogc:def:crs:OGC:1.3:CRS84

galdos
systems inc

Summary and Future Work

Dr. David Burggraf
Vice President
Galdos Systems Inc

Hans Schoebach
Senior Software Architect
Galdos Systems Inc

galdos
systems inc

June 16, 2009

- **Metadata handling**
  - Metadata vs data (Roles of registry and WFS)
  - Inline vs remote

- **Event notification architecture**
  - Other data sources (WXXM)
  - Delivery Protocols (Push/Pull)
  - Registration & Subscription Lifecycle Management
  - Alerts vs feature events
  - Change detection: WFS-T vs Oracle triggers
  - Matching between events and subscriptions

galdos
systems inc

- **Data Propagation**
  - Protocols
  - Delivery method
- **Understanding/improving metrics for system**
  - Performance of spatio-temporal queries
- **Further client development**
  - GML and AIXM SDK
  - KML aware
- **Incorporating elements of existing infrastructure (e.g. SWIM) via SOA**

galdos