Collaborative Modeling for Interoperability Standards

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Overview

- **The Value of Modeling in Standards**

- **Collaborative Modeling**
  - What does it involve?
  - Examples in Utilities, Geospatial and beyond…

- **Challenges, Tools and Techniques**
  - Team-based modeling: What are the challenges?
  - Dealing with performance and concurrency
  - Extracting value: communicating the model

- **Q & A**

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The Value of Modeling in Standards

- **Manage complexity**

- **Plan and mitigate risk**

- **Facilitate communication**

Modeling Open Standards: UML
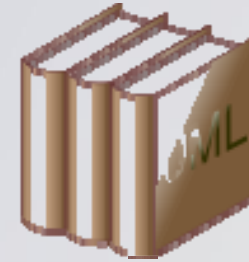
- **UML: Unified Modeling Language**
  - *"…provide[s] system architects, software engineers, and software developers with tools for analysis, design, and implementation of software based systems as well as for modeling business and similar processes."* – UML Specification

- **Graphical language, not a methodology!**
  - Has syntax rules
  - Profiles provide extensibility

- **Current version: 2.3**
 - First UML spec in 1997
  - Object Management Group (OMG)

- **More Info**
  - UML, OMG: http://www.uml.org, www.omg.org
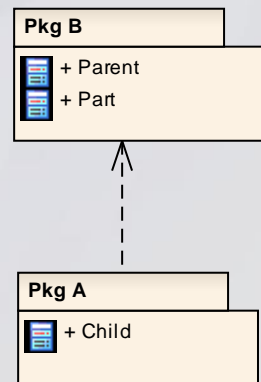 - Sparx Tutorials: http://www.sparxsystems.com/resources

Modeling Open Standards: UML

- **UML supports 14 diagrams to visualize:**
  - Structure (Package, Class, Component etc.)
  - Behavior (Use Case, Activity, State Machine)
  - Interaction (Sequence, Timing etc.)
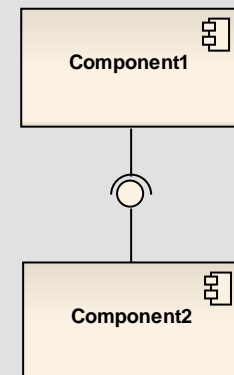
- **UML structural diagrams used for information models:**

Class

Package

Component

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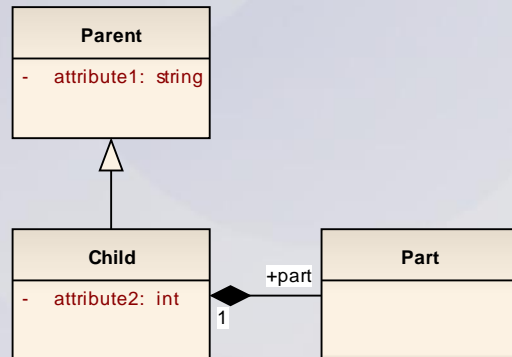
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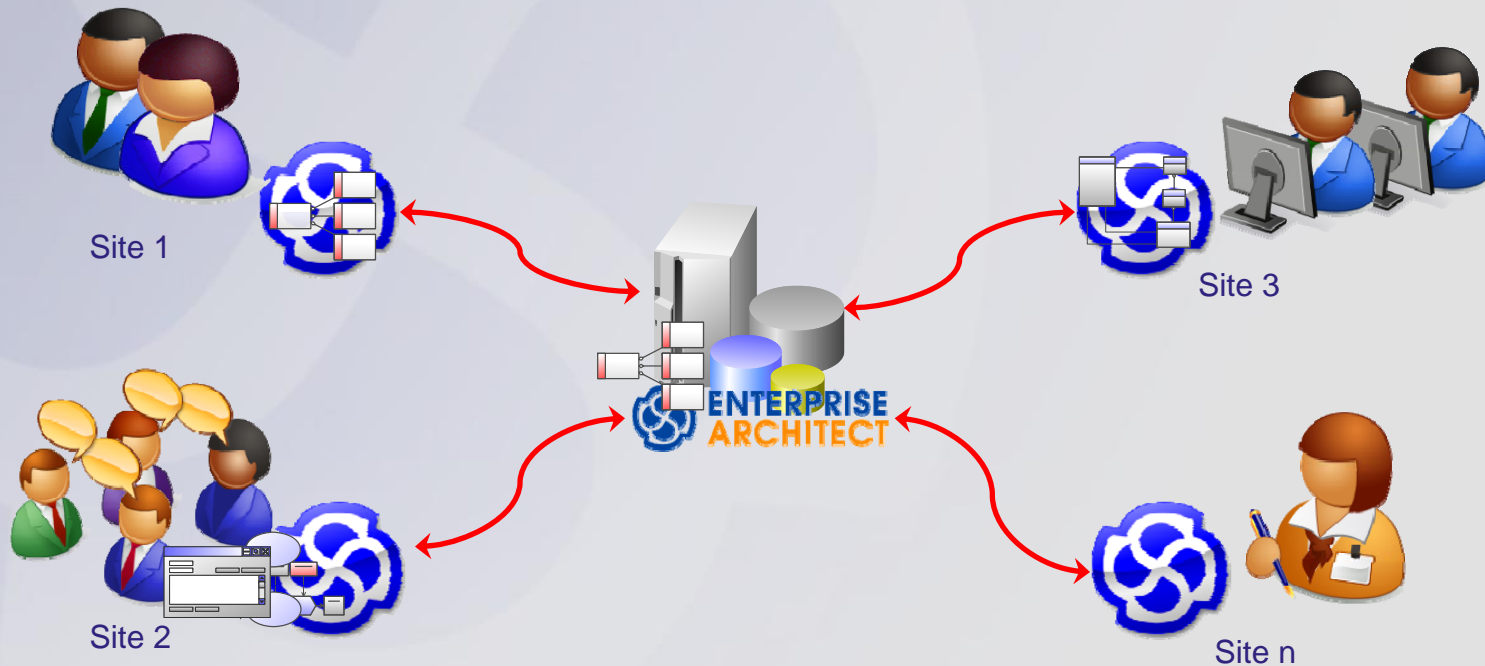# Team based modeling – the challenges

- Widely distributed teams

- Shared development of standards

- Big models and wide scope

- Change control, merging work, revisions etc

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Example of Global Model Deployment
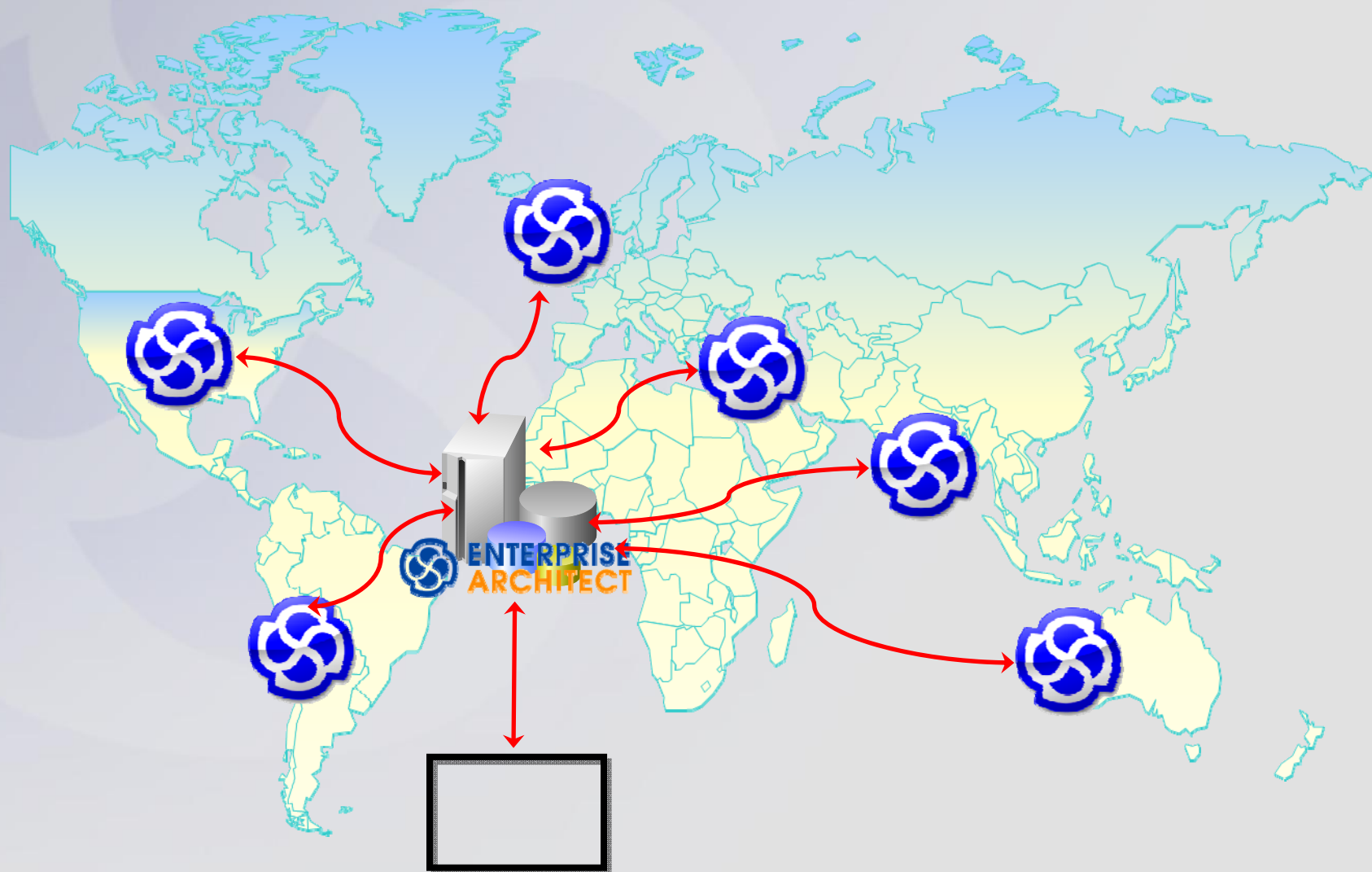
Multi-site Models – How?

- **Ideal Scenario: Single, Shared (Master) Repository**

Site 1

Site 2

Site 3

Site n

- *Assumes good connectivity between each site*

Multi-site Models – How?

- **Alternative Scenario: Local Replicas**

Site 1
Site 2
Site 3
Site n
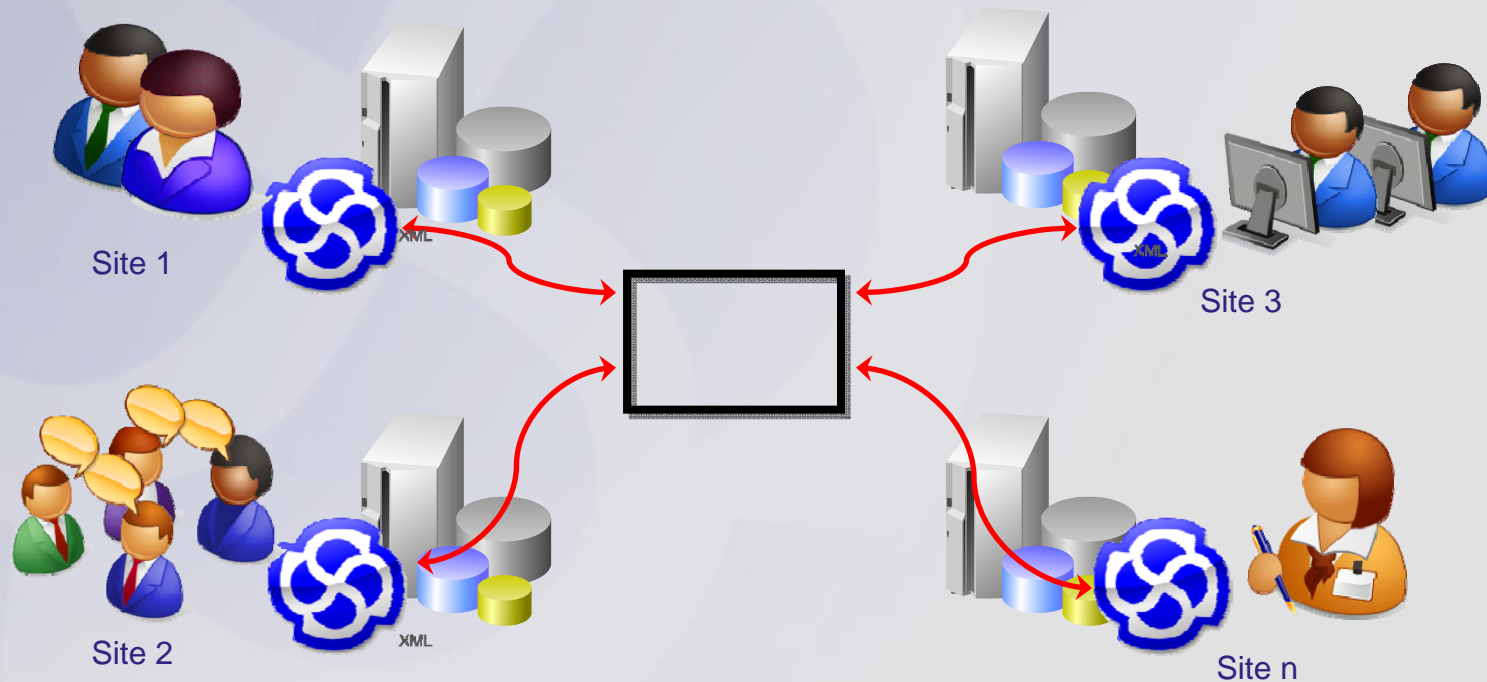
- *Allows broad replication even across slow links*

Collaborative modeling and open standards

Interoperability standards typically:

- Use models and abstractions to:
  - Manage complexity – size and scope
  - Communicate to widely distributed audiences
  - Reduce risk of technology obsolescence

- Use open modeling standards:
  - Often OMG's Unified Modeling Language (UML)
  - For example IEC's Common Information Model (CIM),
  - OGC's Reference Model (ORM)

- Involve many collaborating stakeholders and editors
  - Widely dispersed geographically
  - Numerous and varied member organizations

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Collaborative modeling and open standards

- **Examples:**

  - ISO/TC 211's HMMG (maintains the ISO 19100 models)

  - JRC, INSPIRE

  - GeoSciML

  - International Electrotechnical Commission (IEC) CIM

  - UN/CEFACT's Modeling Methodology (UMM)

  - Many others…

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Performance: Big models, complex info

Information Models can be HUGE!

Complete domain models yield 10,000's of elements!

Need robust, scalable solutions…

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Performance: Big models, complex info

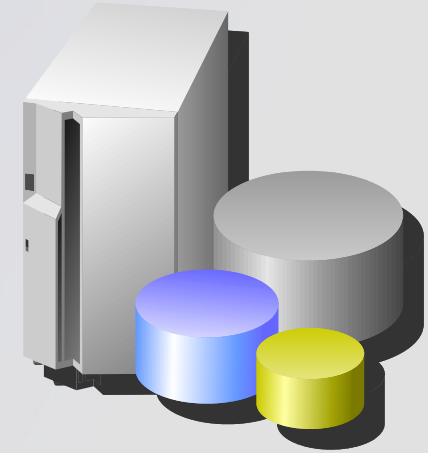- **Use a Database Repository**

  - Robust modeling tools use a DBMS!

  - Supports concurrent users + master view

- **Load on Demand ('Lazy Load')**

  - Only give me *what* I need *when* I need it!

- **Network optimization ('WAN Optimizer')**

  - Widely distributed environment must *reduce the network chatter*

Getting teams connected is a first step, having them work effectively is another matter…

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How to maximize parallel work *SAFELY*

- **Multiple distributed editors**
  - Consider: Who uses the model?
  - For what purpose?
  - Approaches must:
    - Enable **concurrency**
    - *Reduce risk of 'collision'*

- **Managing concurrent access**
  - Role-based Security
  - Version Control procedures

Safe parallel work:
Role-Based Security

- **Shared models, concurrent editors …**
  - Access controls needed!
  - Individual user and group permissions

- **Role-based security:**
  - Require individuals or groups to login to the model repository
  - Restricted editing privileges based on role
  - Locking granularity: View, Package or Element level

Extracting Value: Communicating

- **HTML Output:** Includes model structure, diagrams, project info for online distribution (requires browser only, not model editor)

- Model navigation via project explorer frame and diagram hot-spots

- Automate generation process via API to update online doco regularly (HTML output not synched with model data in real-time)

- Numerous organizations publish standards models in HTML form:

  - ISO/TC 211: http://www.isotc211.org/hmmg/HTML
  - GIEM/Govdex: https://www.govdex.gov.au/pub/
  - DMV: http://www.dmv.virginia.gov/csi/eahtml/index.htm
  - Datex II: http://www.datex2.eu/?q=node/23
  - XML and RTF outputs also possible.

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Thank You