



XML Hierarchical Database for Missions and Technologies

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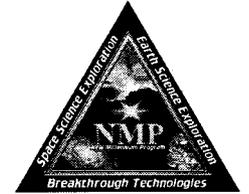
Topics



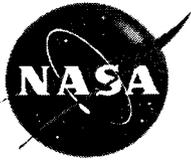
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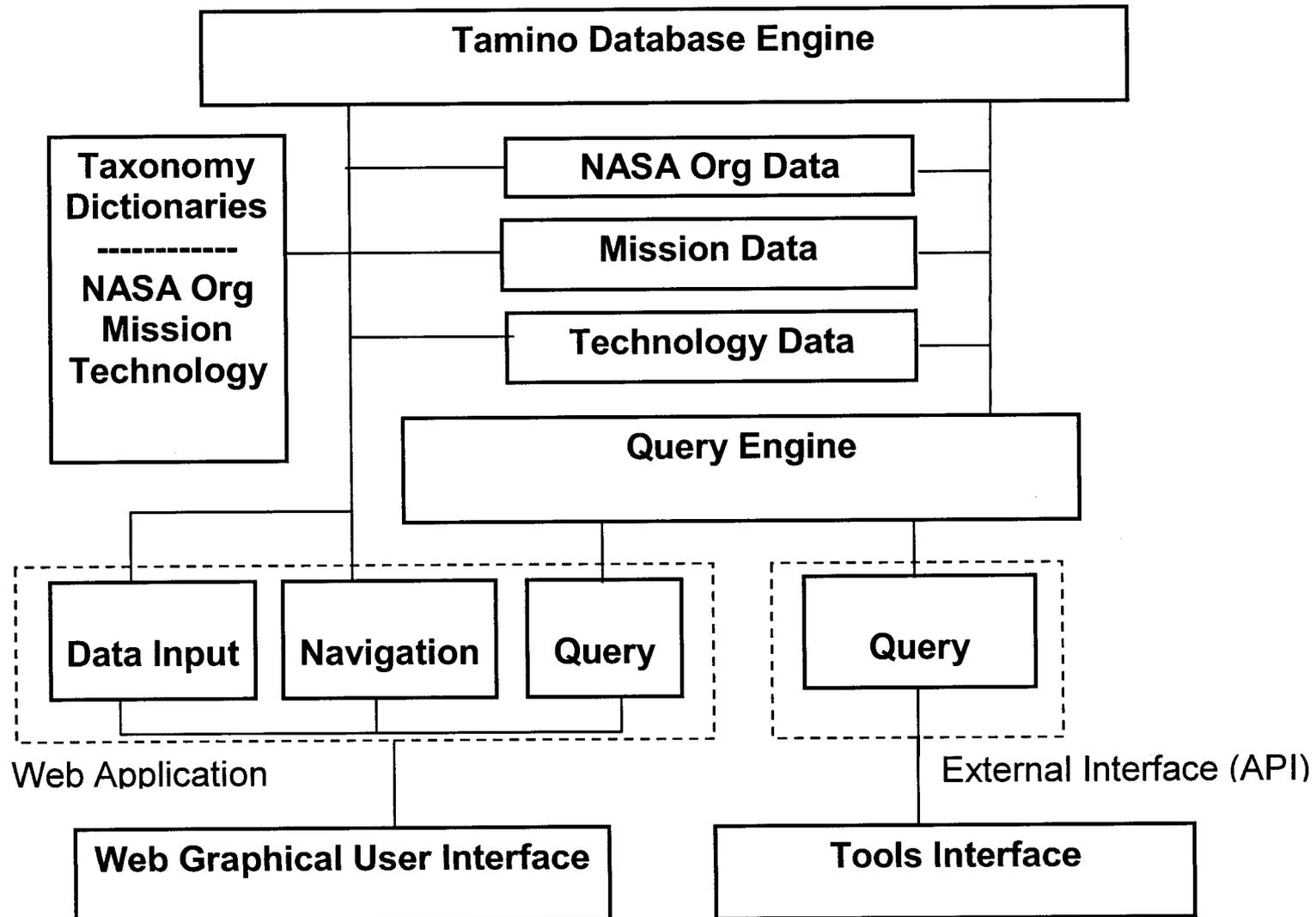
Introduction



- **NMP charter**
- **TCA identification and prioritization**
- **Quantitative, traceable, defensible ROI**
- **Two tasks**
 - ROI evaluation
 - Database
- **Hierarchical, XML-based database**



Functional Block Diagram





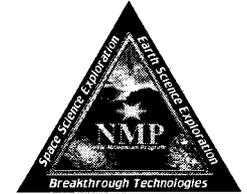
Requirements and Desiresments



- **Hierarchically organized data**
- **Machine-readable entries**
 - explicit definition of data types
 - conceptual meanings and relationships (ontology)
- **User interface**
 - Web-based
 - intuitive and obvious
- **Security model**
 - access control (authentication)
 - multiple concurrent users (authorization)
 - undo feature
- **User not required to populate entire structure**
- **Efficient and fast**
- **Historical record of requirements, technology changes**



Relational Database Limitations



Technology Requirements Data Entry

Date Last Modified Requirement Record #

Acronym Mission

Science Theme Mission Environment Instrument Type

Cognizant Center Record POC POC Phone No.

Product Breakdown Structure (PBS)

TSG PBS1

TSG PBS2

TSG PBS3

Mission Attributes Affecting This Technology

Technology Item (Record Name)

Performance Metrics

Potential Solution Technologies (funded)

Funding start year:

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Additional Cost to Complete	Total Cost
Estimated Funding Required: \$K:	<input type="text" value="240"/>	<input type="text" value="600"/>	<input type="text" value="500"/>	<input type="text" value="1,000"/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value="2340"/>

Status of Funding Estimate: TRL Now TRL Required

Theme Technologist Priority Mission Priority For Technology

Need date Need Date Tied to

Comments

Hierarchical structure isn't intuitively displayed or navigable.

Important data is buried in a text field. This does NOT encourage consistency, completeness or easy access to the data.

Technology links are buried in a text field.

Difficult to determine a complete set of common data fields and to modify this set for all entries. No customization for entries.



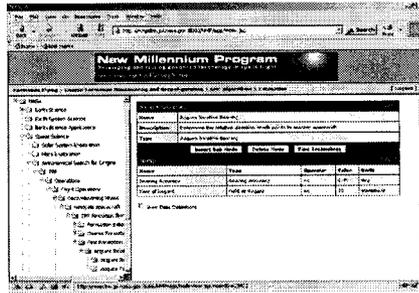
XML Database Advantages



- **Inherently hierarchical**
- **Flexible**
 - sparsely populated data structures
 - easier to add performance metrics
- **Quantitative matches between requirements and technology capabilities**
- **Taxonomy can grow and evolve more easily**

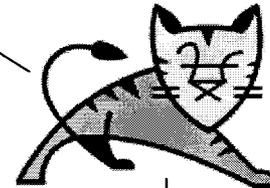


Architecture and Organization



Web GUI

JSP



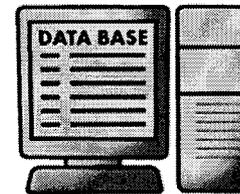
Tomcat
Application
Server

Web
Service

Java API

Sample	Table	Column 1	Column 2	Column 3
Row 1	13	26	33	
Row 2	23	40	50	
Row 3	31	50	30	
Row 4	49	90	123	
Row 5	55	100	150	
Row 6	69	120	190	
Row 7	72	130	210	
Row 8	85	160	240	
Row 9	92	190	270	
Row 10	95	200	330	

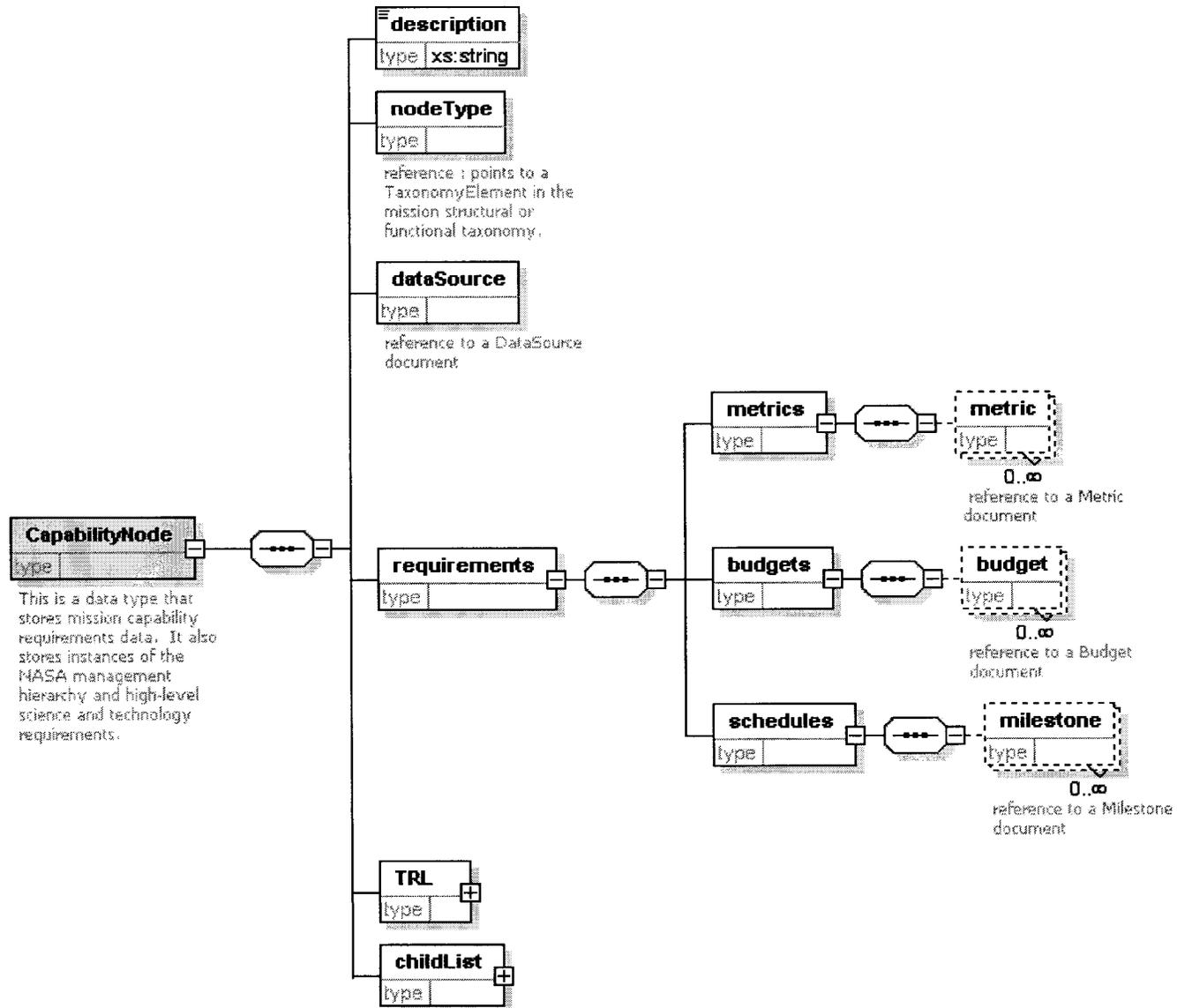
Excel Analysis Tool



Tamino
Database
Server



Sample Database Schema





Status and Plans



- **Alpha testing**
- **Ongoing taxonomy development**
- **Standard software interface to analysis tools**
- **Common data repository for several tools**
- **Two tools in development to assess impact of technologies**
 - **ROI Analysis: science goals**
 - **CoMET: system mass, power, cost**