

Content-Centric Architecture & RDF/OWL

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Architecture Classification

- Compute-Centric Architecture
 - The acme of Control Flow centric
 - Aim to super computer
 - The mirror of this architecture is Grid Computing
 - Content-Centric Architecture
 - The acme of Data Storage
 - Aim to super Database
 - The mirror of this architecture is Web itself
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Content-Centric Architecture

- Web uses a simple, standardized interface to encompass information from all over the world regardless of how that information is created, stored, and processed behind the interface.
[Fielding, Roy Thomas 2000]
 - Content-Centric Architecture eases the task of application integration by focusing on the uniform nature of content rather than the specific controls of any given application.
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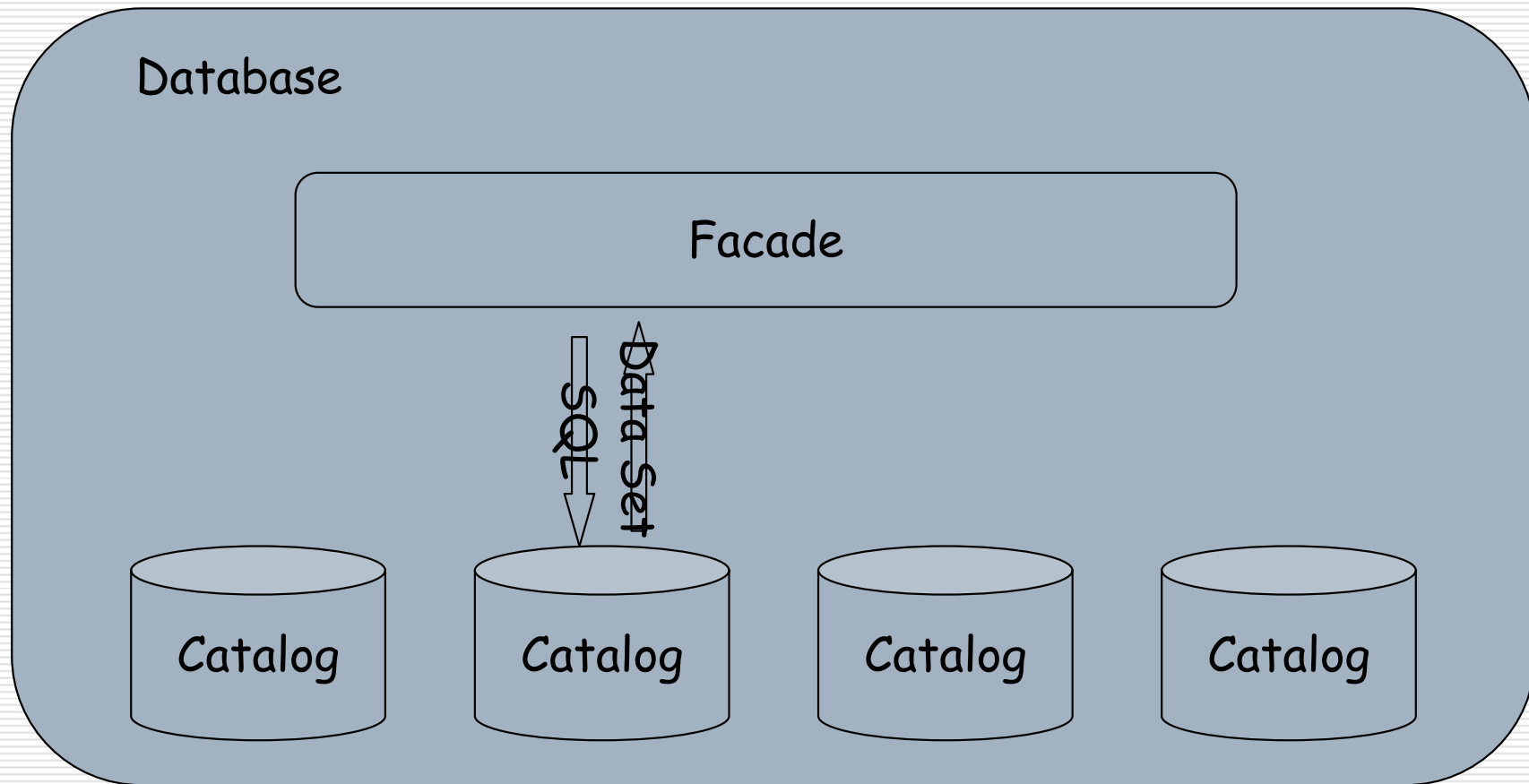
A Simple Computing System Formalization

- What is computing?
 - $Y = f(x)$
 - What is a Computer?
 - Computer = Operation (Data) [董占球 1984]
 - Take computer itself for instance
 - $C = Op (M) M = \{0,1\} Op = \{store, add, \dots\}$
 - The Op set called basic instruction
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A Simple Computing System Formalization

- Content-Centric Architecture
 - $C_c = O_c (D_c)$ $O_c = \{\text{store, query, remove}\}$
 - Take Database for instance
 - $C_{db} = O_{db} (D_{db})$, D_{db} accord with ER model
 O_{db} accord with SQL semantic
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Database Architecture



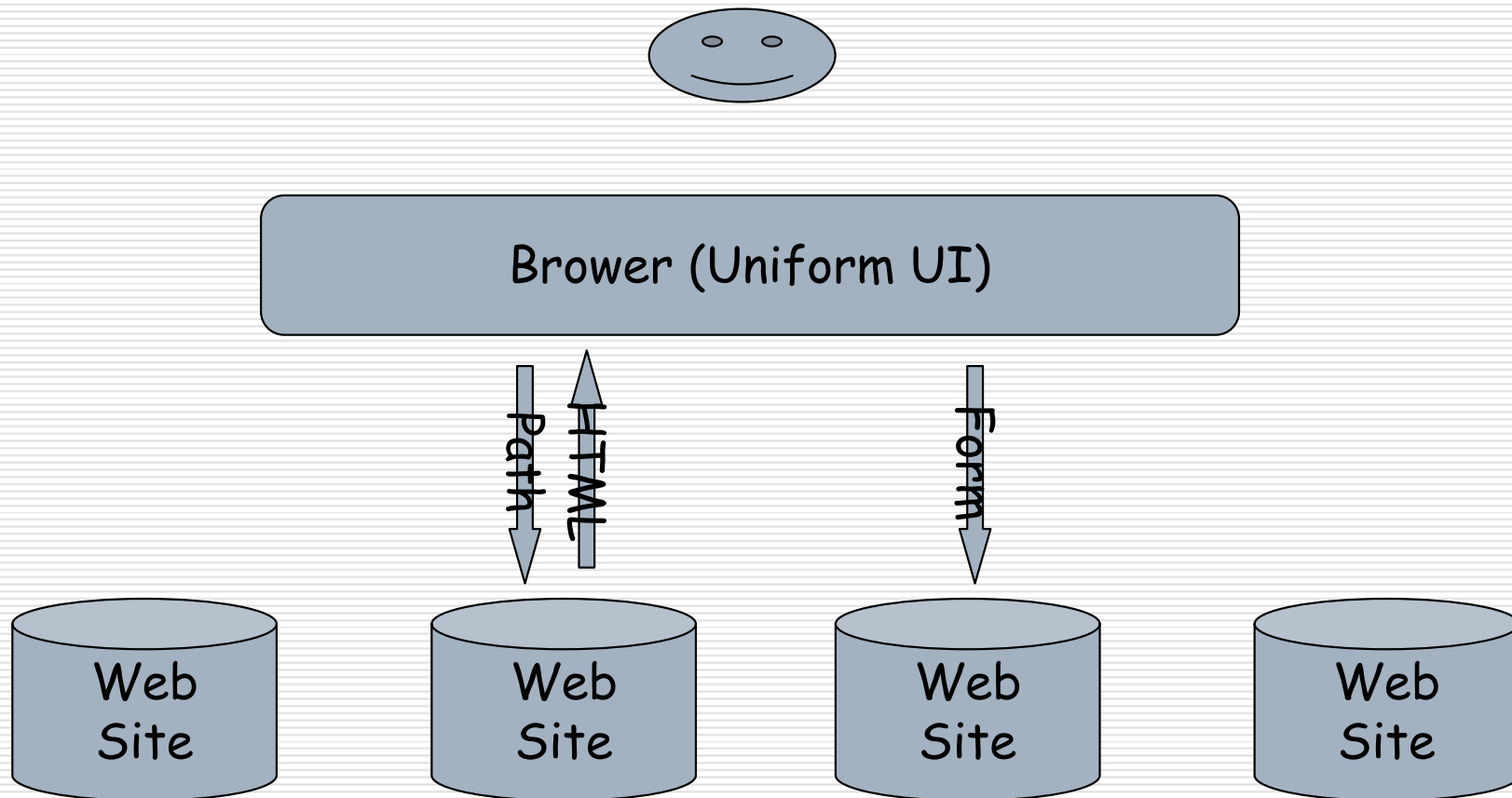
Web Architecture — Data Model

- What is the data model of Web?
 - Graph Model (Tree Model)
 - Text-Based Node
 - URL as arc
 - Text-based content, HTML
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Web Architecture — Basic Instruction

- What is the basic instruction of Web?
 - Path-based query, HTTP URL
 - Form-based store, HTTP Form
 - Mostly Read-Only Content
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Web Architecture



Why Web architecture so successful?

- Simple, standardized Data Model
 - Graph Model is one of the most complex data model
 - Web Graph Model is Text-based Tree Model
 - Simple, standardized Basic Instruction
 - No compelling path semantic
 - According to this, Web is the most large-scale software system ever developed.
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The lack of Web Architecture

- ❑ Better for human reading, but not for computer processing
 - ❑ Hard to be foundation of computing
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XML-based Web Architecture

Data model

- Add node type semantic: XML Schema type system
- Add graph structural semantic: XML Schema
- Add basic arc semantic: XPath

Basic Instruction

- XQuery
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RDF/OWL — A Better Graph Model

Appendix OO in SOA
