Digital Object Architecture

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Presentation Overview

- Introduction
- Digital Information Object
- Notions of Digital Object
- Digital Object Architecture
- Digital Object Chaining

Introduction

Primordial Internet

- TCP/IP was created to allow transmission of packets of data between disparate systems on ARPANET.
- Addresses are location dependent.
- Deals with *where* data goes, but not *what* it is, or *who* it is sent to.

Introduction

Contemporary Internet

- DNS specifies *who* is *where*, as long as *who* does not move often.
- Addresses such as email and URLs are still location dependent.
- Application layer protocols such as HTTP use MIME typing to define *what* data is, but only address one-way communication.

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Digital Information Object

- Exists within the *Digital Object Architecture* with the goal of making information a *first class citizen* on the Internet.
- Allows high level information to be moved around on the Internet much as packets of data are today.
- Aggregates relevant heterogeneous data and metadata.
- Solves the *who* is *where* problem of network addressing by using the CNRI Handle System®, a location independent global naming service.
- Describes the *what* of information in an concise and extensible manner.

Digital Information Object Intents of Use

- The ***Intents of use*** extensible typing mechanism specifies ***what*** a Digital Information Object contains.
- A specific Digital Information Object's ***intent of use*** is described as a ***content type***.
- ***Content types*** are registered and uniquely identifiable.
- A ***content type*** defines a unique set of operations that can be performed on specific information type.
- The set of operations is known as a c***ontent type signature.***
- A ***content type signature*** can be implemented in different ways in the form of mobile code called ***servlets***.

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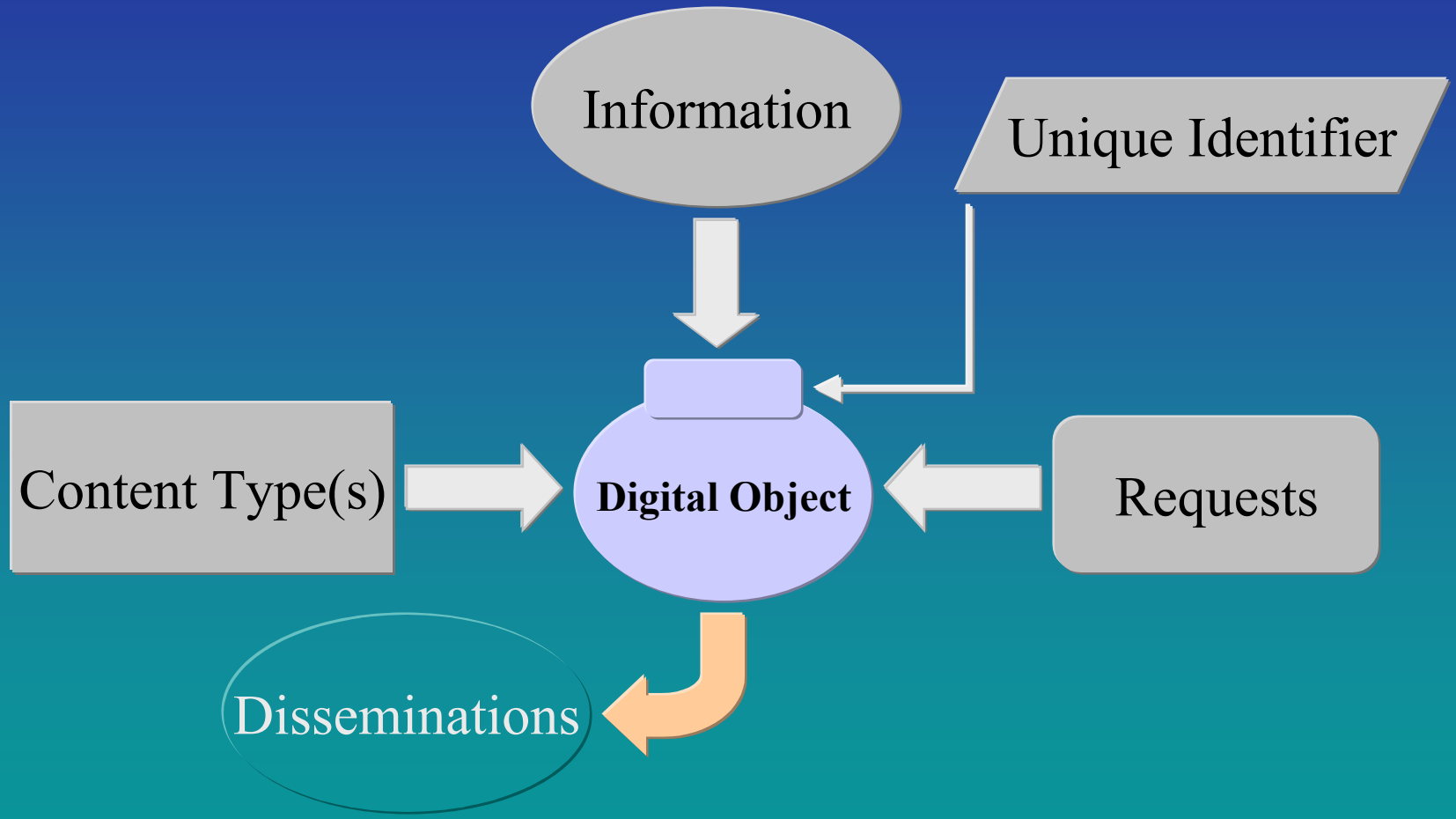
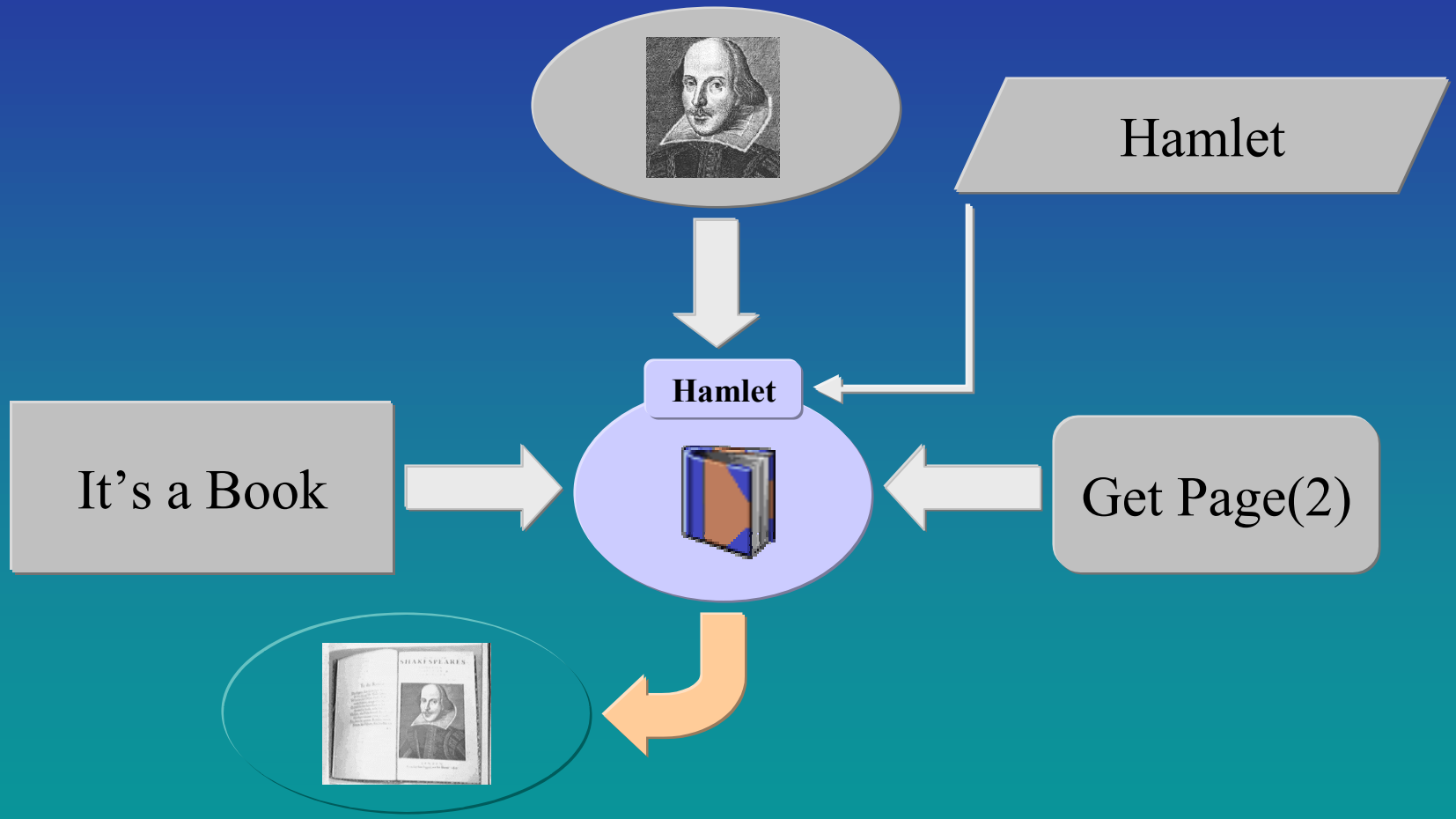
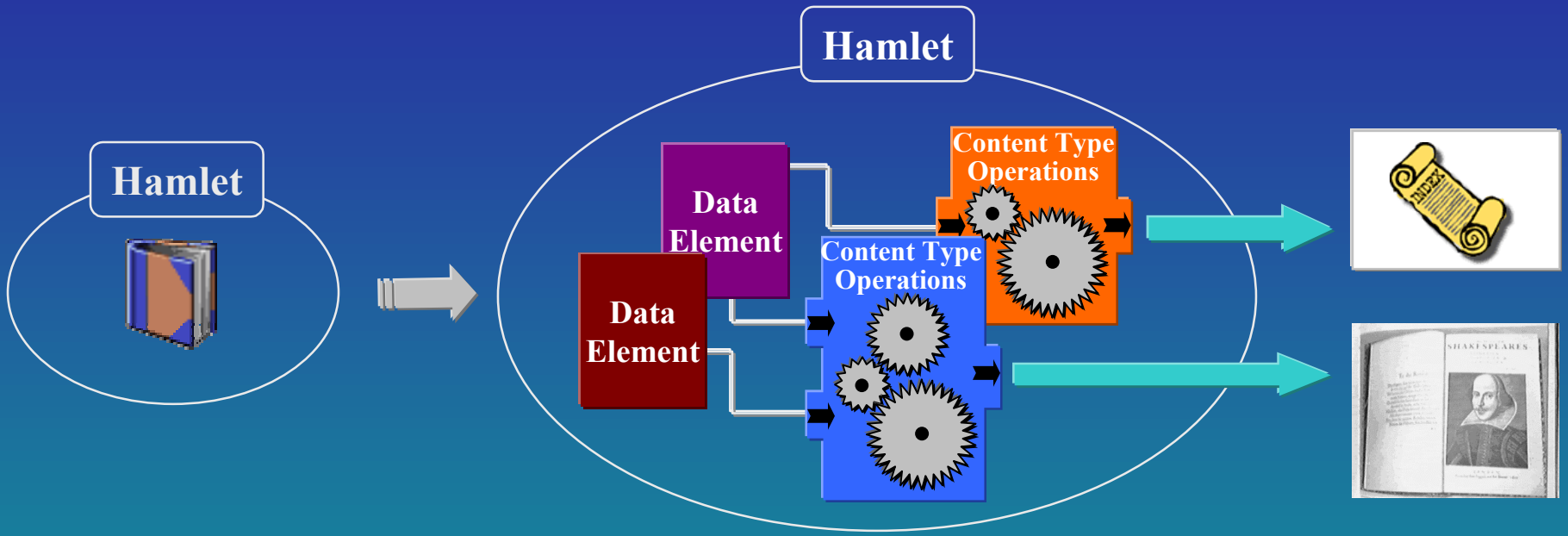
Digital Object Overview



Digital Object Overview



Digital Object Overview



- Digital objects are uniquely identified in a given name space.
- Data elements reference sequences of typed bytes.
- A Digital Object can have zero of more *Content Types* to reflect the intents of use of its creator.

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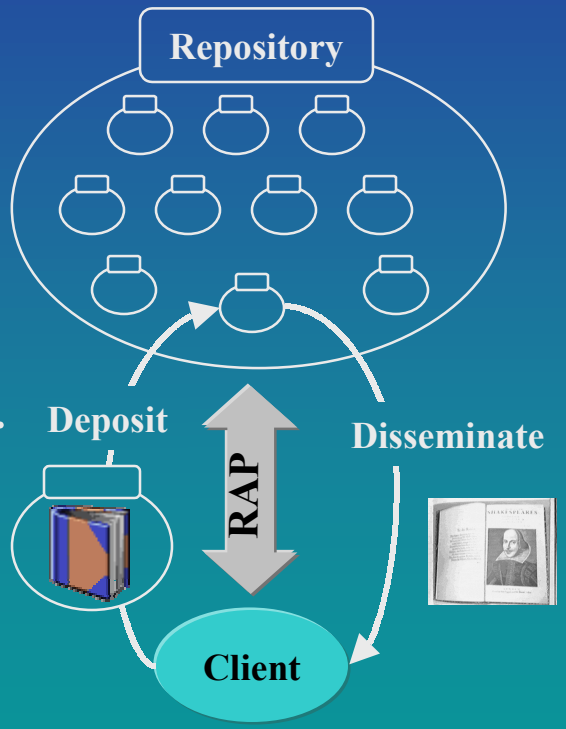
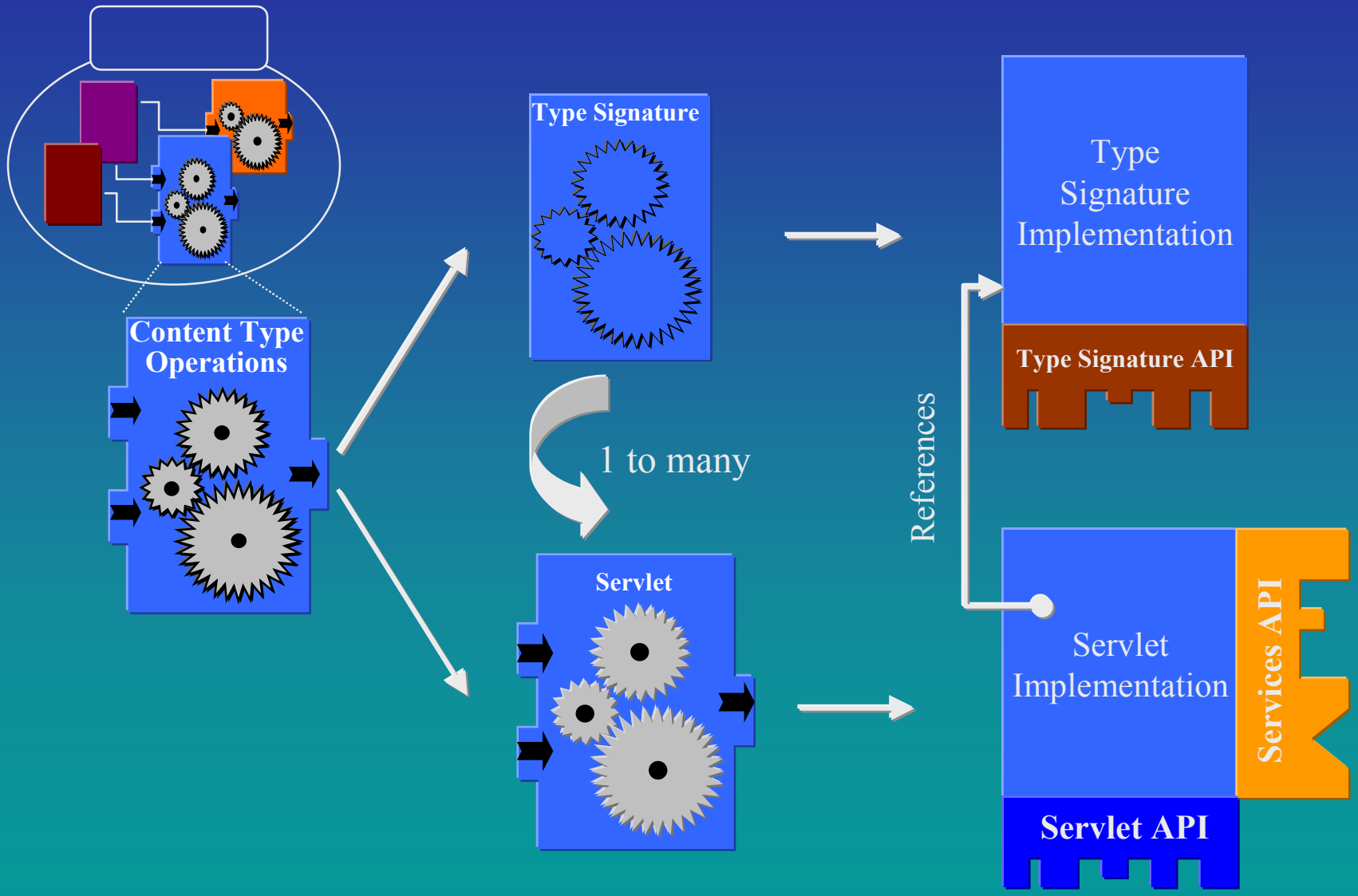
Digital Object Repository

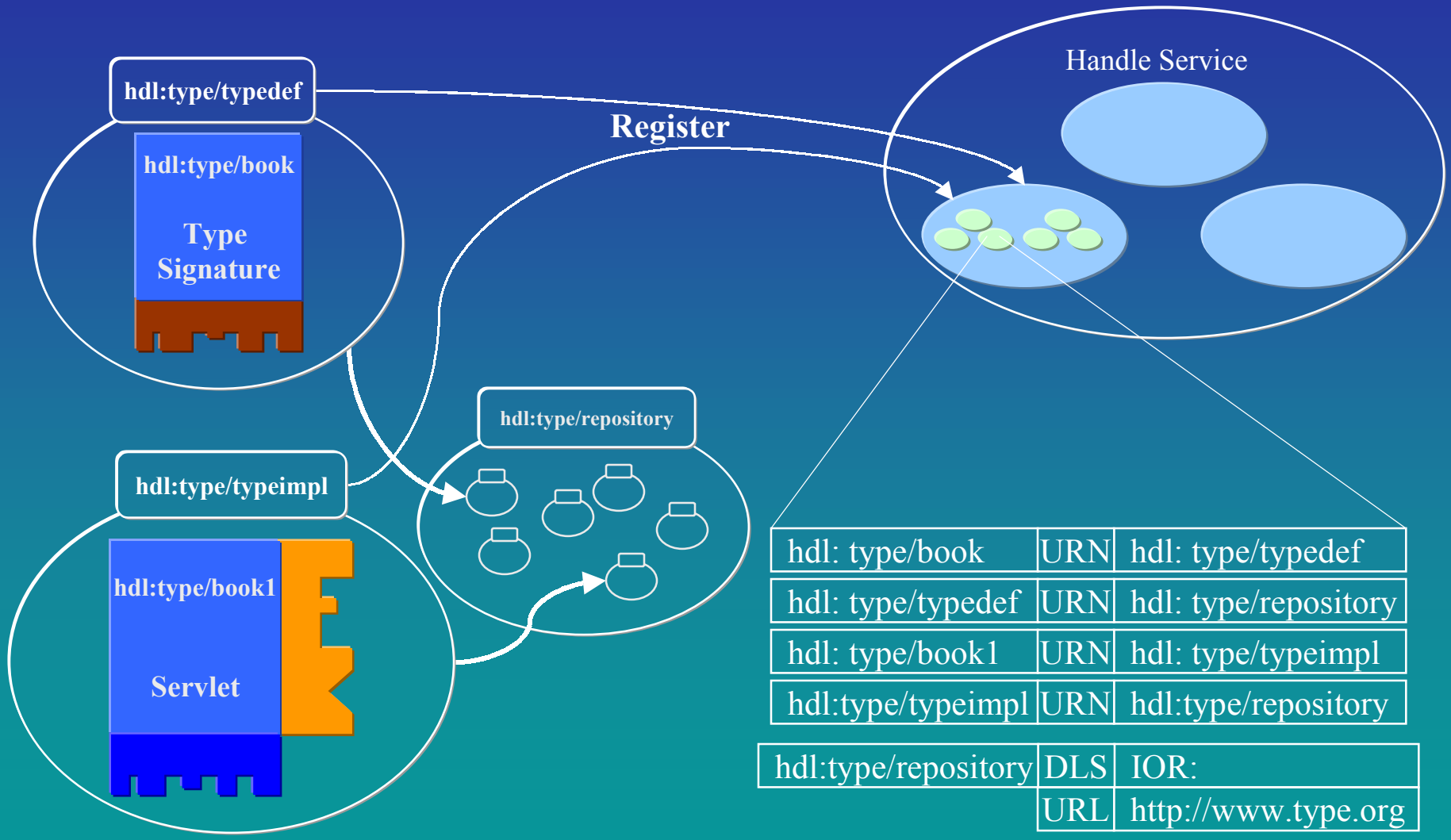
- Provides distributed Digital Object storage.
- Behaves as a Digital Object.
- Provides a dynamic acquisition and execution mechanism for the mobile code that implements the content type operations.
- Exclusively accessed using the Repository Access Protocol (RAP).



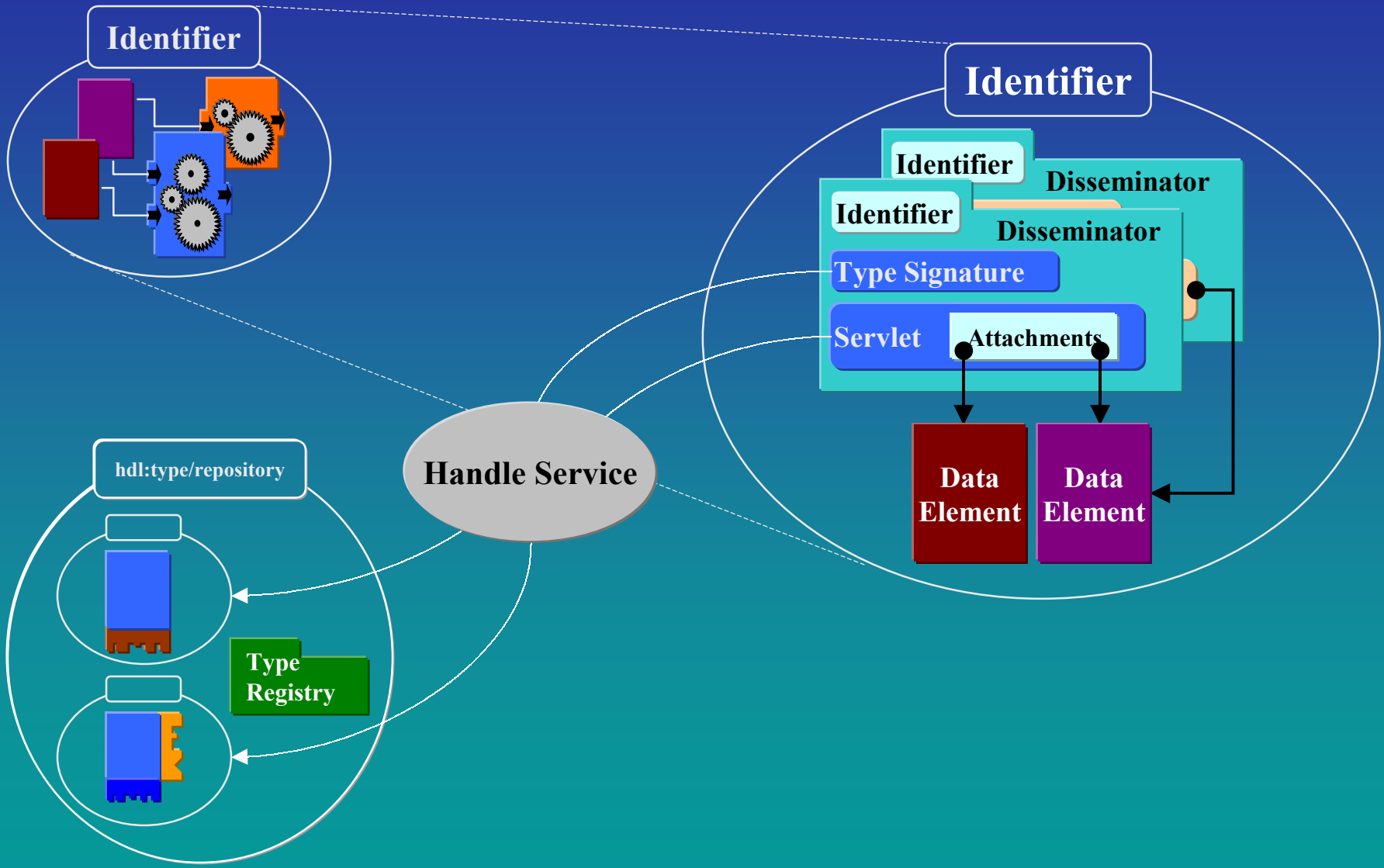
Content Type Extensibility



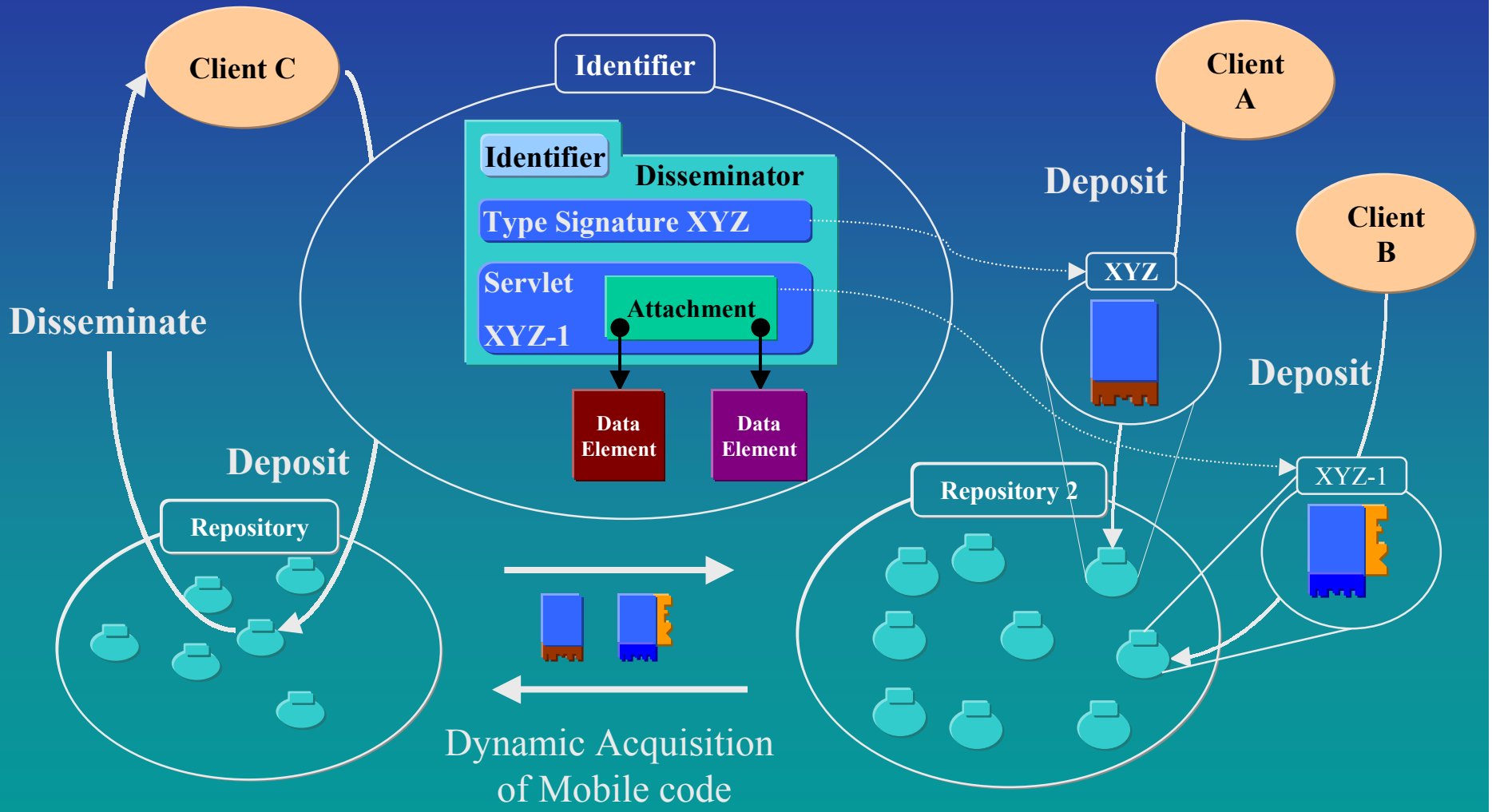
Content Type Registration



Digital Object Structures



Content Type Extensibility Mechanism



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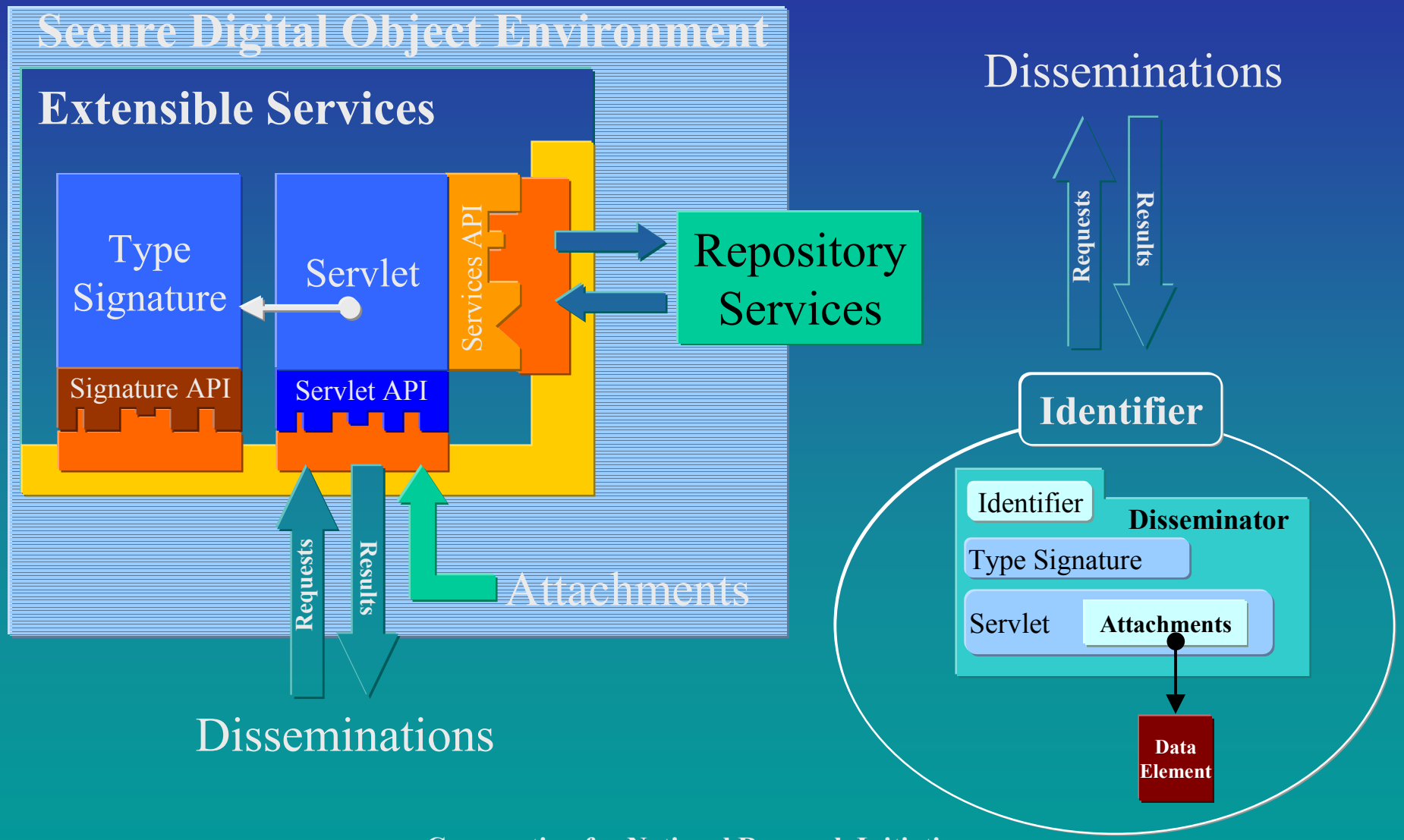
Extensible Dissemination Mechanism



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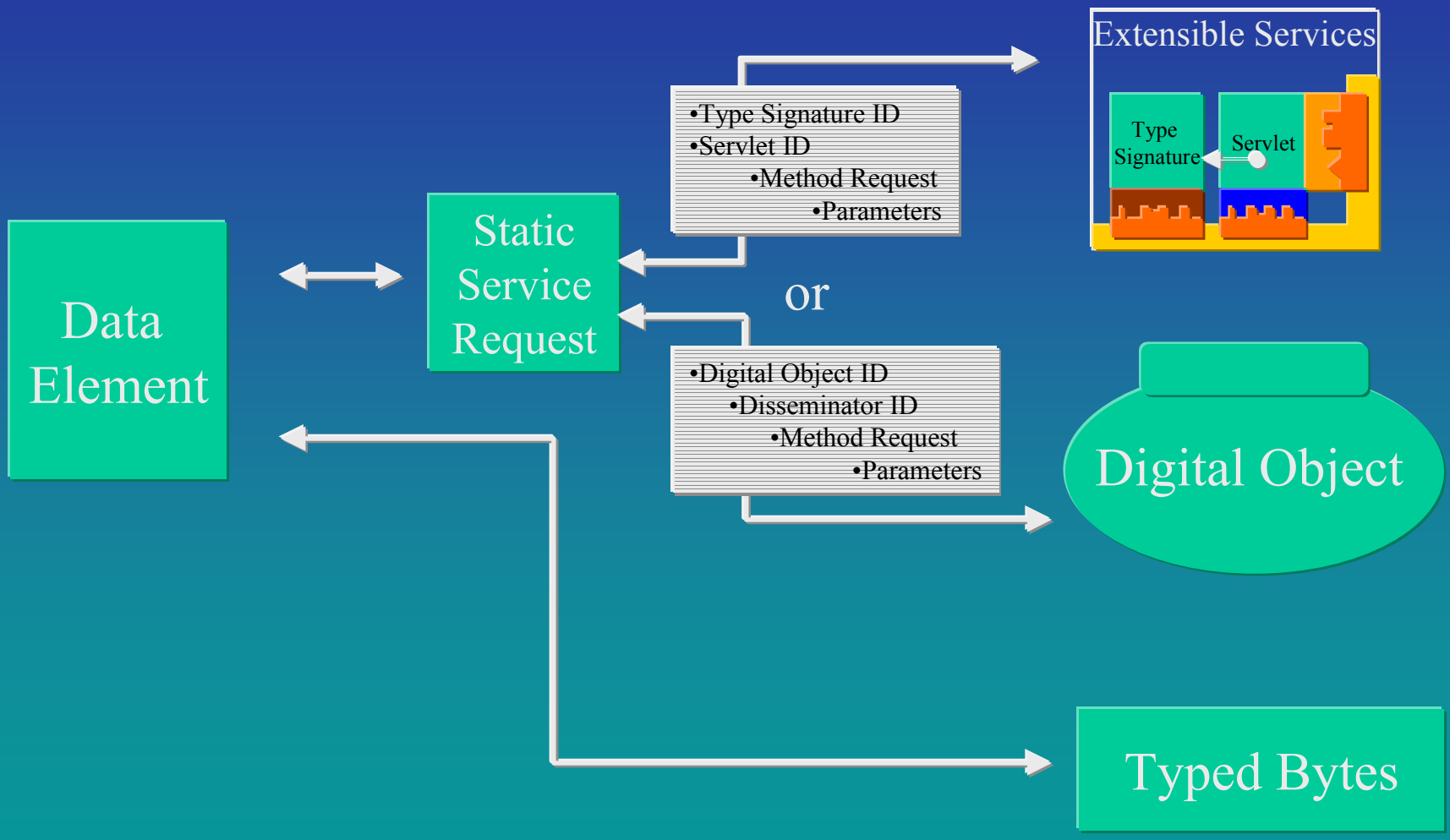
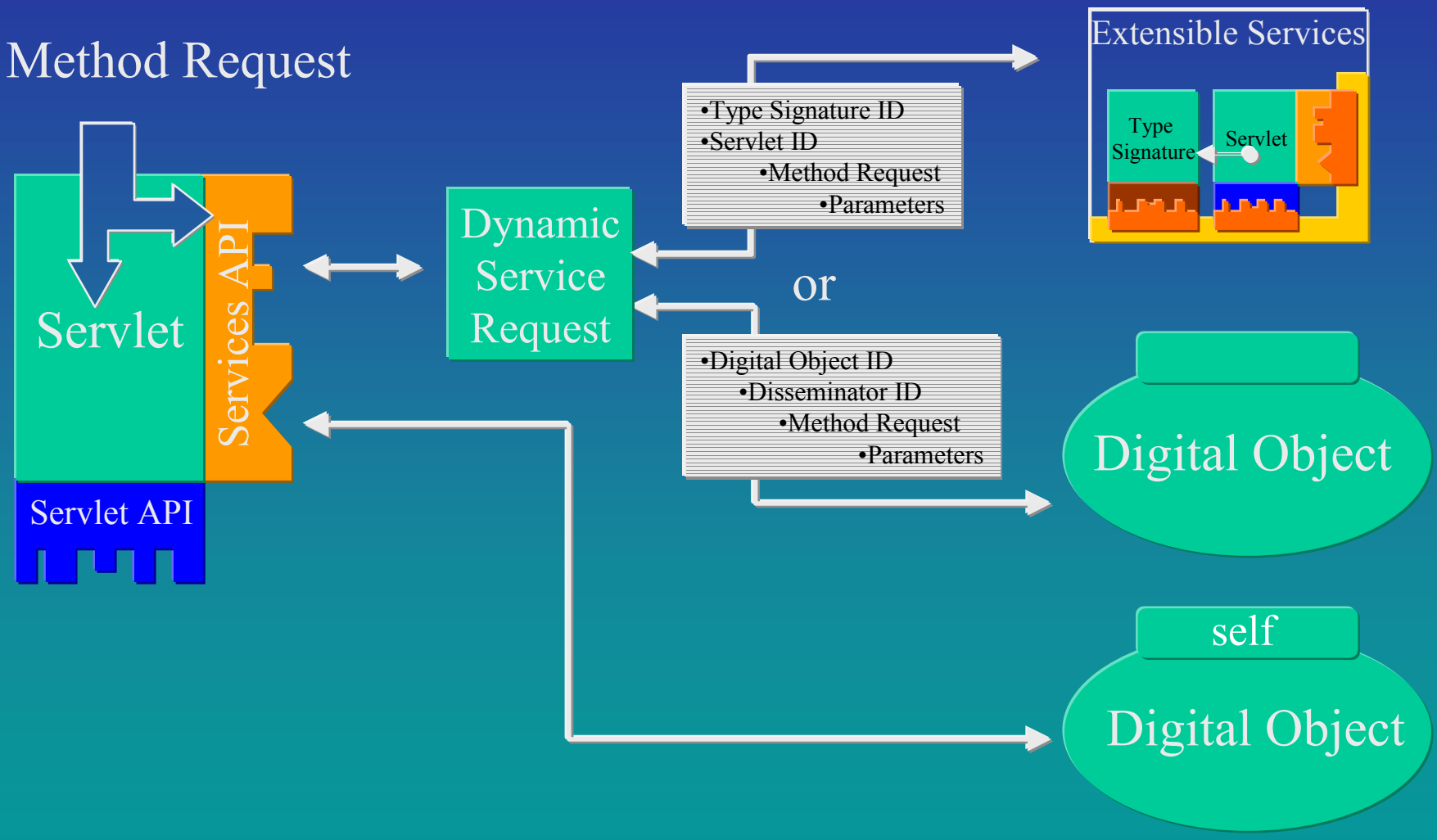
Digital Object Chaining

- Provides a building block approach to information management.
- Enables the creation of information and operation links.
  - ***Content Chaining***: a digital object's data element can reference its respective content.
  - ***Operations Chaining***: servlets can dynamically establish links to external resources or digital object when executed.
  - ***Content Type Chaining***: chaining servlets can be designed to dynamically build digital object chains from input parameters.

Content Chaining Mechanism

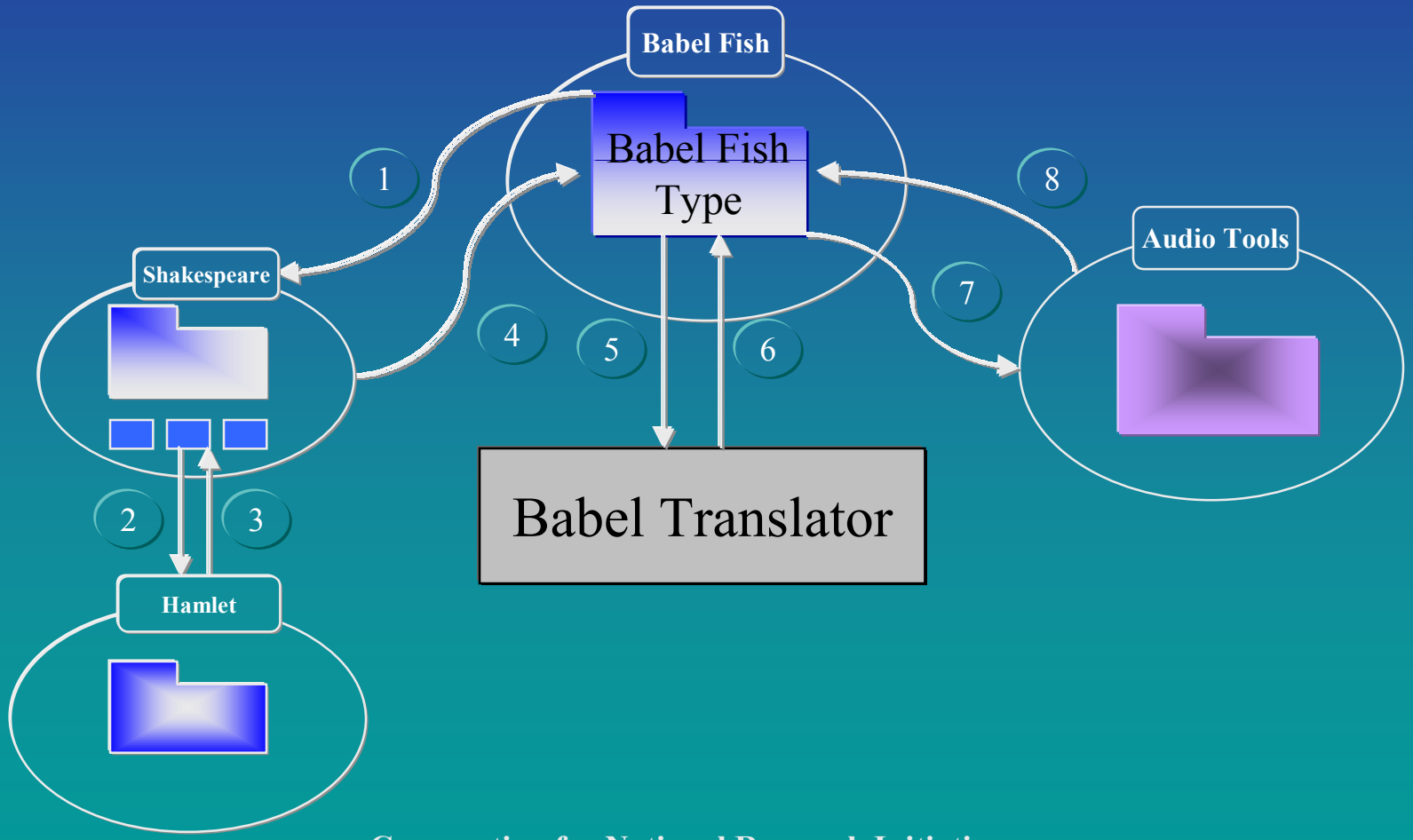


Operation Chaining Mechanism



Digital Object Chaining Example

Example: ask the Babel Fish Object: generate an audio version of a French translation of Shakespeare's Hamlet.



Data Exchange By Chaining

- Digital Object chaining allows for homogeneous data exchanges in a heterogeneous data environment.
- Digital Object Chaining provide a layer of abstraction over data formats, encoding and transport protocols.