

SIF and SOA: The SIF Zone embraces Web Service technology

(updating the K-12 “wire”)

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<All photos/images included in this presentation are clip art images>

STATS DC 2011

Balancing Timeliness and Quality



Agenda

- What is SIF?
- What is the SIF Wire?
- The SIF Zone
- Web Services
- SIF and Service Oriented Architecture (SOA)

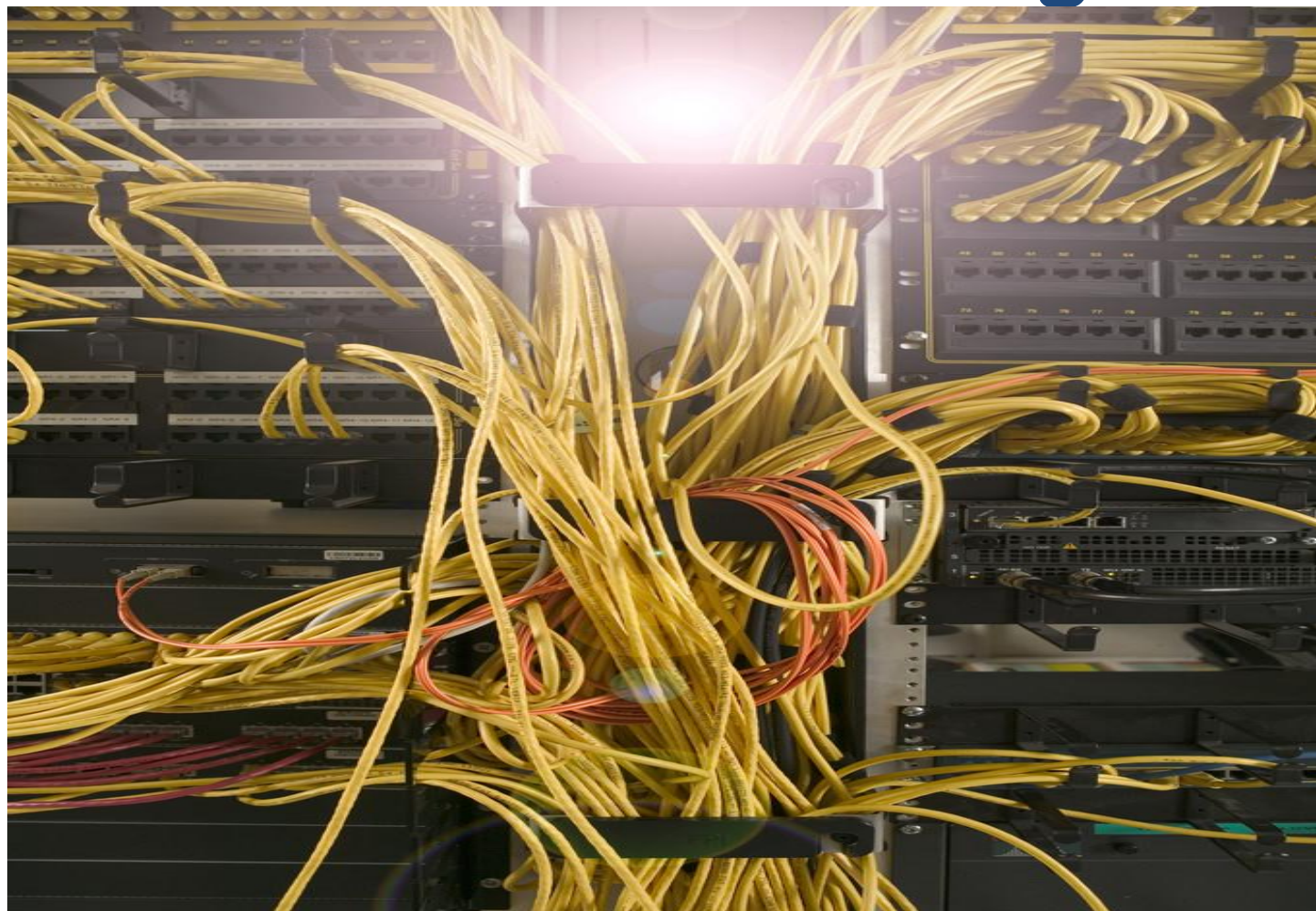


What is SIF?

- **An Association / A Community**
 - 2,300+ Members in US, UK, AU / Deployed solutions in all 50 states
 - K12 Application Vendors, LEAs and SEAs
 - Federal Agency & Data Standards Partners
- **A Standard for K-12 Application interoperability**
 - Free, community developed open process
 - Data Model & Customized State Data Profiles
 - Process Behavior (SRE, Student Locator, NYR)
 - **Infrastructure for K-12 Data Exchange**
 - Test Harness & Certification Program



The SIF “Wire”: An Infrastructure for K-12 Data Exchange

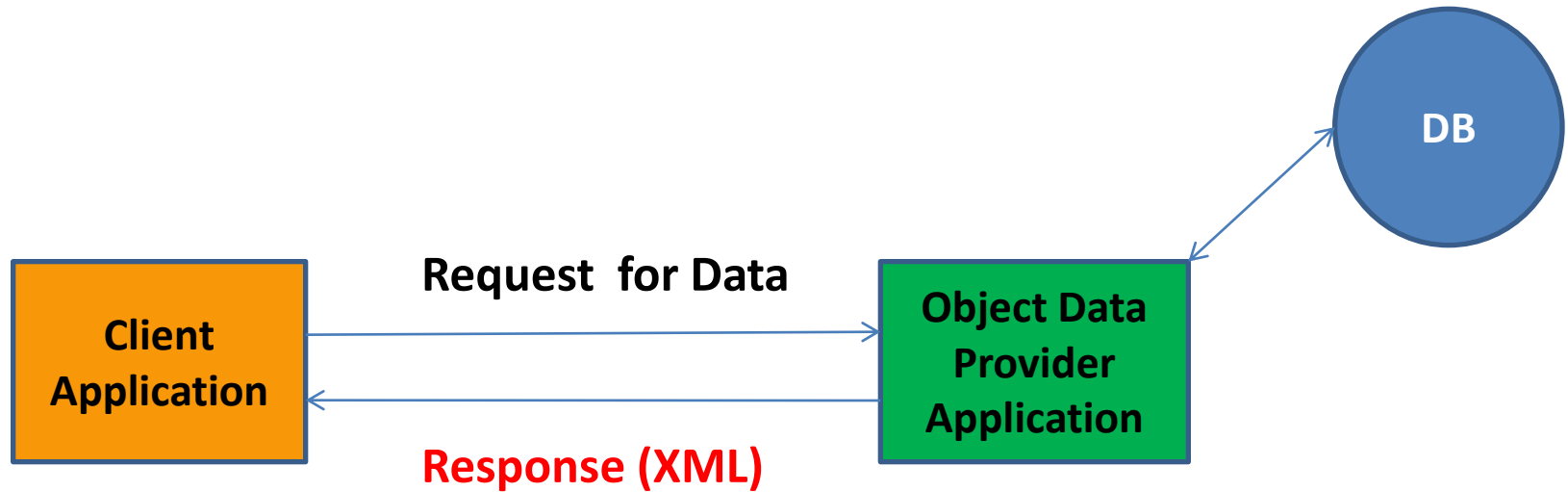


Not SIF

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The Communicating Parties: Client, “Service” and ... the Wire

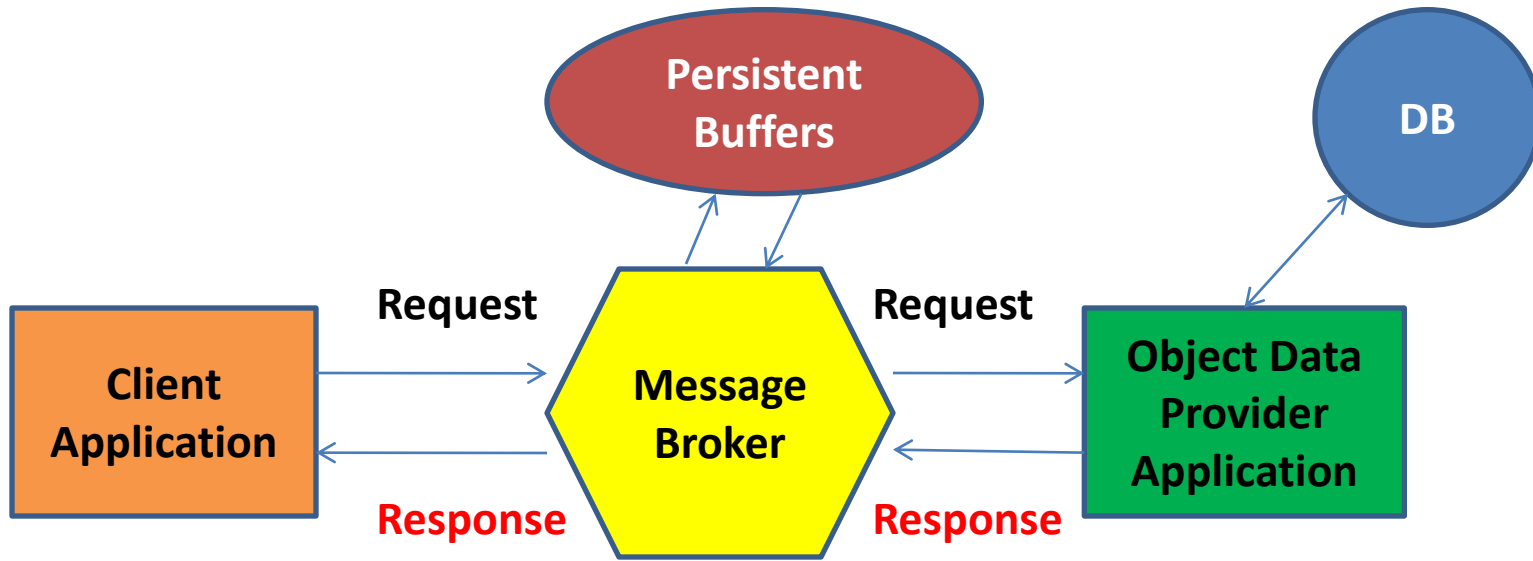


The Point to Point Wire (1:1)

- **How did the client discover the Object Provider?**
 - Where it is / What it can do / Correct Version
- **What is the agreed upon Transport protocol?**
 - HTTP / HTTPS / SOAP / REST
- **How is Security Imposed?**
 - Encryption / Authorization / Authentication
- **What is the Quality of Service?**
 - Best Effort / Once only Delivery / Guaranteed Delivery
 - <Yes No> ... or <Yes No Maybe>
- **Synchronous or Asynchronous Response?**



Message Broker: The 3rd Party on the wire

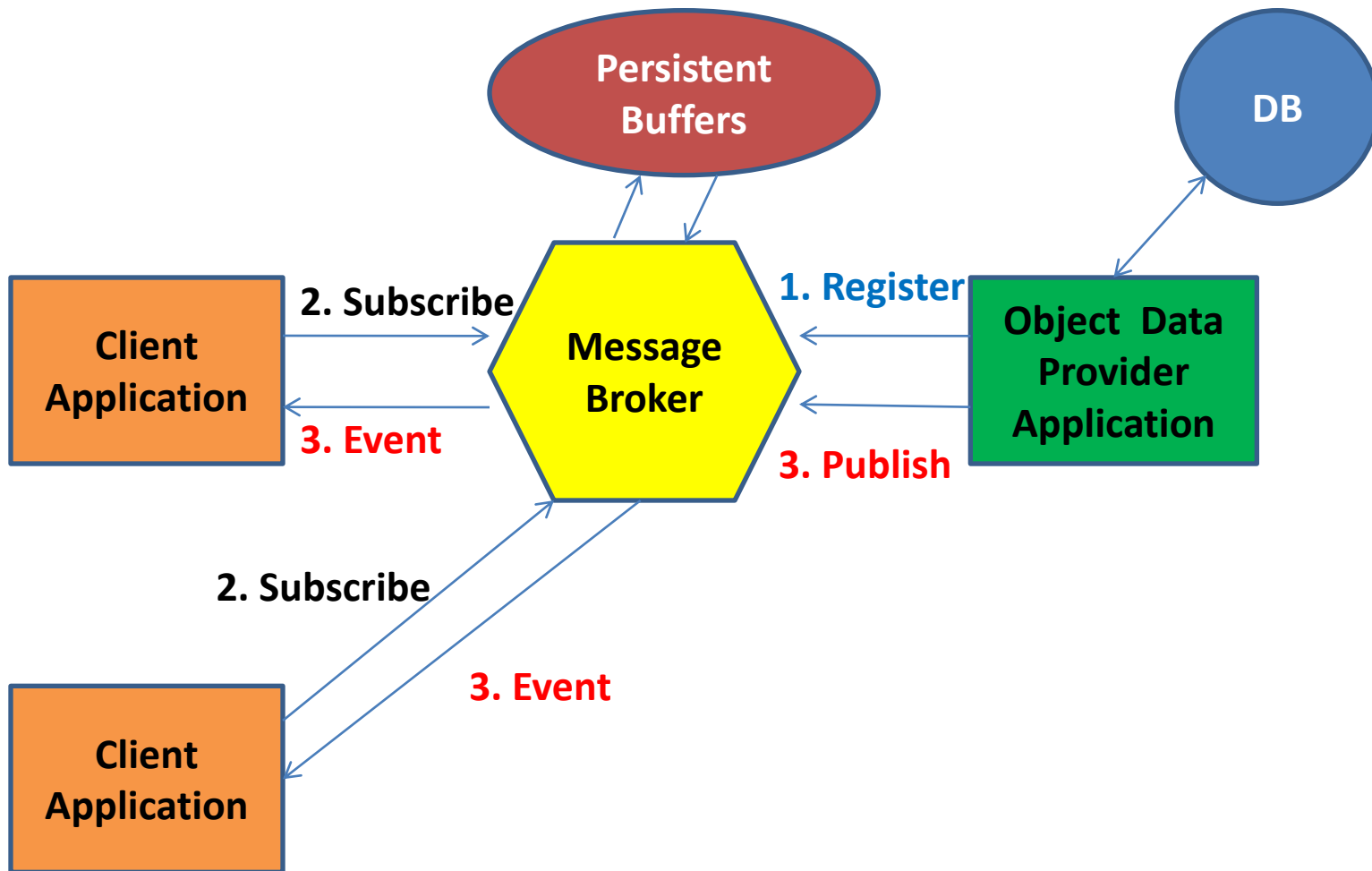


The Message Broker Wire (N:1)

- **How did the client discover the Object Provider?**
 - Content based routing (request routed to provider)
- **Agreed upon Transport protocol: HTTP/S**
- **Guaranteed (Buffered) Message Delivery**
- **Data Security (the opposite of interoperability)**
 - Data Encryption (mask the data being exchanged)
 - Standardizes Authentication (who are you?)
 - Enforces Authorization Rules (Can this client application request this type of object?)
 - XML Filtering (Can this client see THAT?)



Pub / Sub Message Exchange Paradigm

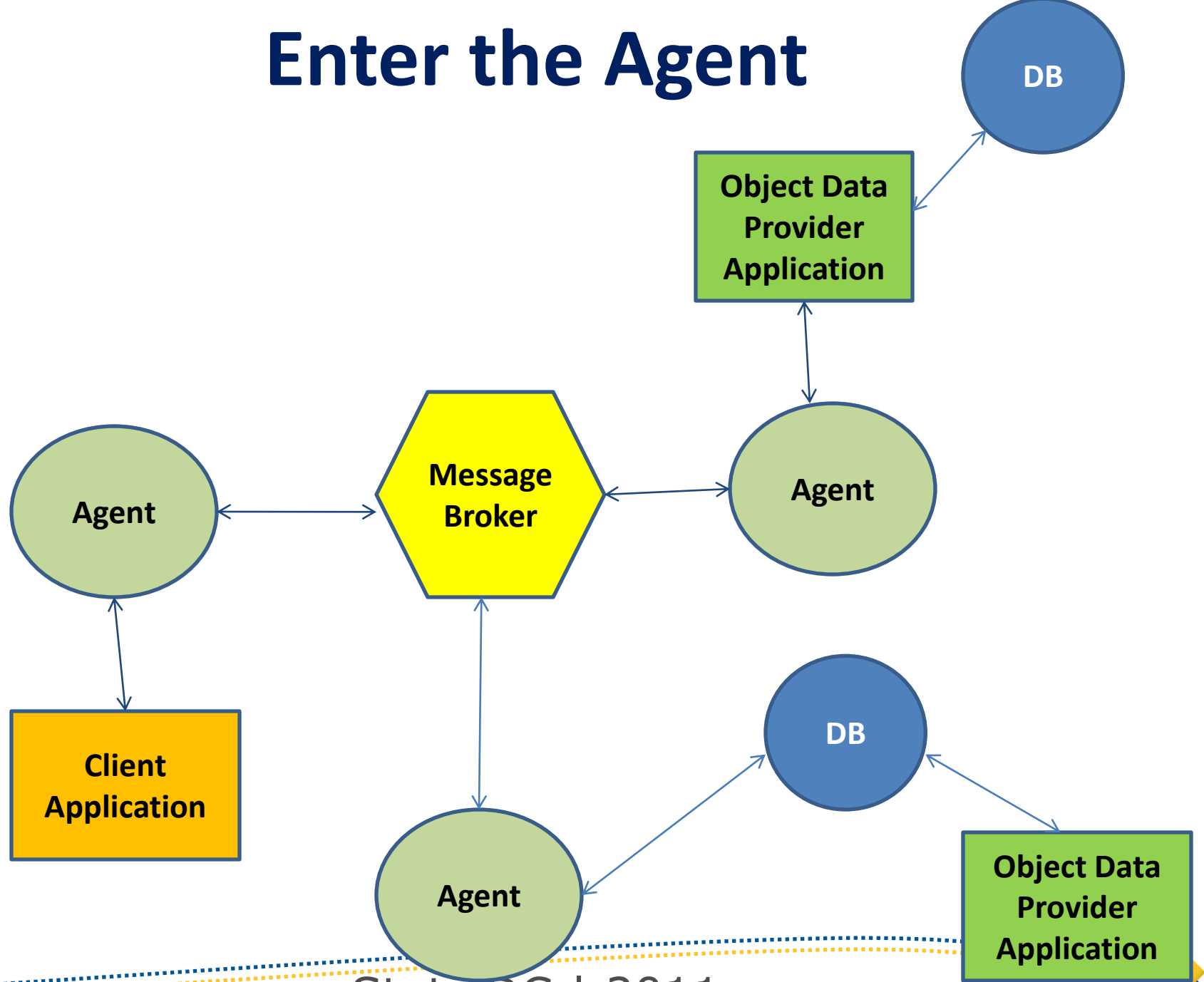


So the Message Broker solves everything?

- **Excess “Coupling” problem only deferred**
 - Limited coupling between Applications 😊
- **Major coupling between MB and Application ☹️**
 - Common Transport
 - Shared Security Conventions
 - Topic List (Object Types that can be CRUD)
 - Application must “Register” functionality
 - Provide what Object types / Subscribe to what Events
- **Need “Bridge” Architectural Component**
 - A “mini-broker” between MB and Application



Enter the Agent



Agent Provides whatever Application needs

- **Wraps Transport Protocol details**
- **Wraps Message Broker coordination**
 - Automatic Initial Application Registration
 - Automatic Event Subscriptions requests
 - Application doesn't know Message Broker is there
- **Transparent Database Updates from Events**
 - Agent reads DB Data and responds to DB triggers
 - Application need not know Agent is there!

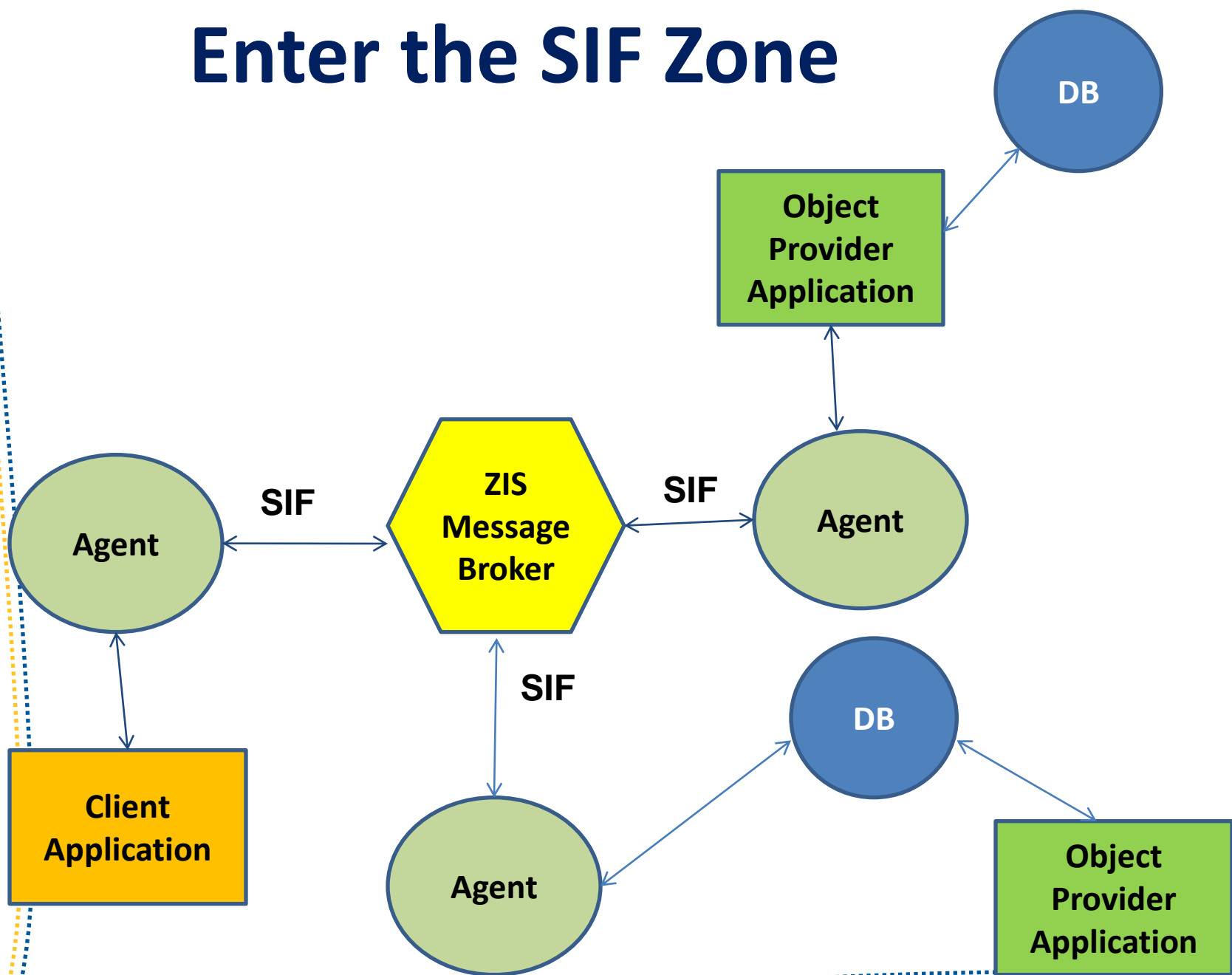


There is no such thing as a free lunch!

- Applications are fully independent of other applications and the Message Broker (the wire)
 - But ... Agent and Message Broker remain closely coupled
- Add another level of indirection?
 - Somewhere, somehow, two components will be coupled
- The Aha Moment!
 - *“Interoperability is much easier if it’s you on both ends of the wire ... but if it’s another guy, then you need a standard!” - EduGuy*
- Standardize the internal MB to Agent connection
 - Applications focus only on Data Object issues



Enter the SIF Zone



What is the SIF Standard?

The SIF Object Hierarchy

- A set of XML Schemas defining the format of data transmitted between K-12 Applications
 - Student, Library, Transportation, Assessment ...

The SIF Zone

- The “on-the-wire” Infrastructure that supports the transfer of SIF Object data between applications.
 - Agents and the Zone Integration Server (ZIS)

Certification Program to ensure interoperability

- Defining the wire allows interoperability testing between SIF agent/application pairs via the Test Harness



SIF Zone Functionality

- **Quality of Service**

- Guaranteed once only Message Delivery
- Content Based Routing
- Publish / Subscribe support

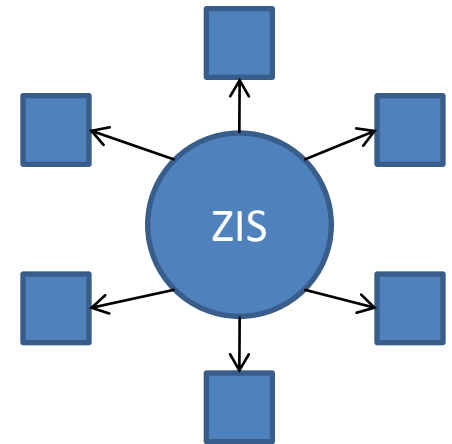
- **Security**

- Message Encryption
- Application level Authorization
- Element Level Security (XML Filtering)

- **Auto-Application Discovery via Registry**

- **Auto-Request routing to Object Providers**

- **Zone Management (monitoring & control)**



SIF and Web Services (in the past the present was the enemy of the future)



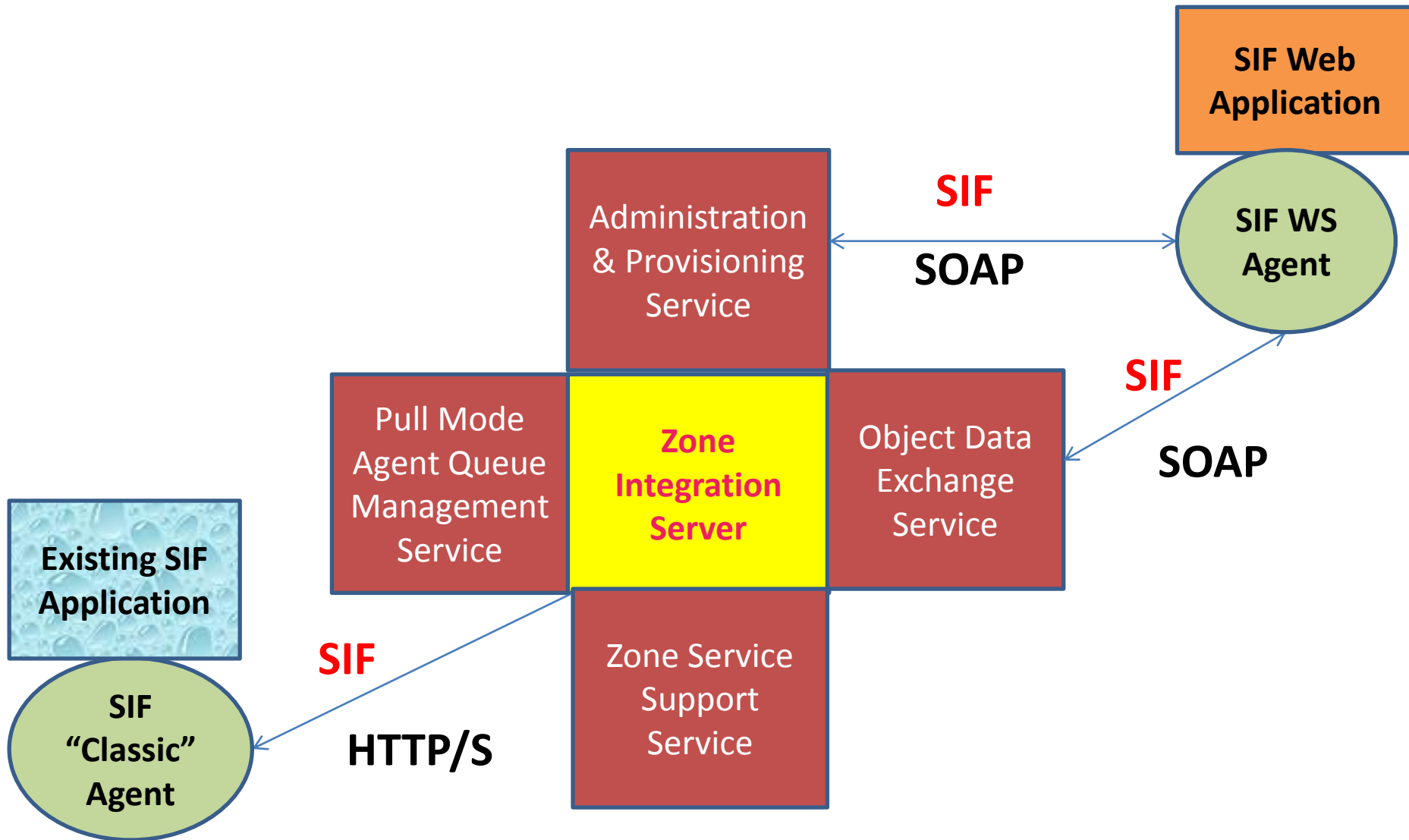
SIF Web Service: Development Guidelines

- **Backwards and Forwards Compatibility**
 - Preserve & leverage existing SIF investments
 - Provide seamless incremental migration
- **Data Model Independence**
 - Single XML namespace utilized by AU, UK and US
 - Infrastructure maintained by International Tech Board
- **No loss of OOB Application Interoperability**
 - WS Framework with technology versions & options





Web Application Equivalent to v2.x SIF Agent/Application



The Web Service enabled Zone

- **Any SIF agent / application writable as a standard Web Service using a publically available SOAP/WSDL toolset**

- Enable external Educational Communities that must soon interface with SIF Zones to leverage known technologies

- **All SIF Data seamlessly accessible as a Web Service**

- Will transparently interoperate with existing SIF agents / applications. Incremental migration

- Allow non-Educational Vendor Products or End User Communities to access SIF data with pure SOA solutions

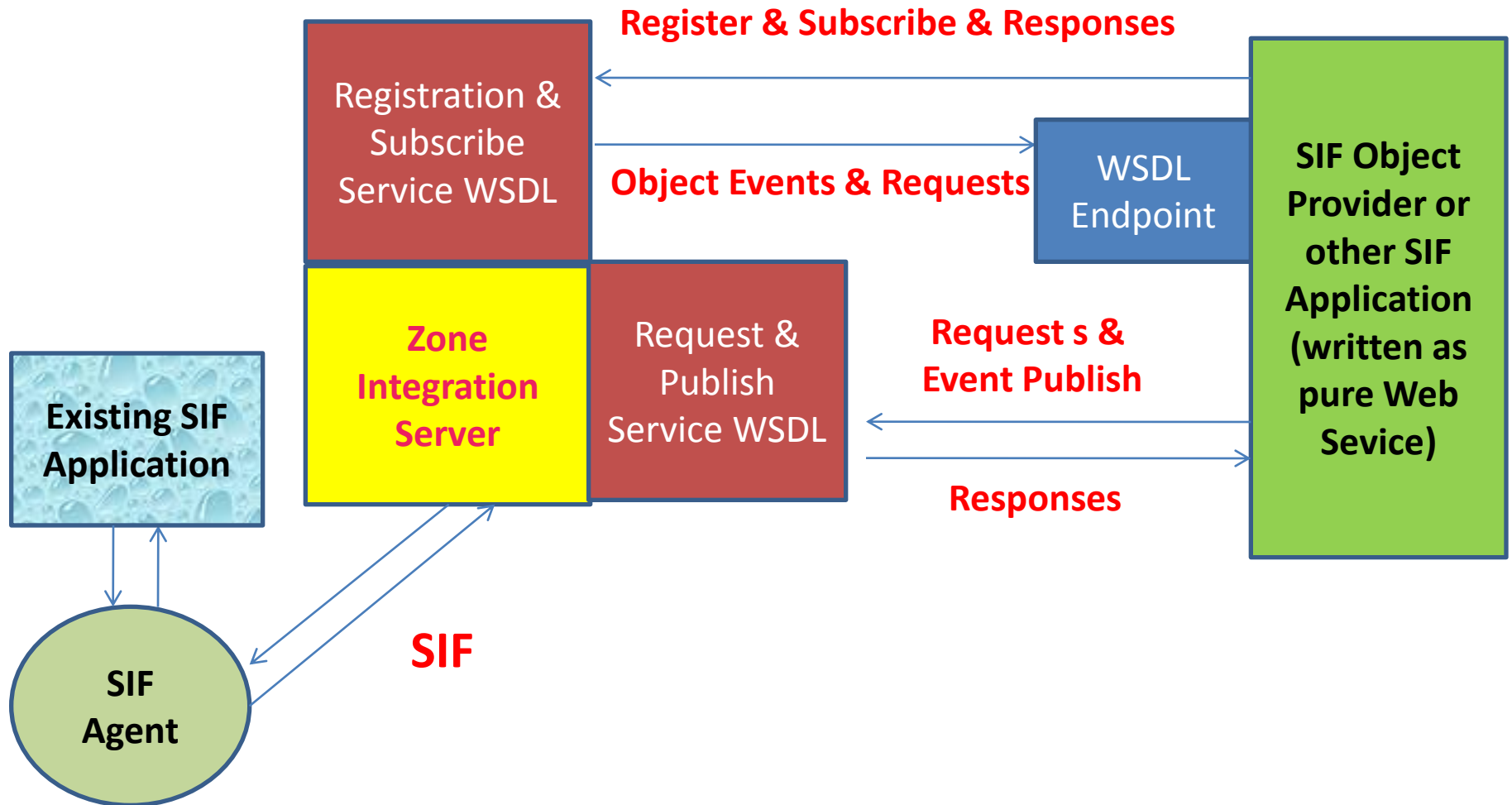
- **ZIS functionality still available**

- Guaranteed Delivery, Content Based Routing, Auto Discovery





Web Service Alternative to Agent/Application

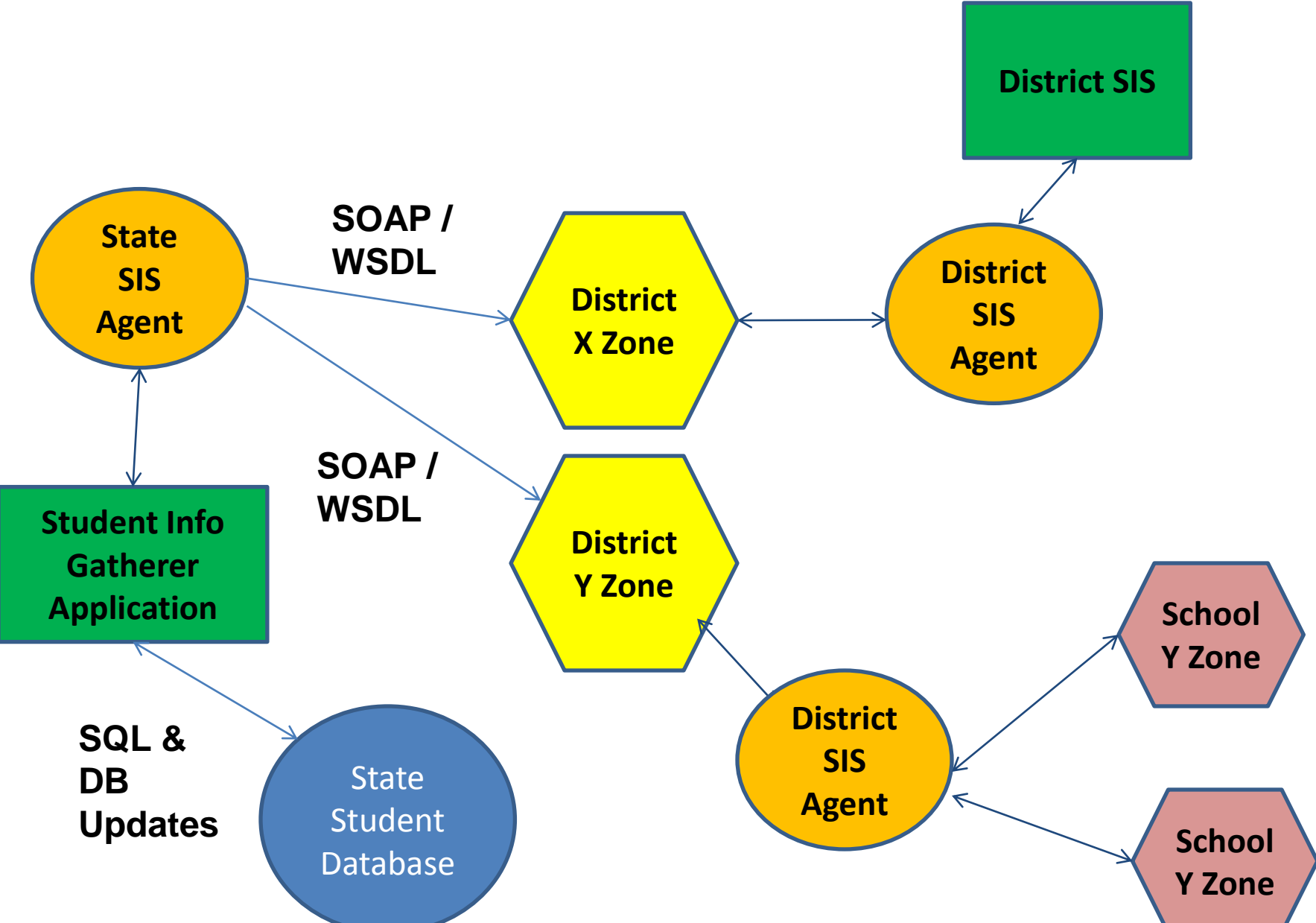


SIF v2.5 offers pure SOA

Vertical Solutions for the SEA

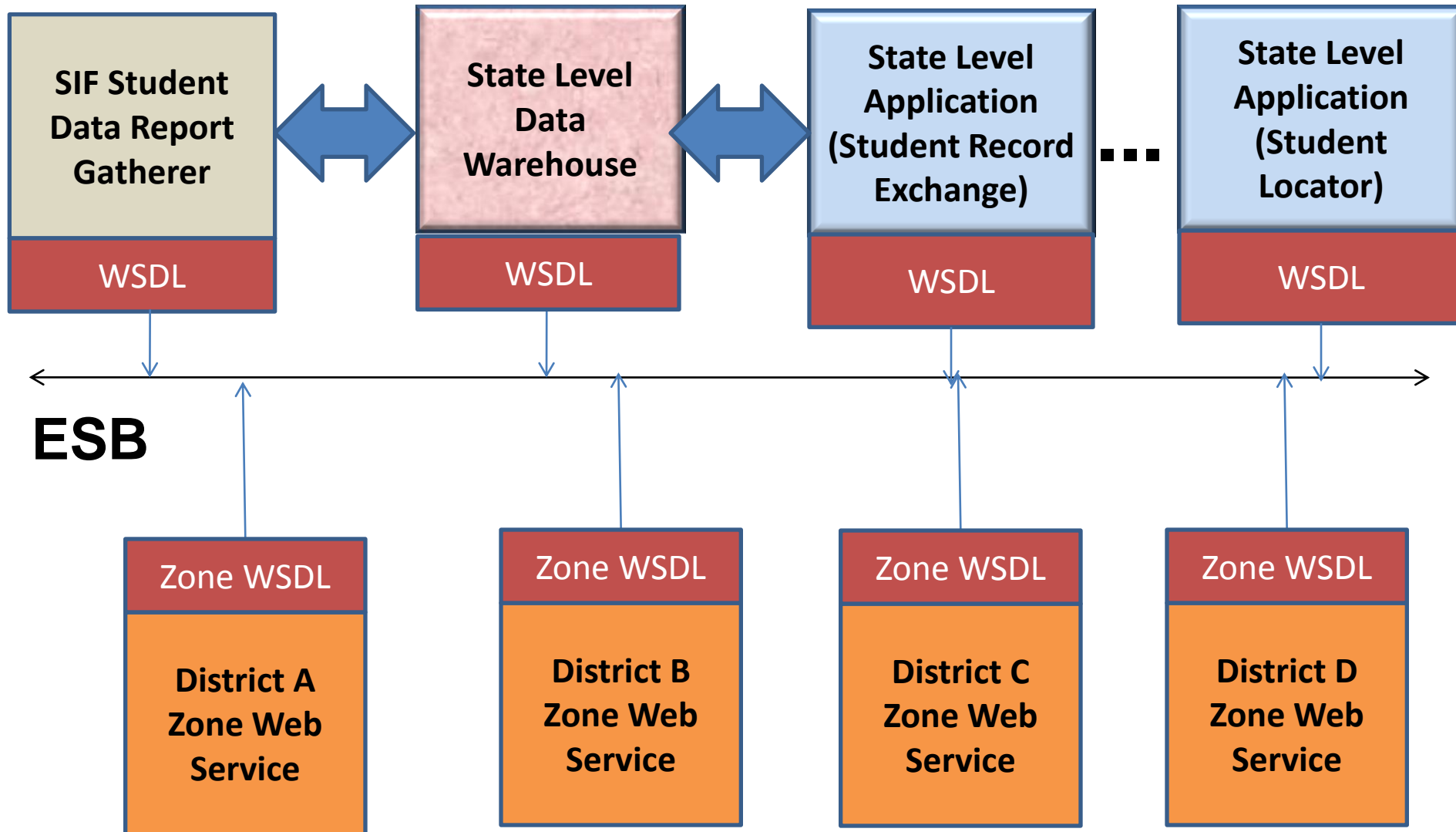
- **Student data xfers directly from Districts to State**
 - State Agent registers in all District Zones
 - Subscribes to SIS Events in each District Zone
 - Requests latest student data direct from owning District
 - Full SEA / LEA student data sharing
- **State level Student Agent**
 - Data updates are dynamic (as they happen at District)
 - Student Data formatted and provided to State LDS.
 - Can be written as a Web Service (SIF is “SOA”)
- **Administrators reuse existing WS toolsets & Skills**
 - Service Governance, Service test & diagnostics

“Global” SEA Agent Spans District Zones





SIF Zones as Independent Web Services in an SEA Enterprise



Questions



EduGuy