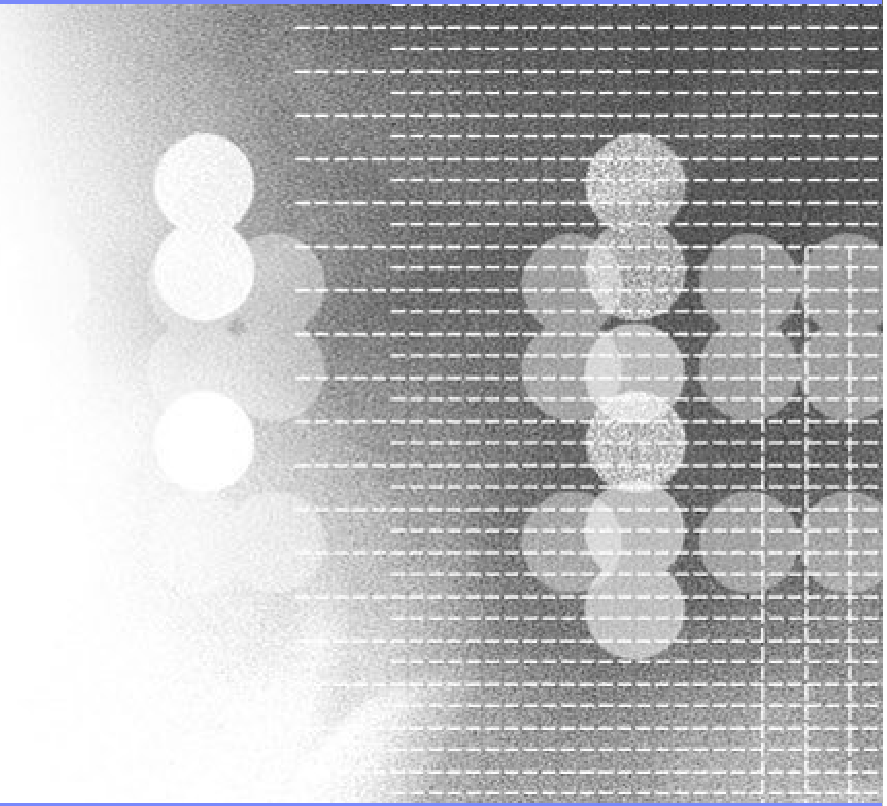
z/TPF EE V1.1
z/TPFDF V1.1
TPF Toolkit for WebSphere® Studio V3
TPF Operations Server V1.2

TPF Users Group Spring 2006

An SOA Primer



Name: Bill Cousins
Venue: Distributed Systems

AIM Enterprise Platform Software

IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

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Agenda

- SOA Overview
- SOA Programming Model
- SOA on TPF
- SOA Enablement Patterns
- Recap

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Service Oriented Architecture Overview

- What is a service?
  - A repeatable business task; a distinct business function
  - So what is that to my TPF application?
    - Application functions, implemented as transactions, can generally be transformed into services
    - Complex transactions may be implemented as several services
  - Why would I want to implement services?
    - Open up your business functions outside of TPF
    - Also make your customer data available
  - Services are implemented in *components*

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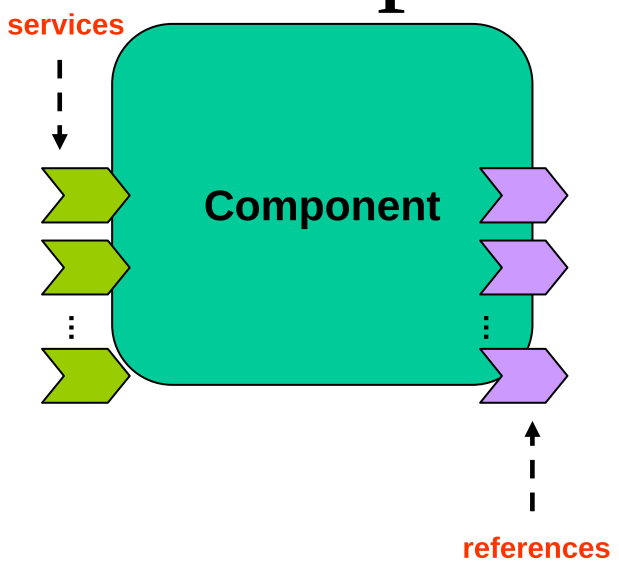
Components



- A component provides **Services** to other components
  - (The Service in SOA)
- Service **Interfaces** are defined *usually* with WSDL
  - (In the Web services implementation of SOA)
- Components are linked to create **composite applications**

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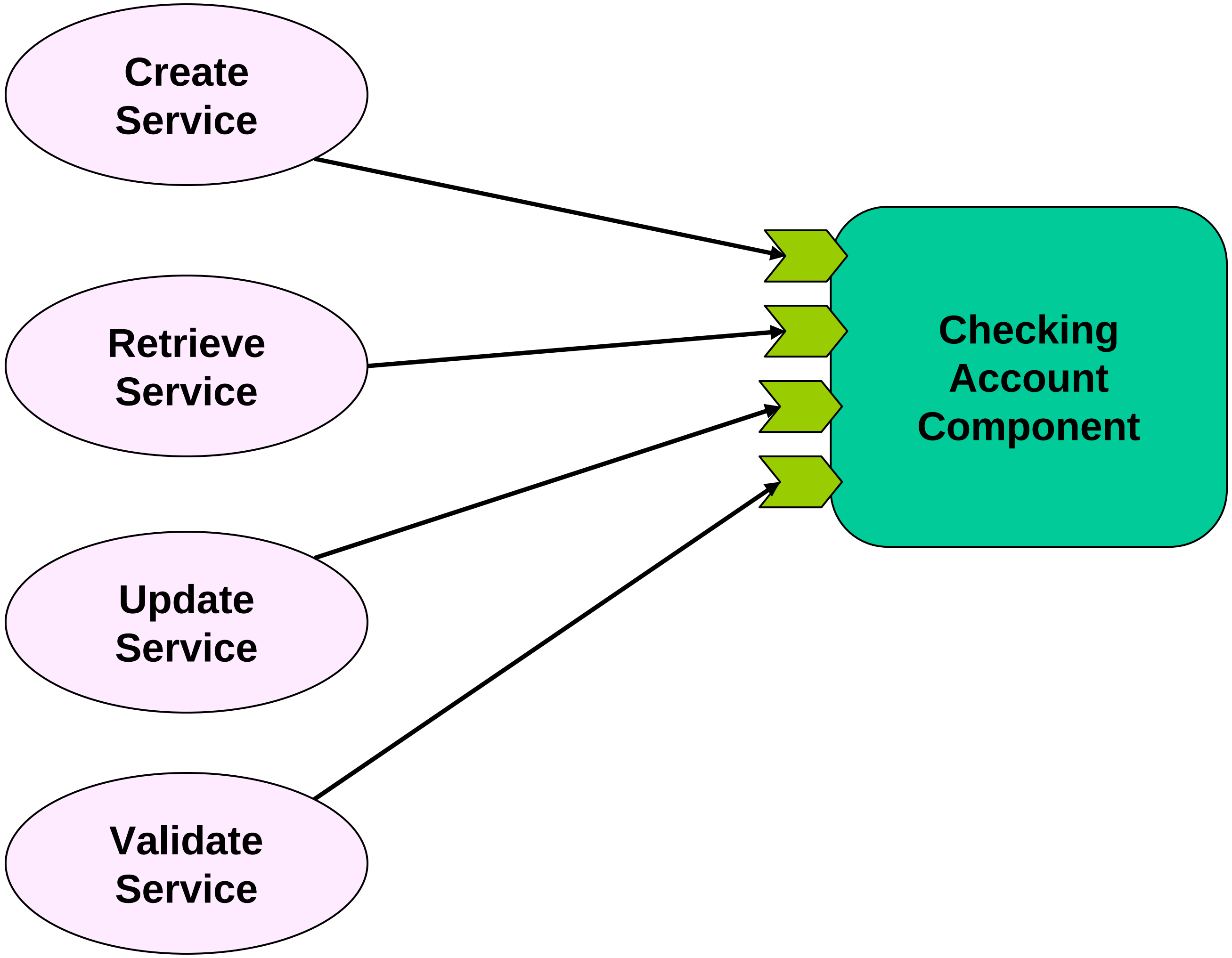
Component Example



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SOA Overview (cont’d)

- What is a composite application?
  - ➢A set of related and integrated services that support a business process
  - ➢This is how applications are built in an SOA environment
  - ➢Services can be deployed across a heterogeneous environment
    - 👍The full breadth of the enterprise can be leveraged to implement new business processes
    - 👍Reuse and increased flexibility provides quicker time to market

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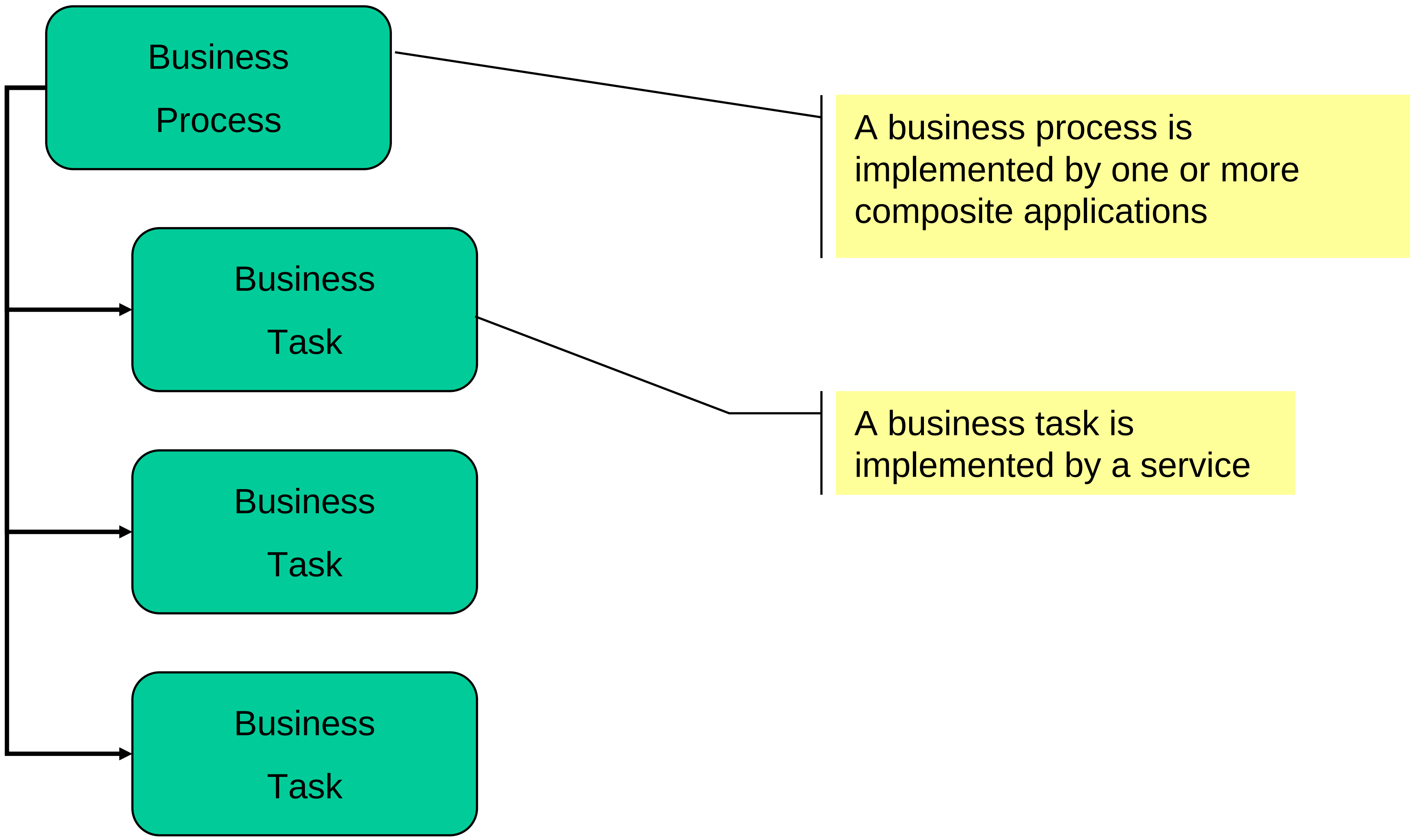
SOA and Business Process



A business process is implemented by one or more composite applications

A business task is implemented by a service

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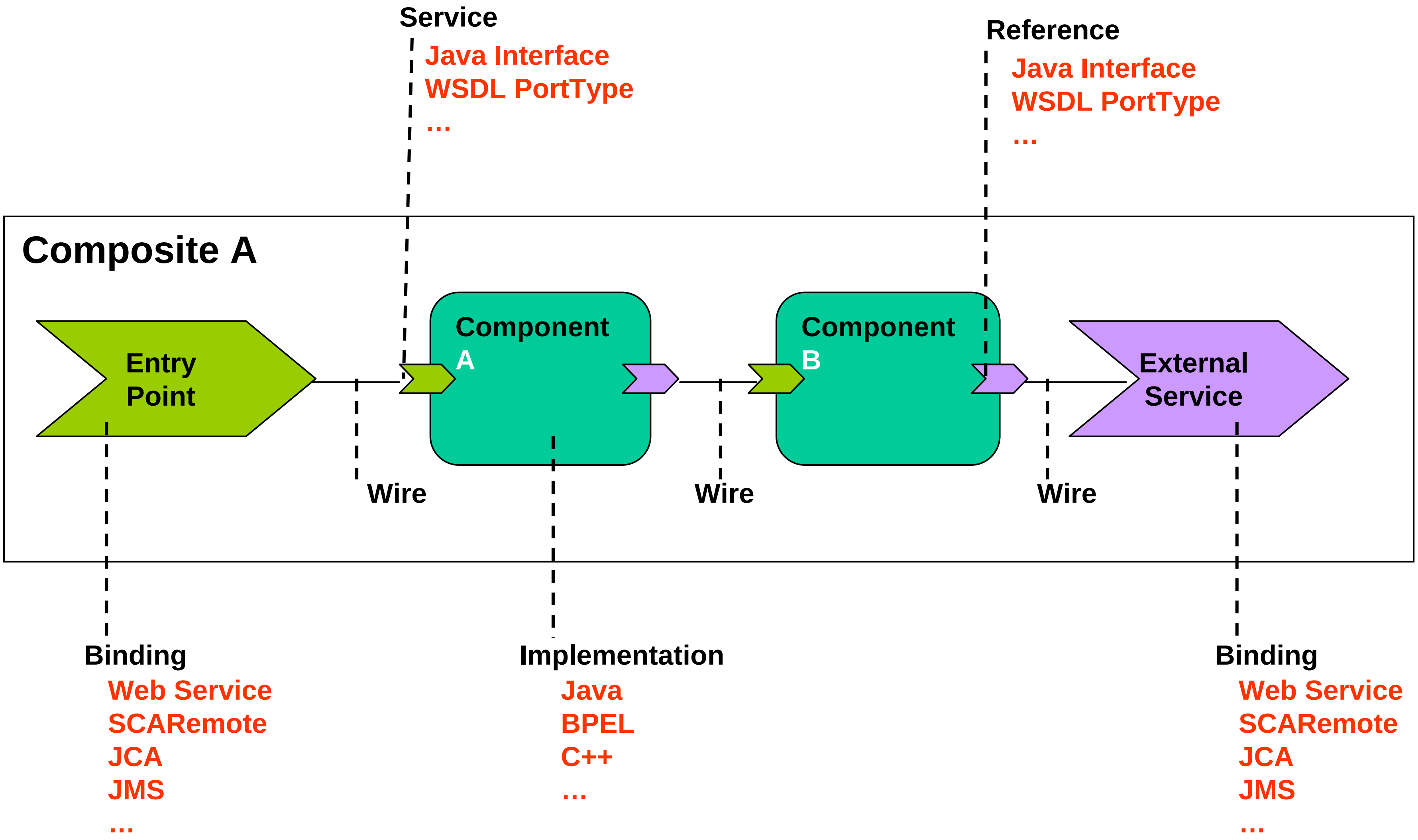
Composite Application



Service

Java Interface
WSDL PortType
…

Reference

Java Interface
WSDL PortType
…

Binding

Web Service
SCARemote
JCA
JMS
…

Implementation

Java
BPEL
C++
…

Binding

Web Service
SCARemote
JCA
JMS
…

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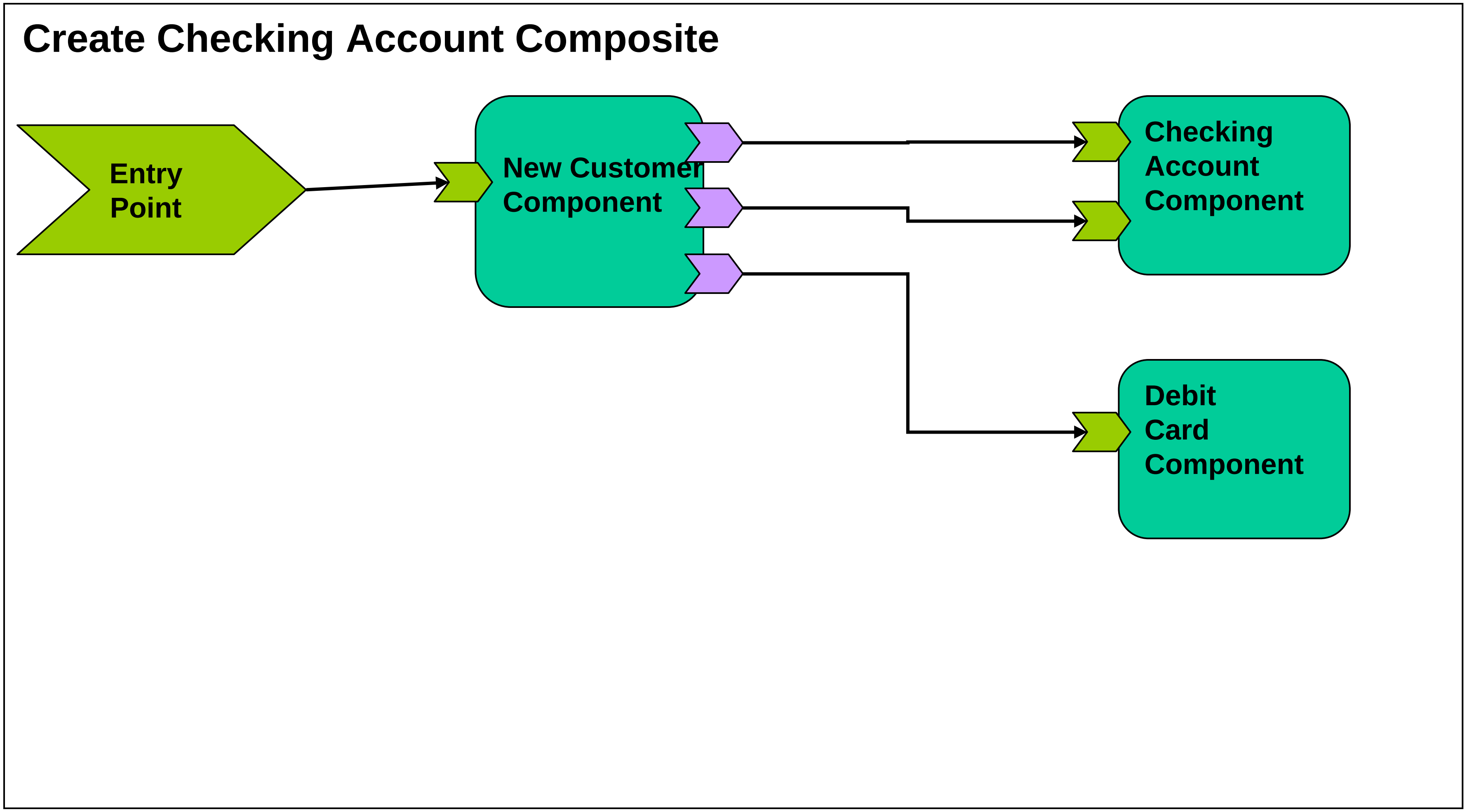
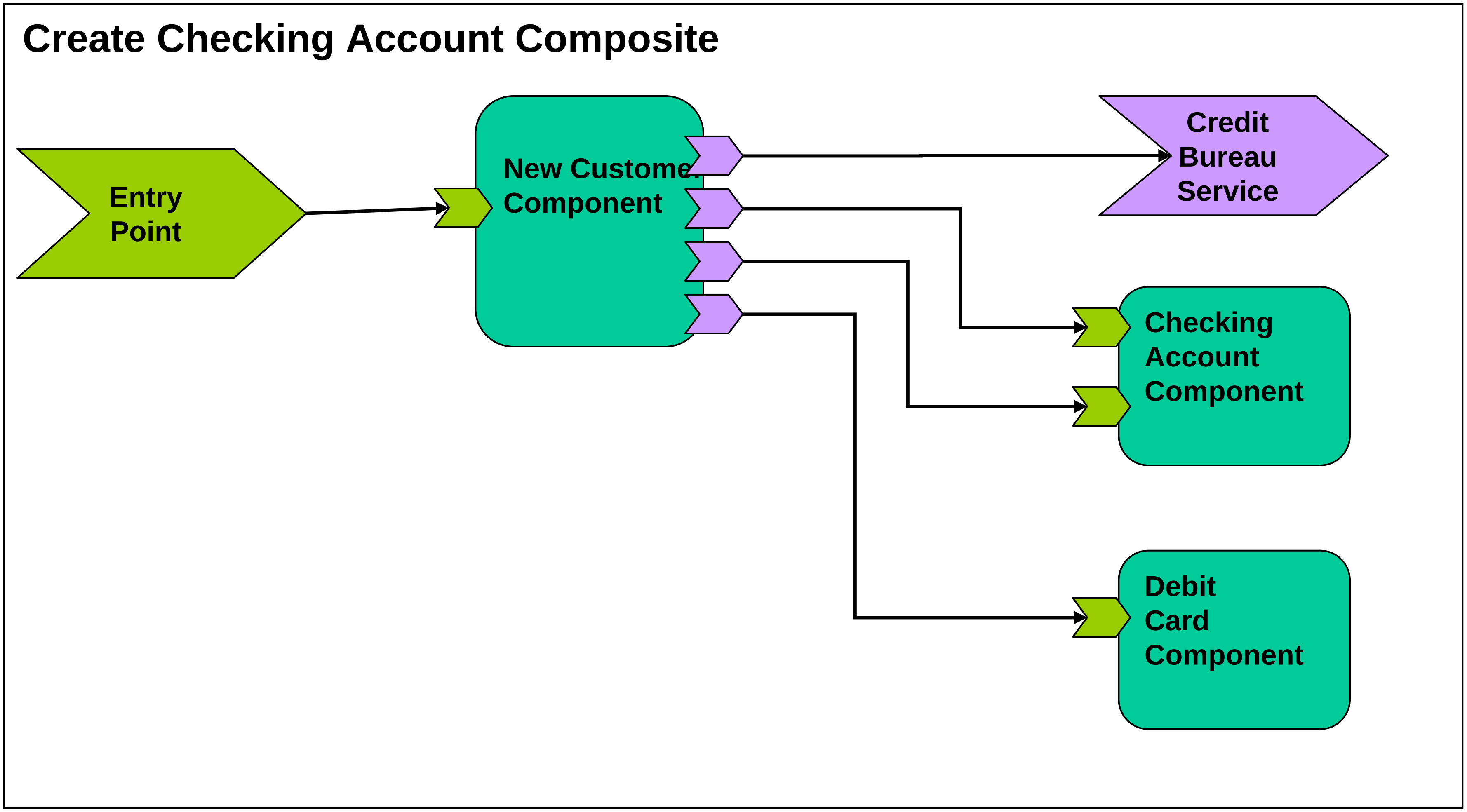
Composite Application Example



Create Checking Account Composite

Composite Application Example



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SOA Overview

- What is SOA?
  - An IT architectural style that supports service orientation
  - Creates new applications by coordinating services
  - New terms to be aware of:
    - Service consumer
    - Service provider
    - Service registrar

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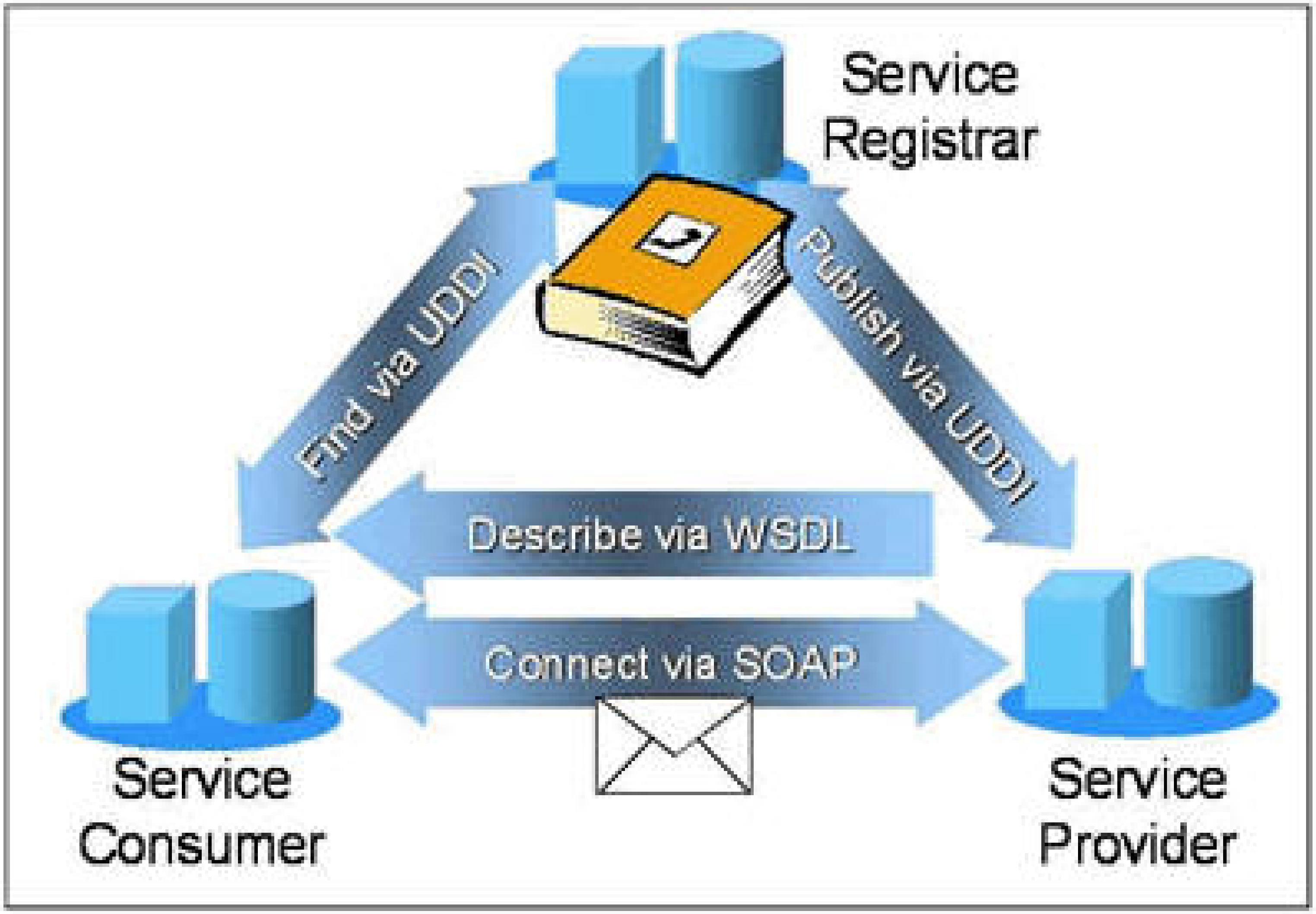
SOA Roles and Operations



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What does SOA mean to…

- a business analyst
  - ➢a set of business services that depict the business process to be exposed to customers and clients
- a software architect
  - ➢an architectural style that requires a service provider, service consumer, and service description
- a software developer
  - ➢a programming model with standards, tools, and methodologies to implement services

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SOA Programming Model

- Service Component Architecture
  - ➢Provides ability to integrate services into composite applications
- Service Data Objects
  - ➢Standardizes data access across heterogeneous data sources
  - ➢Data Access Service
    - Handles connectivity to a data source
- Enterprise Service Bus
  - ➢Provides connectivity between services and composite applications

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SOA on TPF

- The SOA implementation on TPF is with Web services
  - Web services is becoming the primary implementation of SOA (XML, SOAP, HTTP (Apache), …)
- Allows TPF to participate in an enterprise-wide SOA environment
  - Business analysts and software architects can include TPF in their plans
- Opens TPF applications and data to outside systems
  - Using standard, open methods

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Web Services

- Standards for documenting service interfaces and invoking services
- Focuses on distinct services and business operations
- Exploits Internet standards
  - ➢For example, HTTP/S, XML
- Flexible aggregation of services into new, modified business processes and solutions

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SOA Enablement Patterns

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SOA Enablement Patterns (cont’d)

- Wrapping
  - An existing application has a gateway attached to manipulate input and output messages to provide an SOA interface
  - Changes are made to the application to return to the gateway instead of sending the response message
  - This pattern allows for access to the application but limited reuse and flexibility

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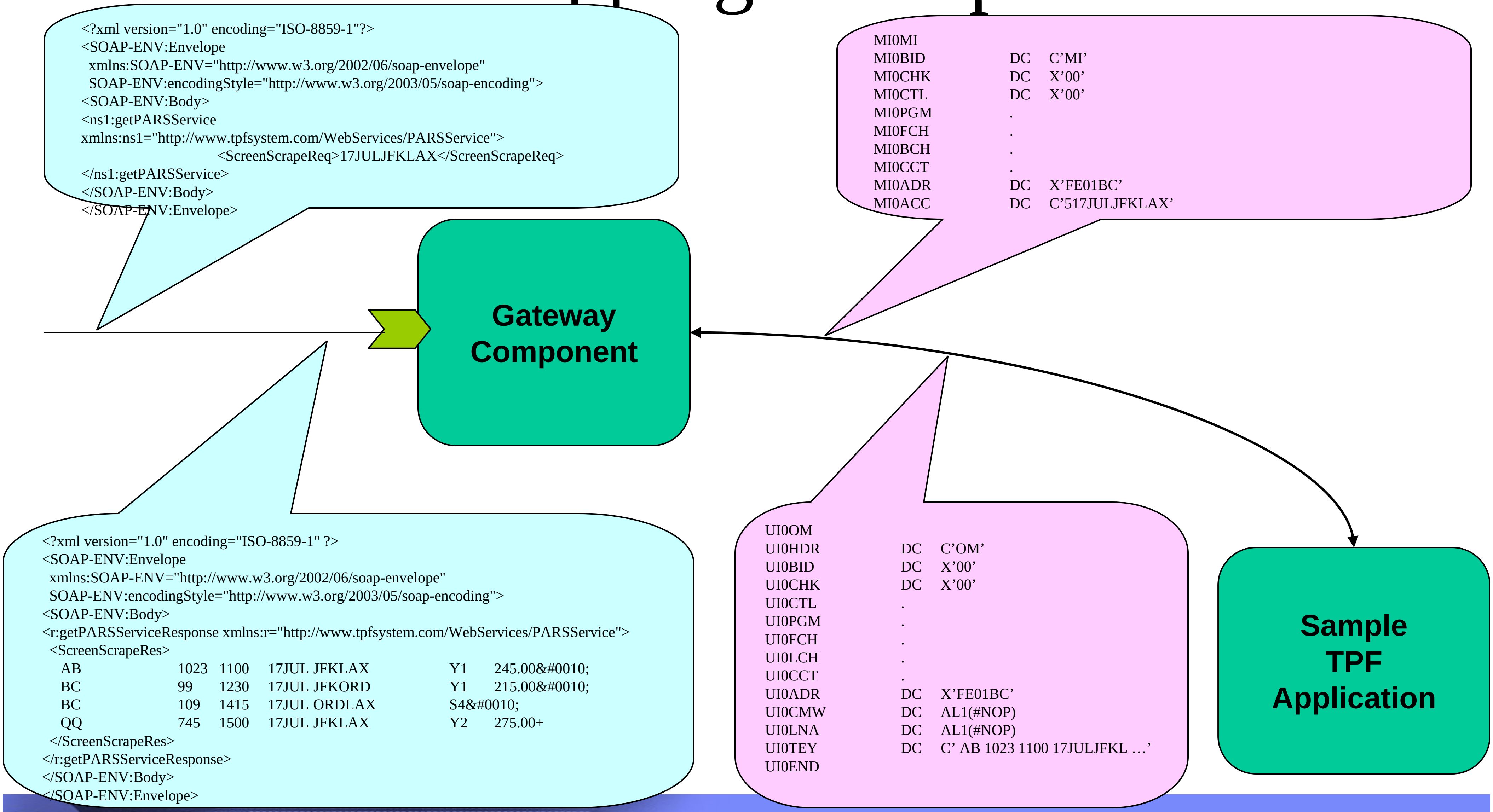
Wrapping Example



```
<?xml version="1.0" encoding="ISO-8859-1"?>
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://www.w3.org/2002/06/soap-envelope"
  SOAP-ENV:encodingStyle="http://www.w3.org/2003/05/soap-encoding">
<SOAP-ENV:Body>
<ns1:getPARSService
xmlns:ns1="http://www.tpfsystem.com/WebServices/PARSService">
                  <ScreenScrapeReq>17JULJFKLAX</ScreenScrapeReq>
</ns1:getPARSService>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

```
MI0MI
MI0BID          DC   C'MI'
MI0CHK          DC   X'00'
MI0CTL          DC   X'00'
MI0PGM          .
MI0FCH          .
MI0BCH          .
MI0CCT          .
MI0ADR          DC   X'FE01BC'
MI0ACC          DC   C'517JULJFKLAX'
```

Gateway Component

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://www.w3.org/2002/06/soap-envelope"
  SOAP-ENV:encodingStyle="http://www.w3.org/2003/05/soap-encoding">
<SOAP-ENV:Body>
<r:getPARSServiceResponse xmlns:r="http://www.tpfsystem.com/WebServices/PARSService">
  <ScreenScrapeRes>
    AB          1023   1100    17JUL JFKLAX           Y1     245.00&#0010;
    BC          99     1230    17JUL JFKORD           Y1     215.00&#0010;
    BC          109    1415    17JUL ORDLAX           S4&#0010;
    QQ          745    1500    17JUL JFKLAX           Y2     275.00+
  </ScreenScrapeRes>
</r:getPARSServiceResponse>
</SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```

```
UI0OM
UI0HDR          DC   C'OM'
UI0BID          DC   X'00'
UI0CHK          DC   X'00'
UI0CTL          .
UI0PGM          .
UI0FCH          .
UI0LCH          .
UI0CCT          .
UI0ADR          DC   X'FE01BC'
UI0CMW          DC   AL1(#NOP)
UI0LNA          DC   AL1(#NOP)
UI0TEY          DC   C' AB 1023 1100 17JULJFKL …'
UI0END
```

Sample TPF Application

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SOA Enablement Patterns (cont’d)

- Refacing
  - An existing application is modified to provide a new SOA interface; business logic is separated from the message logic
  - A service wrapper is written to transform datatypes between XML and native format needed by the application
  - This pattern allows for access to the application and increased reuse and flexibility

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Refacing Example

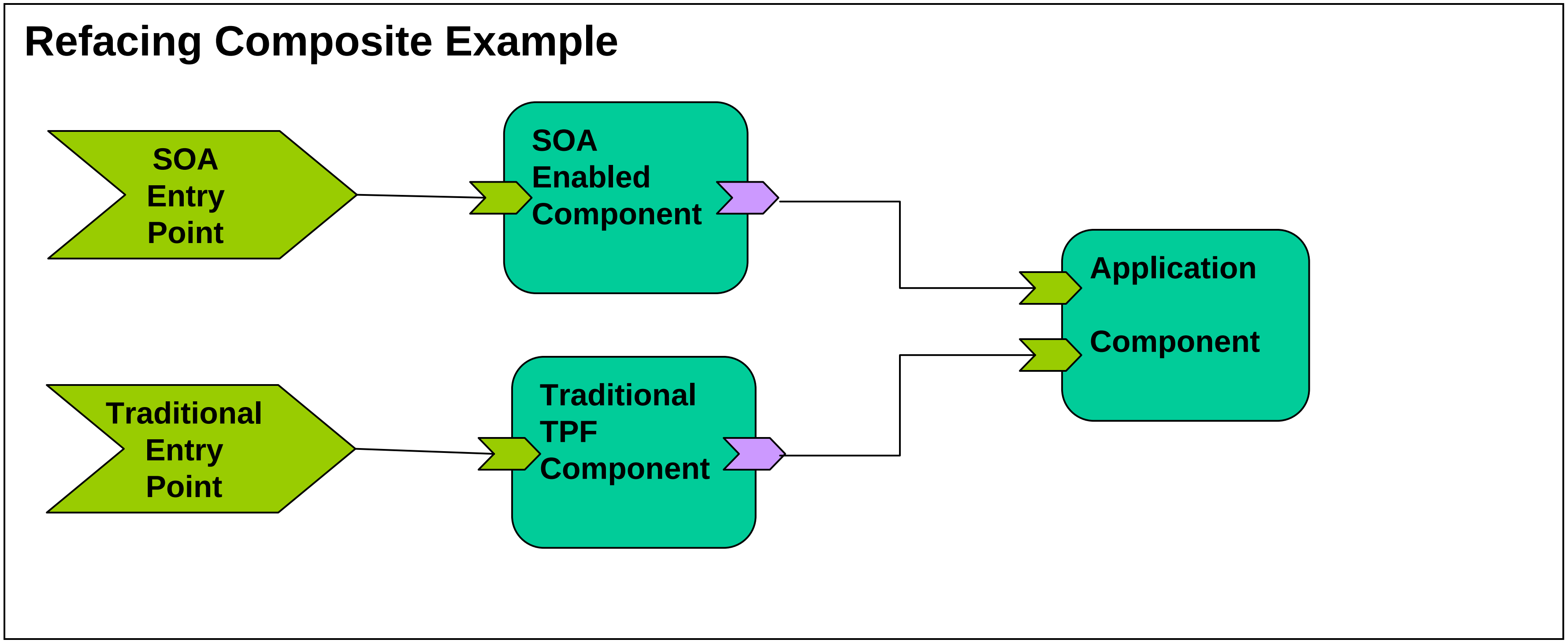
- **Sample Request Message**
- <?xml version="1.0" encoding="ISO-8859-1"?>
- <SOAP-ENV:Envelope
-   xmlns:SOAP-ENV="http://www.w3.org/2002/06/soap-envelope"
-   SOAP-ENV:encodingStyle="http://www.w3.org/2003/05/soap-encoding">
- <SOAP-ENV:Body>
- <ns1:getAvailability xmlns:ns1="http://www.tpfsystem.com/WebServices/AvailabilityService">
-   <Date>
-     <Day>17</Day>
-     <Month>JUL</Month>
-   </Date>
-   <CityPair>
-         <DepartureCity>JFK</DepartureCity>
-         <DestinationCity>LAX</DestinationCity>
-   </CityPair>
- </ns1:getAvailability>
- </SOAP-ENV:Body>
- </SOAP-ENV:Envelope>

Refacing Example (cont’d)

- **Sample Response Message**

```
•   <?xml version="1.0" encoding="ISO-8859-1" ?>
•   <SOAP-ENV:Envelope
•     xmlns:SOAP-ENV="http://www.w3.org/2002/06/soap-envelope"
•     SOAP-ENV:encodingStyle="http://www.w3.org/2003/05/soap-encoding">
•   <SOAP-ENV:Body>
•   <r:getAvailabilityResponse xmlns:r="http://www.tpfsystem.com/WebServices/AvailabilityService">
•               <carrier>AB</carrier>
•               <flight>1023</flight>
•               <time>1100</time>
•               <Date>
•               <Day>17</Day>
•               <Month>JUL</Month>
•               </Date>
•               <CityPair>
•                           <DepartureCity>JFK</DepartureCity>
•                           <DestinationCity>LAX</DestinationCity>
•               </CityPair>
•               <class-of-service>Y1</class-of-service>
•               <price>245.00</price>
•   </r:getAvailabilityResponse>
•   </SOAP-ENV:Body>
•   </SOAP-ENV:Envelope>
```

Refacing Example (cont'd)



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SOA Enablement Patterns (cont’d)

- Componentizing
  - The existing application is deconstructed into components.
  - This pattern is more applicable to new applications
  - Creates service interfaces to internal functions that were not previously accessible
  - This pattern allows for maximum value for access to the application, for reuse and flexibility

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SOA Enablement Considerations

- Create application portfolio
- Incremental changes
- Defensive coding
- Session state (AAA, RCB, etc.)
- Strategy and planning

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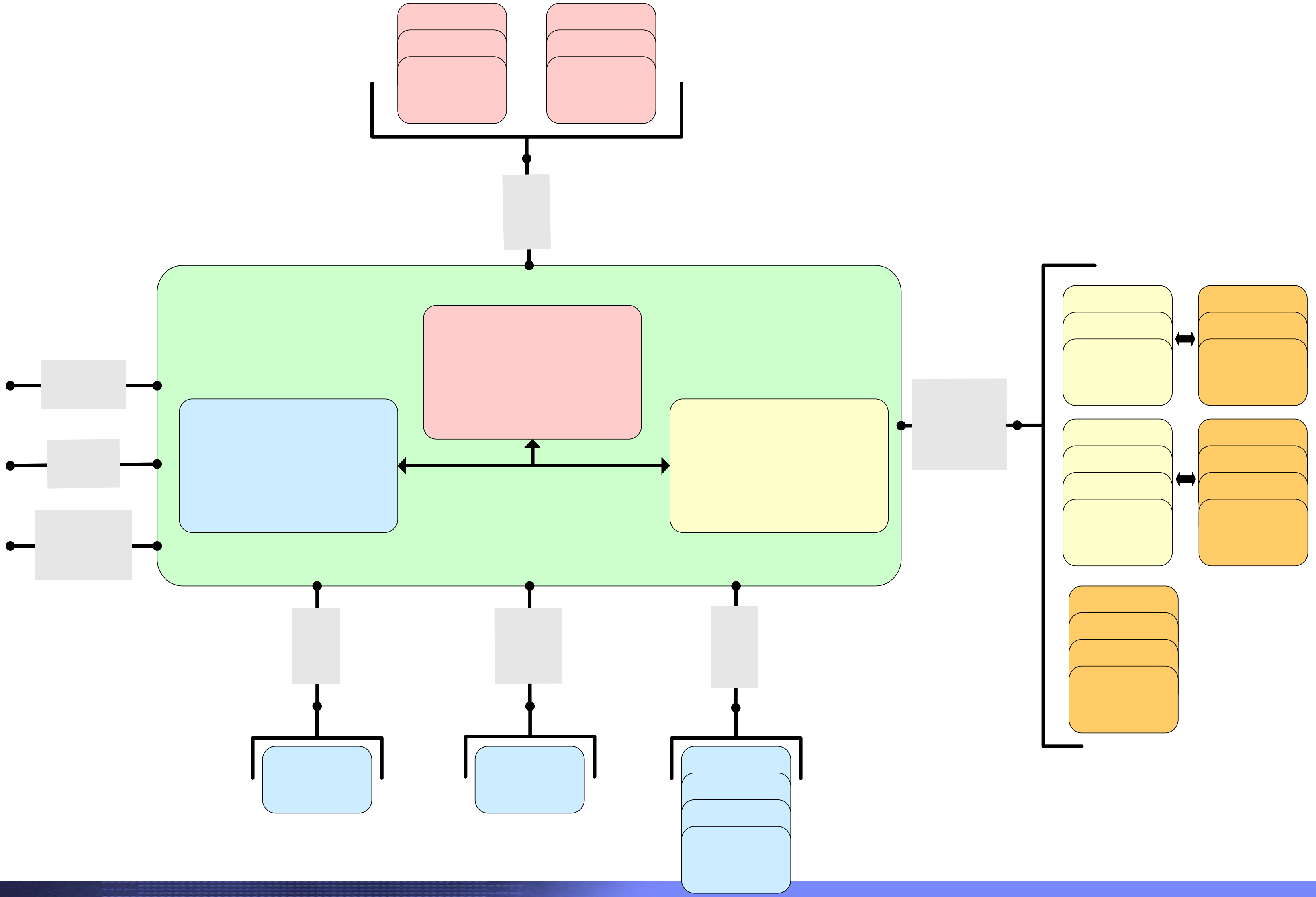
SOA Direction of Intent for z/TPF



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Recap

- SOA can be implemented incrementally
  - Use it to open TPF business logic and data
- Wider adoption of SOA yields greater benefits
  - Enable TPF applications to participate in enterprise-wide business processes
- Web site for z/TPF SOA Whitepaper:
  - http://www.ibm.com/software/htp/tpf/pages/SOA_White_Paper_v1_2.pdf
- For further information, see your IBM customer rep

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