



| z/TPF V1.1

TPF Users Group – Fall 2012

Title: **Creating Composite
Web Services on z/TPF**

**Colette Manoni
Edwin van de Grift
Ongoing Education**

AIM Enterprise Platform Software
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

Any reference to future plans are for planning purposes only. IBM reserves the right to change those plans at its discretion. Any reliance on such a disclosure is solely at your own risk. IBM makes no commitment to provide additional information in the future.

© 2012 IBM Corporation

Agenda

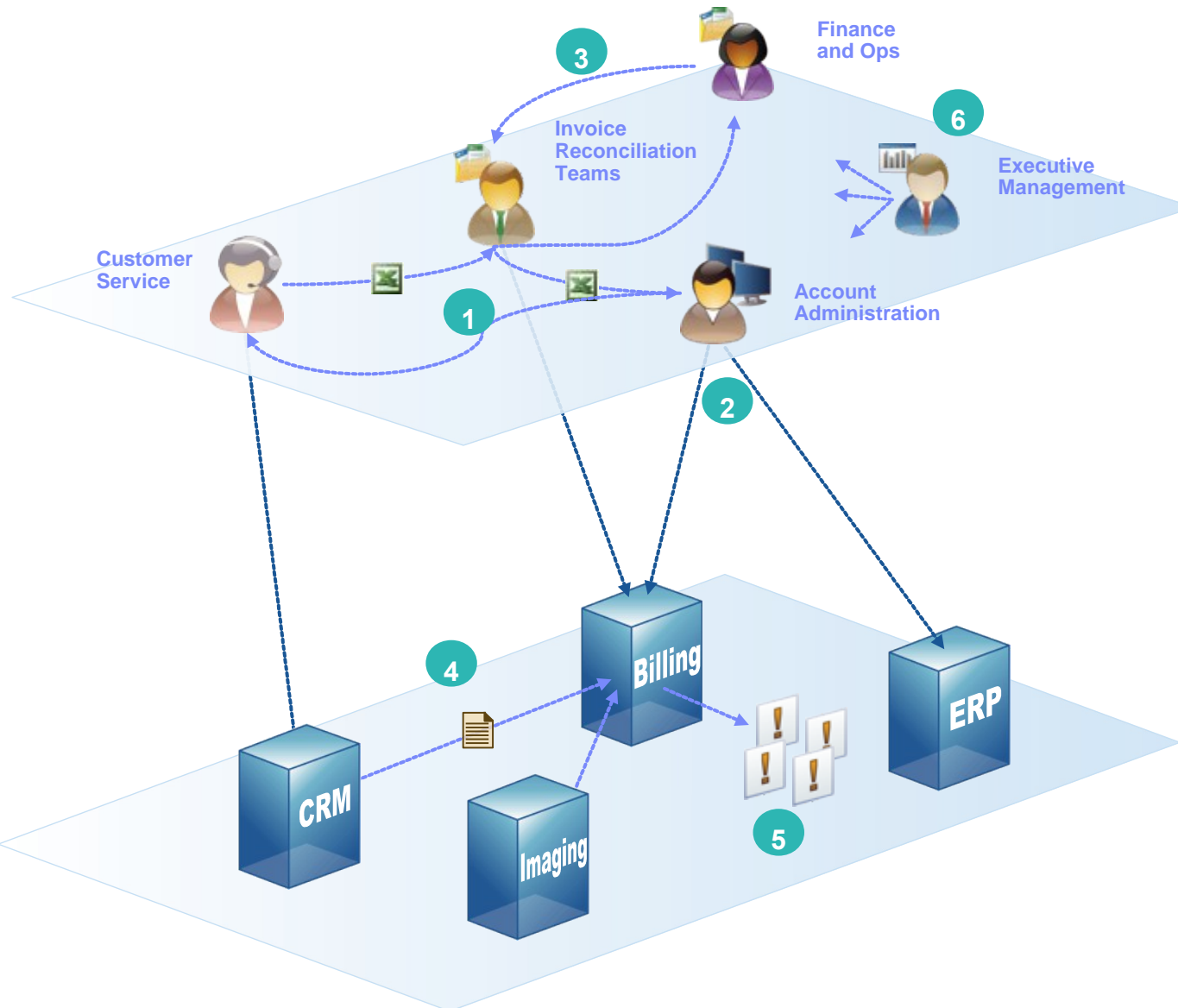
- **Introduction to business process management**
 - Overview and value of business process management
 - Composite web services vs. Web service orchestration
 - Overview of Business Process Execution Language (BPEL)
 - Overview of Business Process Model Notation (BPMN)
 - What is ESB mediation and how does it differ from web service orchestration?
- **Leveraging z/TPF capabilities to create composite web services**
 - Web service wrapper for provider service
 - Calling web service provider locally
 - Combining BAL segments to create composite service
 - Using consumer service to create composite service
- **References**
- **Summary / Questions**

Introduction to Business Process Management

Goals of Business Process Management

- **Grow business**
 - Improve existing processes
 - Create new processes
- **Reduce expenses**
 - Eliminate inefficiencies
 - Reuse existing assets

Typical Business Problems

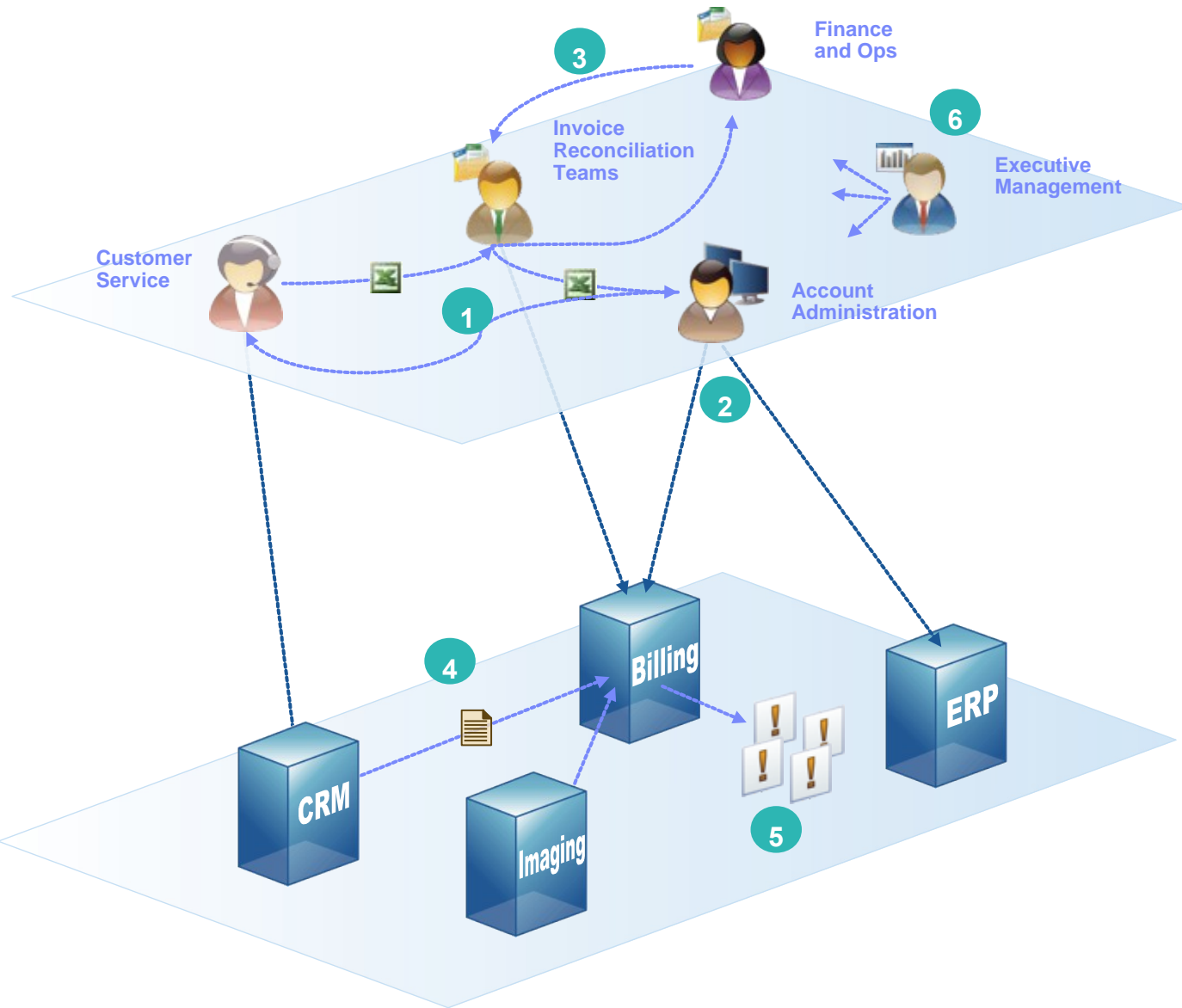


1. Unstructured tasks and communication (i.e., paper or e-mail)
2. Inefficient Working Environment Spans Systems
3. Inconsistent Prioritization
4. Incomplete or Inaccurate Data Flow Between Systems
5. Lack of Control Over System and Business Events (Exceptions)
6. Poor Visibility Into Process Performance

Customer Problem:

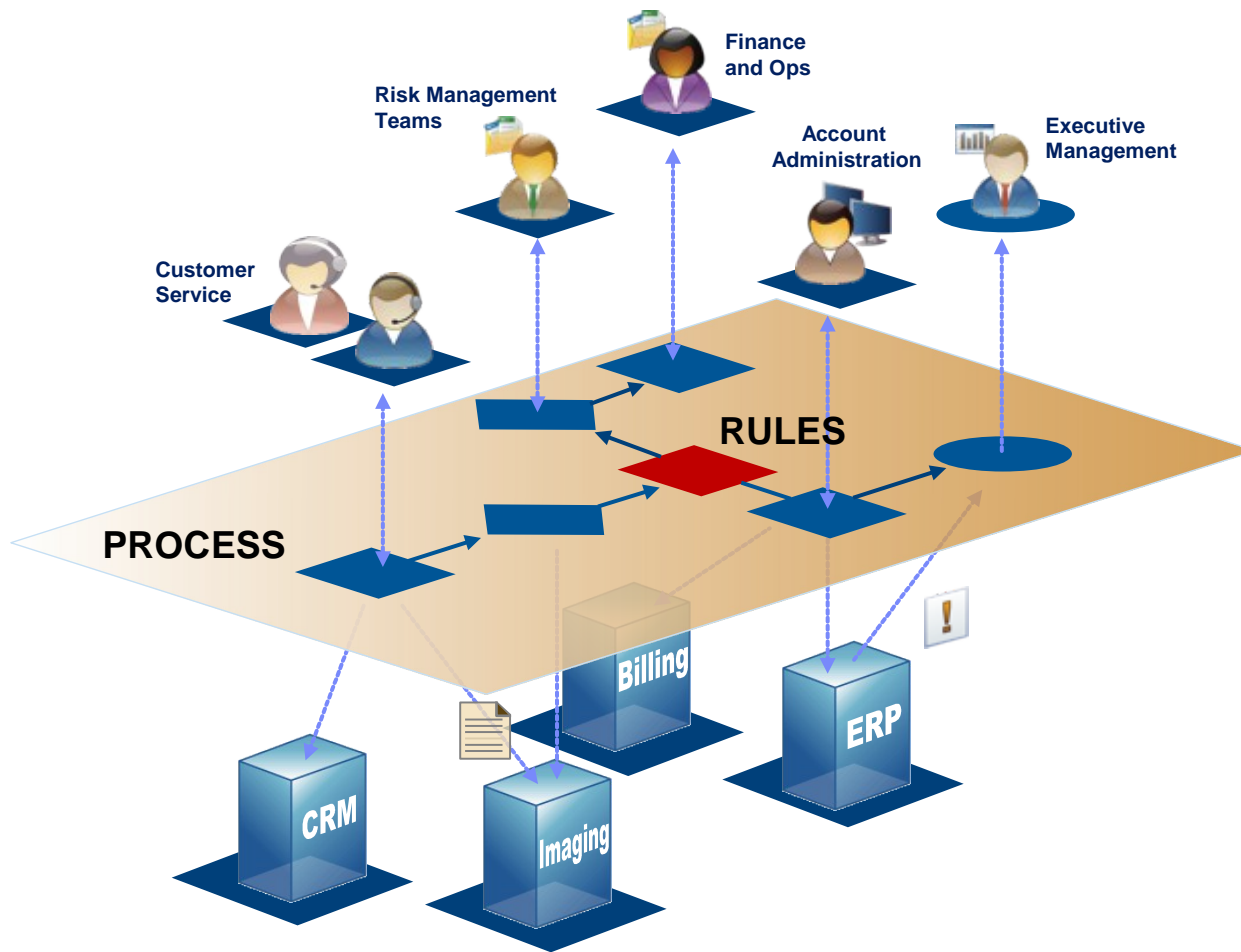
- Cannot Grow Efficiently
- Customer Satisfaction

Typical Business Problems



Inefficient
Ineffective
Inaccurate
Incomplete
Inconsistent
Inflexible
Invisible

BPM and Decision Management Brings Order to the Chaos

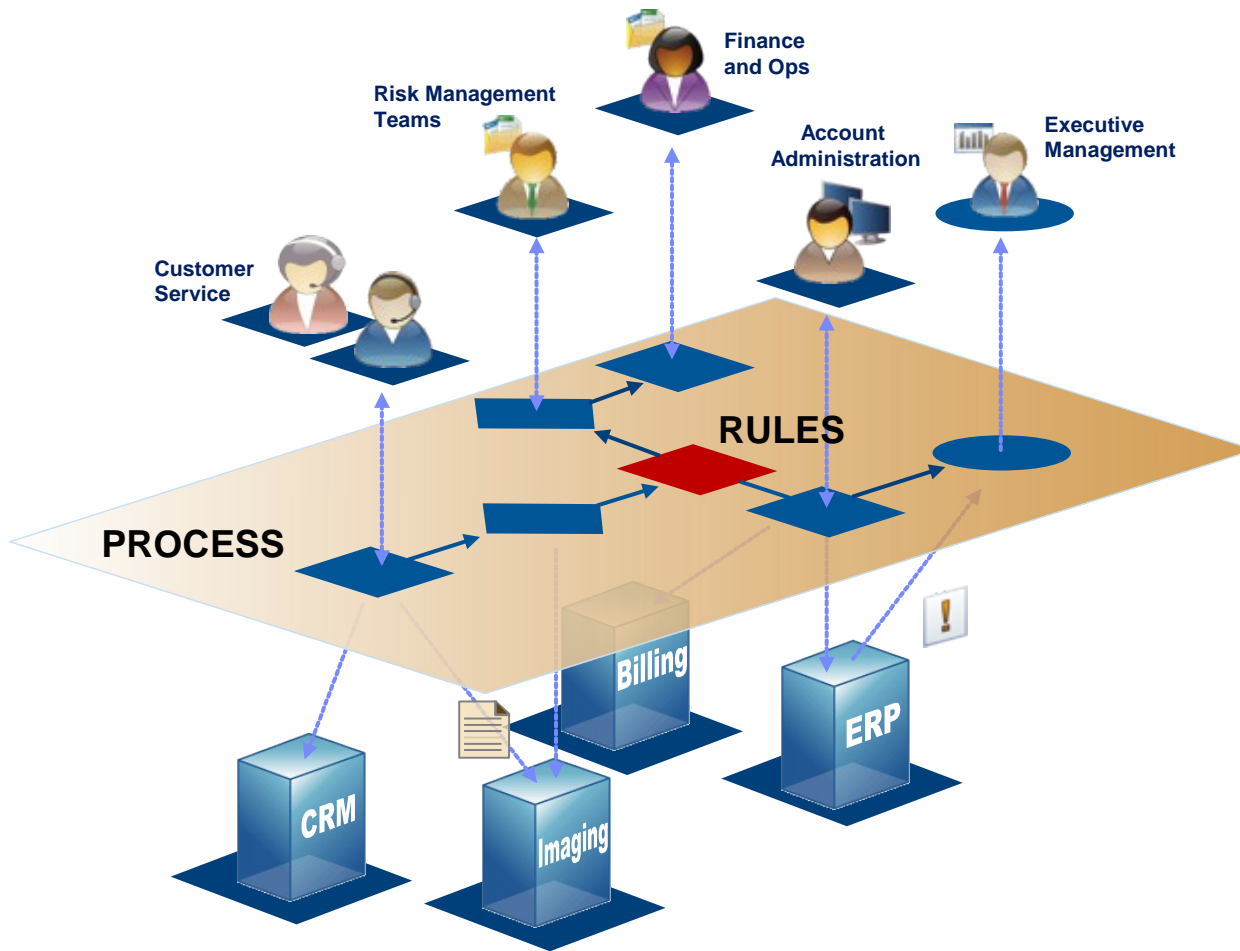


- 1 Automate workflow & decision making
- 2 Reduce errors and improve consistency
- 3 Standardize resolution across geographies
- 4 Leverage existing systems and data
- 5 Monitor for business events and initiate actions
- 6 Real-time visibility and process control

Customer Benefits:

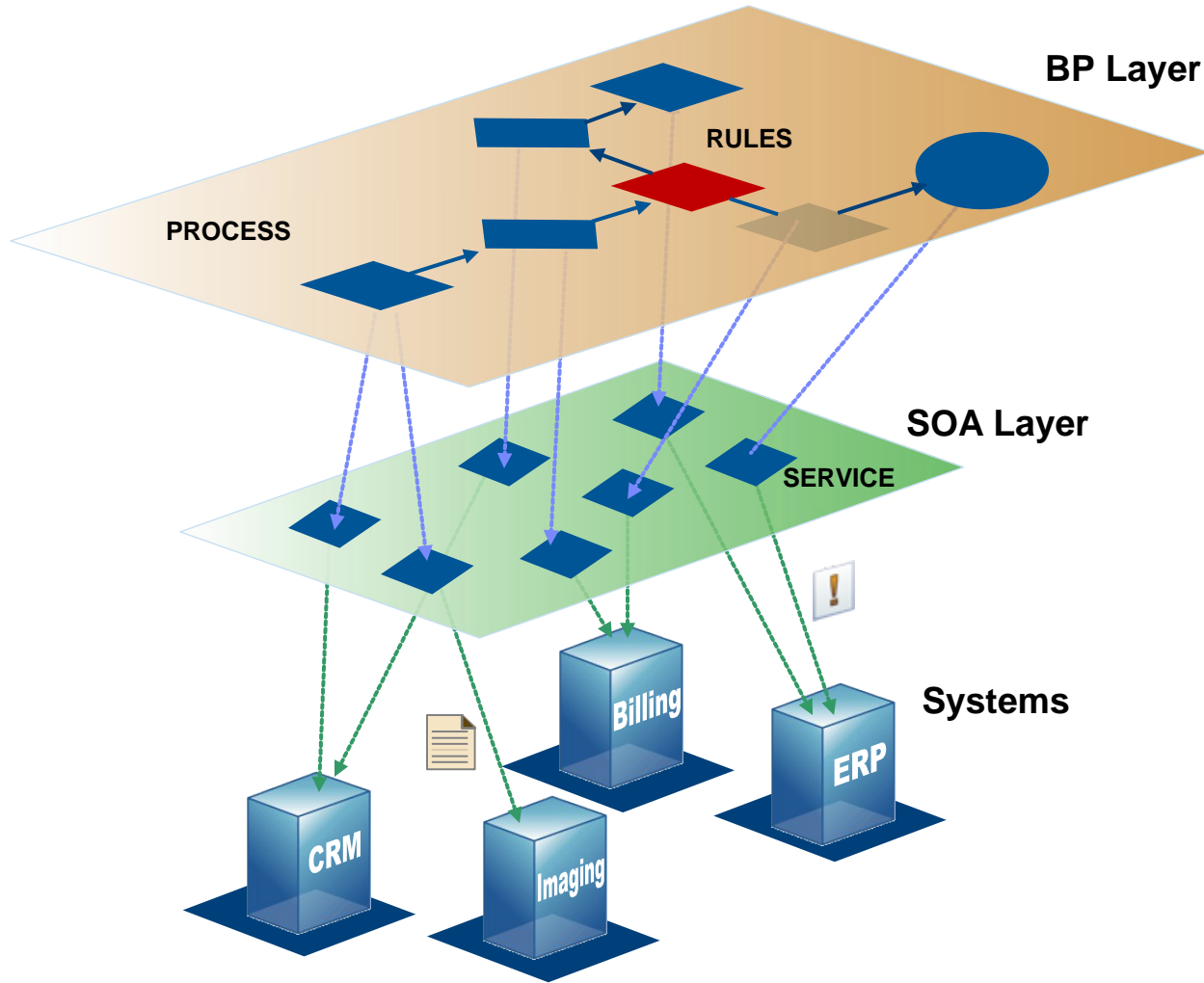
- Huge Reduction in Manual Work, Errors
- Faster, More Consistent Issue Resolution
- Easier to Manage the Business
- Consistent Case Handling

BPM and Decision Management Brings Order to the Chaos



Consistent
Accurate
Complete
Flexible
Visible
Efficient
Effective

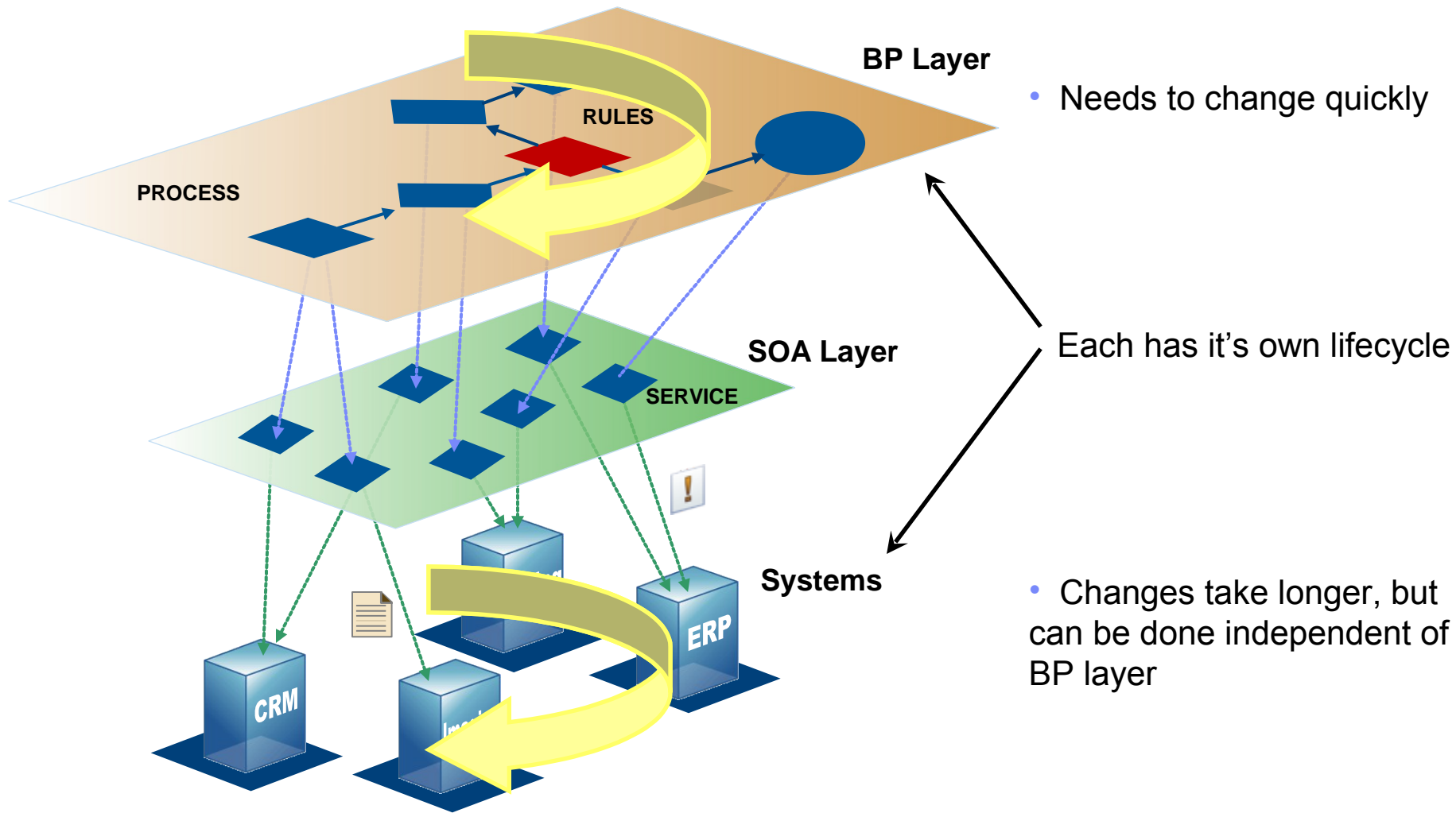
Under the covers is a supporting SOA infrastructure



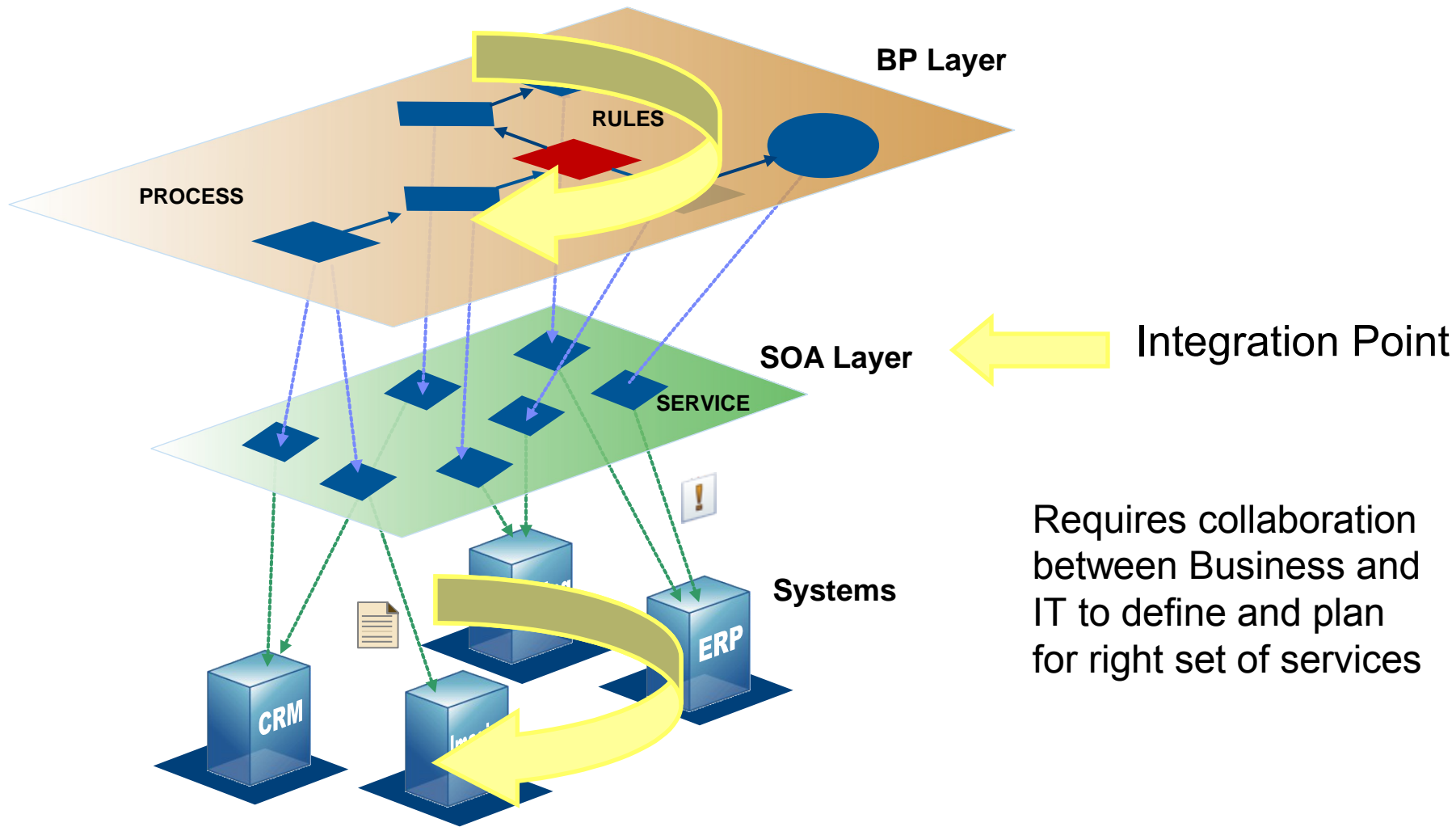
- BP Layer is owned and managed by the business team

- Systems owned and managed by IT team

Under the covers is a supporting SOA infrastructure

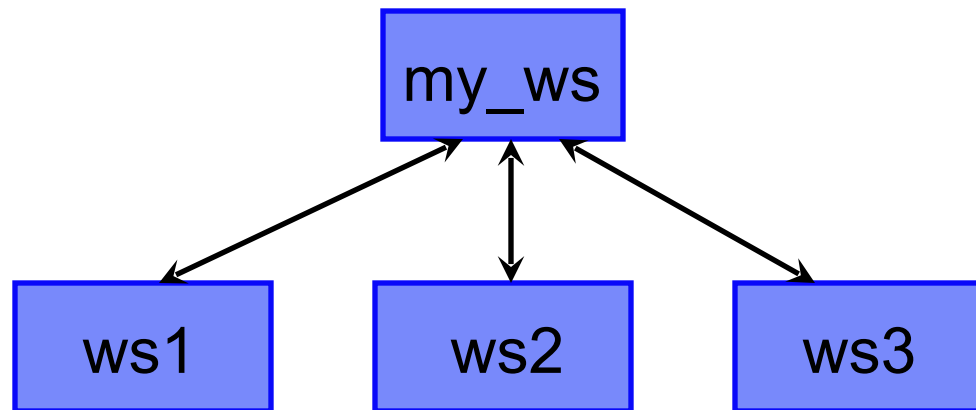


Under the covers is a supporting SOA infrastructure



Composite Web Service

- Aggregate of other web services
 - Example: a web service makes calls to 3 other services
- Usually exposed as just another service (WSDL)
- Can contain a basic work or process flow
- Anything more complex is considered orchestration



Web Service Orchestration

- **Web service orchestration is the process of managing data, services, and a set of decisions to accomplish a business function**
- **Orchestration is similar to a composite in that it implements a work flow, but it is more complex**
 - Examples
 - Exception handling or compensation
 - Managing parallel execution

Business Process Execution Language (BPEL)

- **WS-BPEL 2.0 is a standard language designed to define the interfaces and behavior of a business process**
 - Relationships to external partners
 - Definitions of process data
 - Definitions of handlers
 - Activities to be executed
- **Uses several XML specifications**
 - WSDL 1.1 and XML Schema 1.0 – data model
 - XPath 1.0 and XSLT 1.0 – data manipulations

Business Process Execution Language (BPEL)

- **Primitive activities**

- <invoke>
 - invoking an operation on some web service
- <receive>
 - waiting for a message to operation of the service's interface to be invoked by someone externally
- <reply>
 - generating the response of an input/output operation
- <wait>
 - waiting for some time
- <assign>
 - copying data from one place to another
- <throw>
 - indicating that something went wrong
- <terminate>
 - terminating the entire service instance
- <empty>
 - or doing nothing

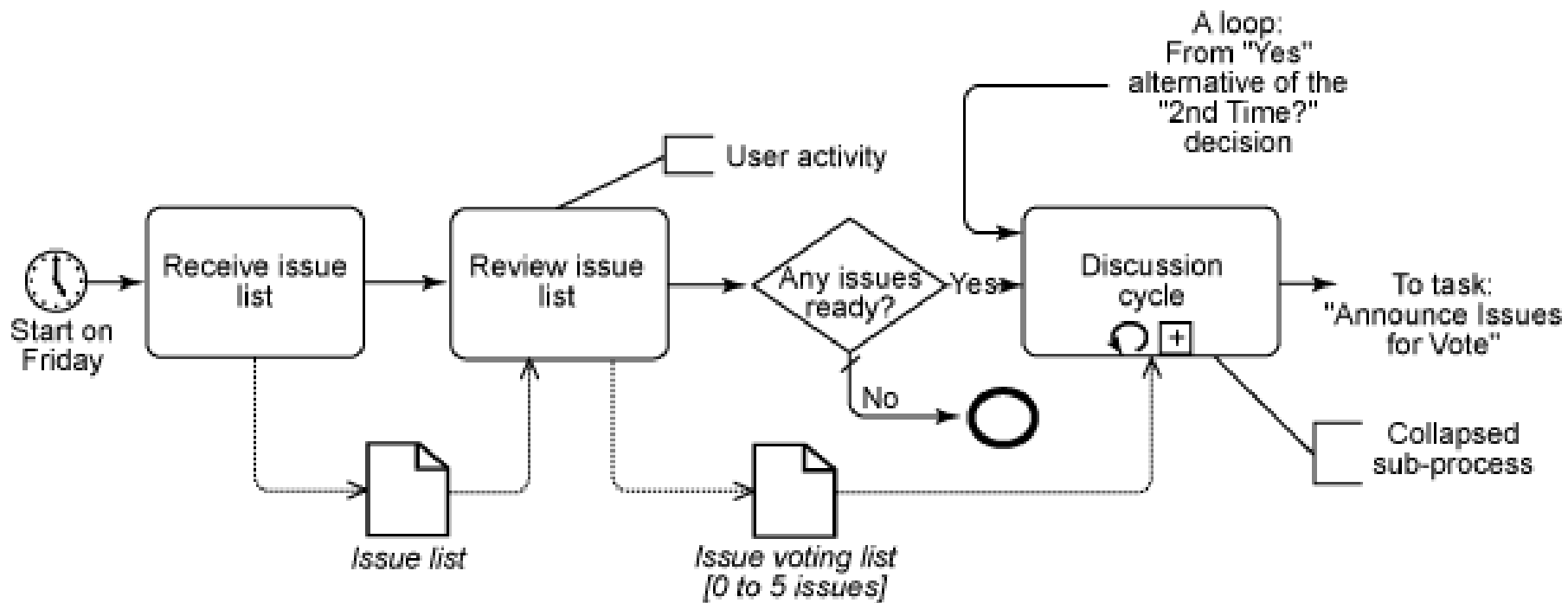
- **Structure activities**

- <sequence>
 - ordered sequence of steps
- <switch>
 - branching using the now common "case-statement" approach
- <while>
 - the ability to define a loop
- <pick>
 - the ability to execute one of several alternative paths
- <flow>
 - ability to indicate that a collection of steps should be executed in parallel

Business Process Modeling Notation (BPMN)

- **Provide standard graphical representation of a business process**
- **Goal is consistency: the same icon is used to represent the same object**
- **Easier to understand and use**
 - Don't need to be a programmer !

BPMN Example



Summary

- **Business process management is important**
- **SOA is the integration layer between business process and IT**
- **Collaboration is needed to define the right set of services in the SOA layer**
- **Composition and orchestration are tools that can be used to enable services in the SOA layer**

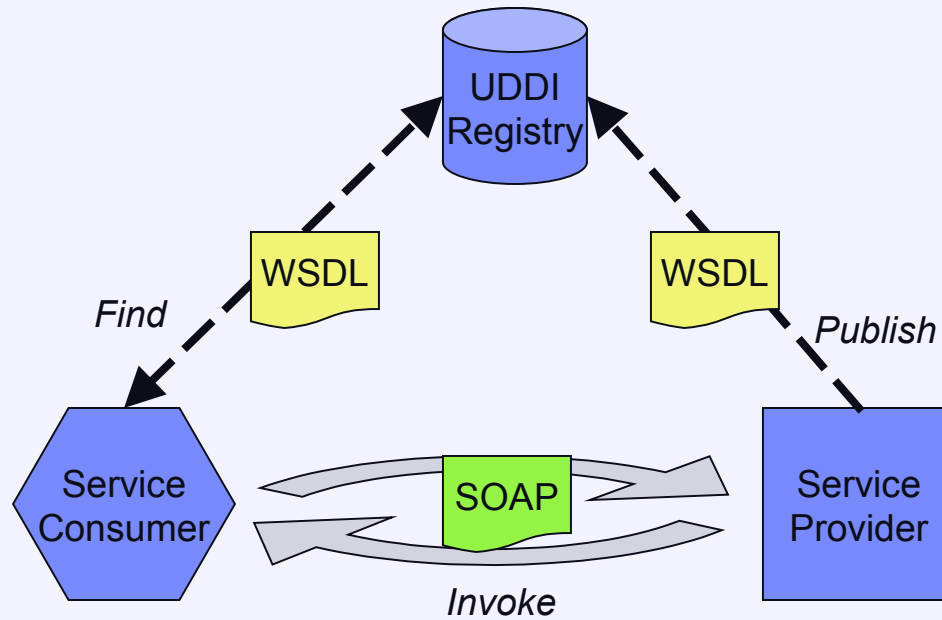
References

- **Toward a pattern language for Service-Oriented Architecture and Integration, Part 2: Service composition**
 - <http://www.ibm.com/developerworks/webservices/library/ws-soa-soi2/>
- **Business Process with BPEL4WS: Understanding BPEL4WS, Part 1**
 - <http://www.ibm.com/developerworks/webservices/library/ws-bpelcol1/>
- **BPEL Primer**
 - <http://docs.oasis-open.org/wsbpel/2.0/Primer/wsbpel-v2.0-Primer.pdf>
- **Business process standards**
 - http://www.ibm.com/developerworks/websphere/library/techarticles/0710_fasbinder/0710_fasbinder.html
- **Business process modeling notation**
 - <http://www.bpmn.org/>

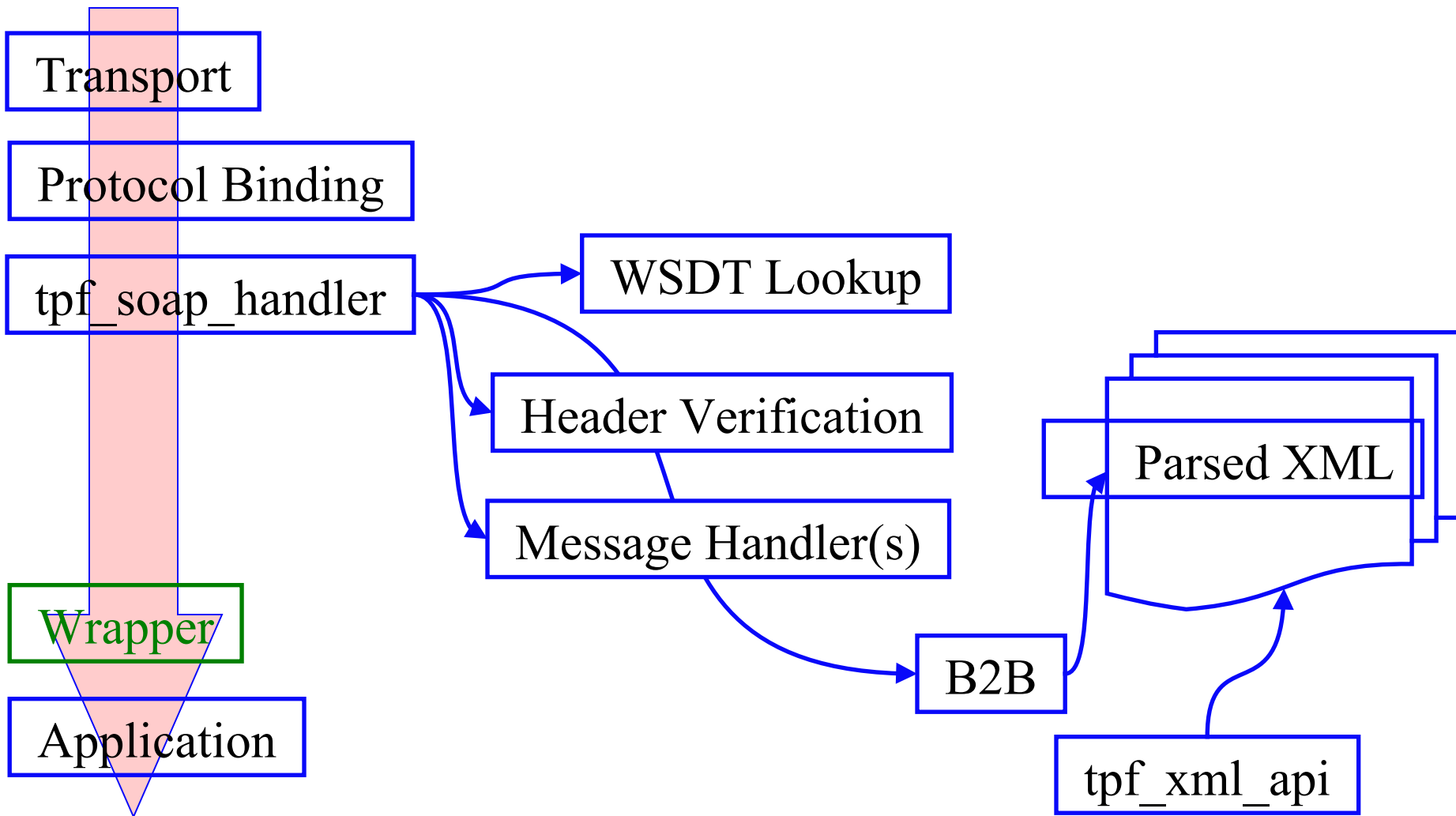
Leveraging z/TPF capabilities to create composite web services

Web Services

SOA



z/TPF Web Service Provider



z/TPF Web Service Wrapping

- **“Wrapper” = Web Service End Point**

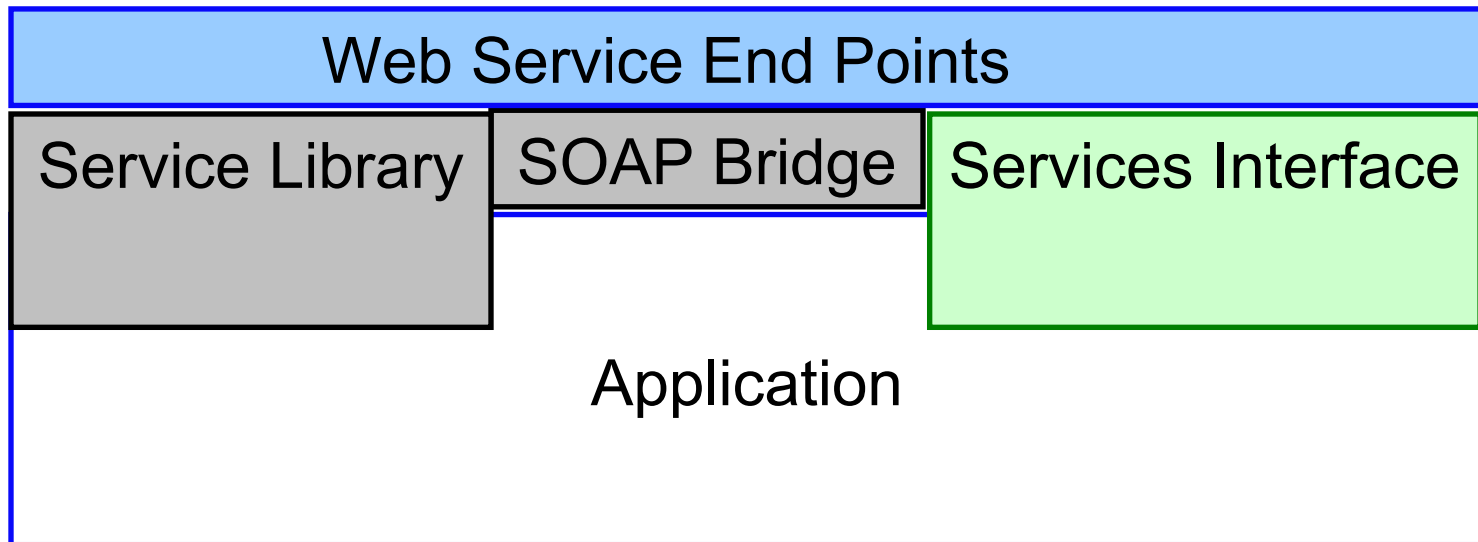
Web Service End Points

????????????????????

Application

z/TPF Web Service Wrapping

- **Service Library**
- **... Anything In Between ...**
- **Legacy Transactions**



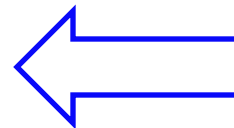
z/TPF SOAP Bridge

- **Wrapper**

- 1. Choose LNIATA
- 2. `tpf_soapBridge_register()`
- 3. `tpf_soapBridge_route()`
- 4. `tpf_soapBridge_receive()`
- 5. `tpf_soapBridge_unregister()`

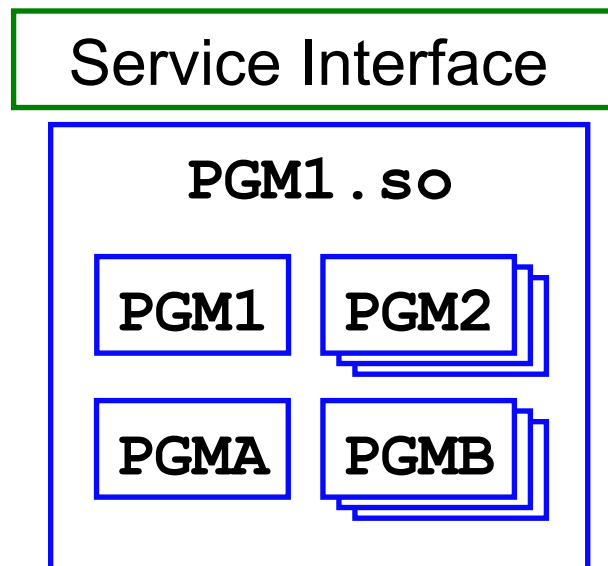


Existing unaltered
Application

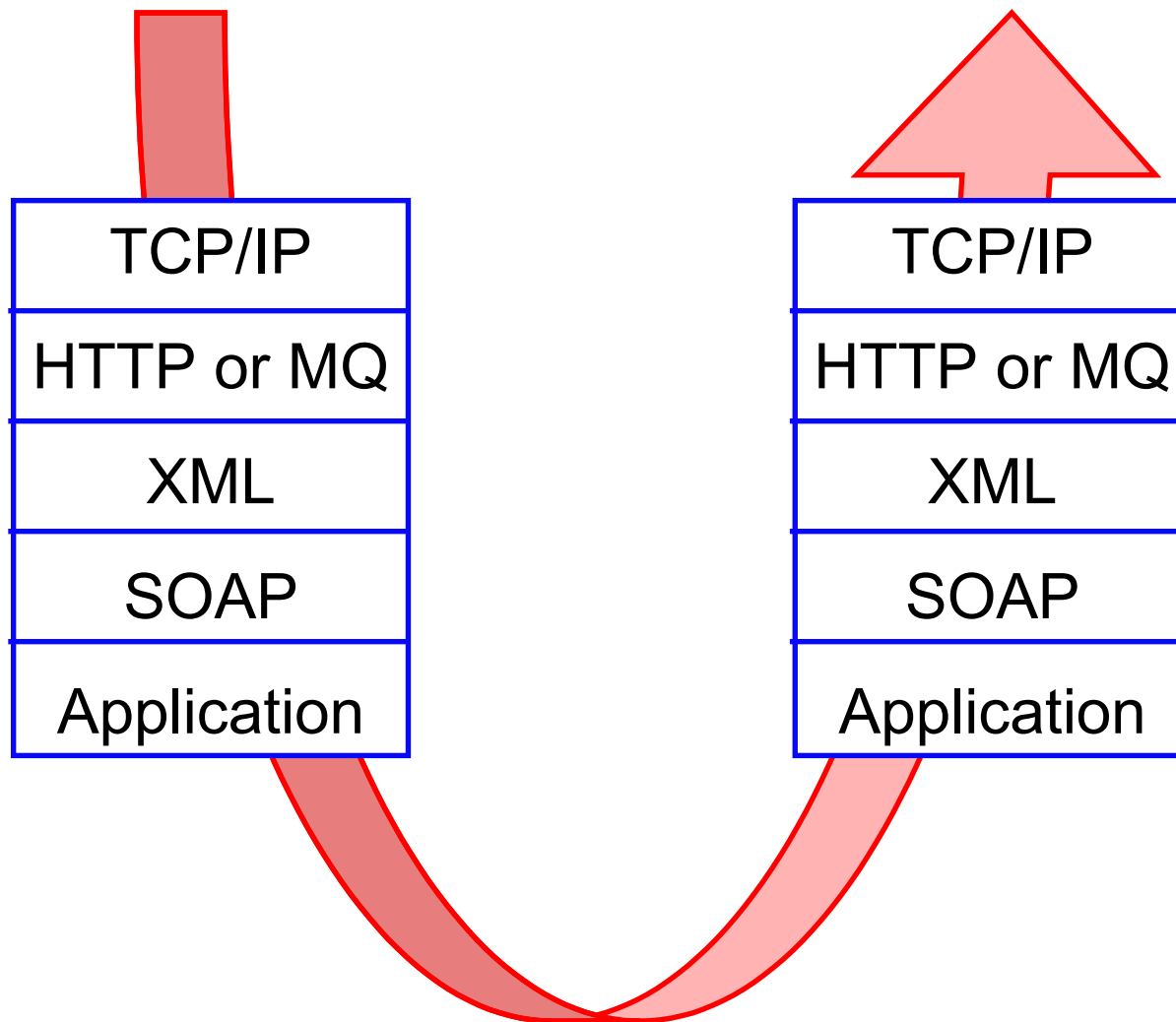


z/TPF Combining Assembler Segments

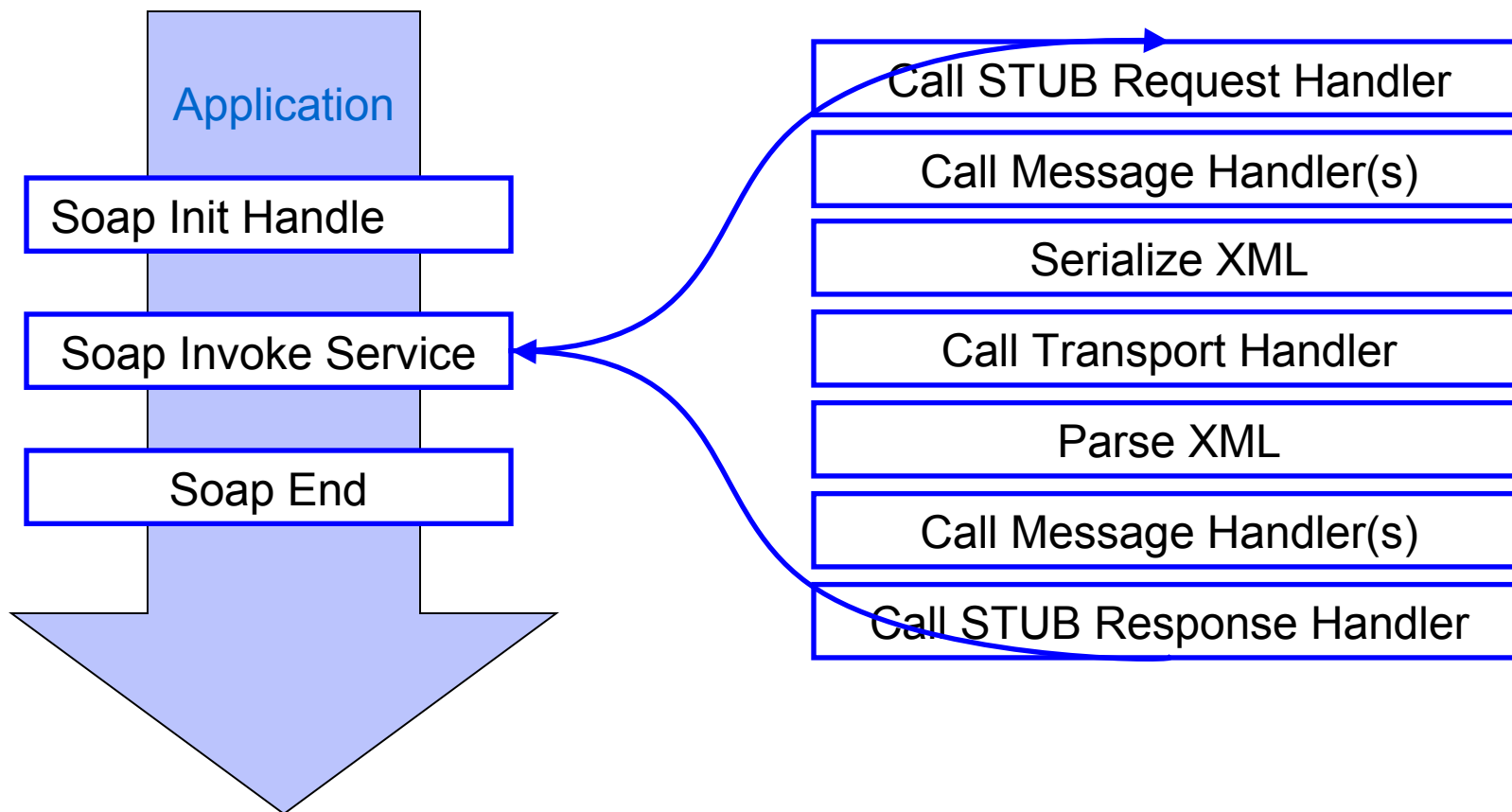
- **Decrease number of modules; increase interface manageability**
- **Also increase performance when using internal ENTR/BACK option**



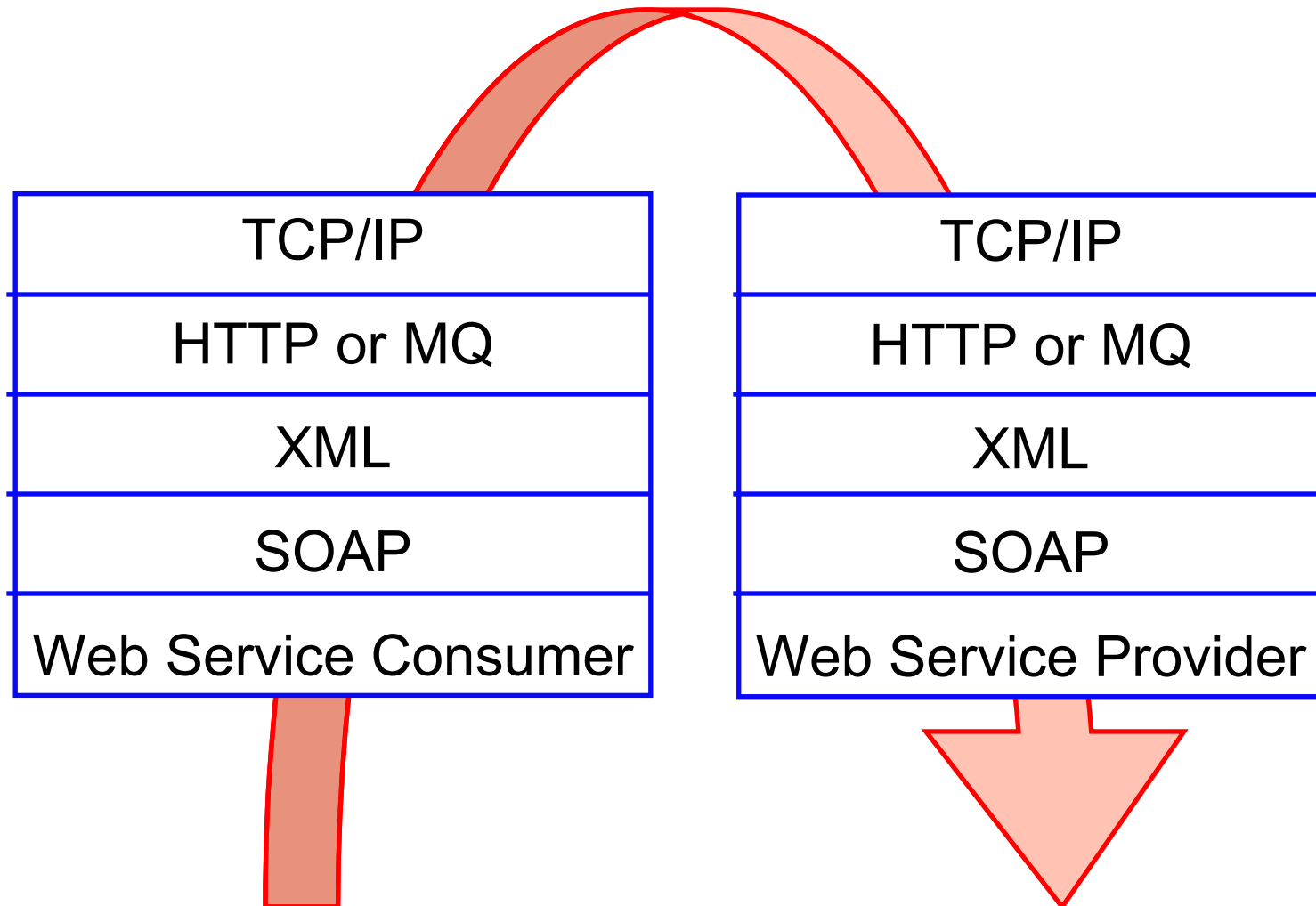
z/TPF Web Service Provider Stacks



z/TPF Web Service Consumer

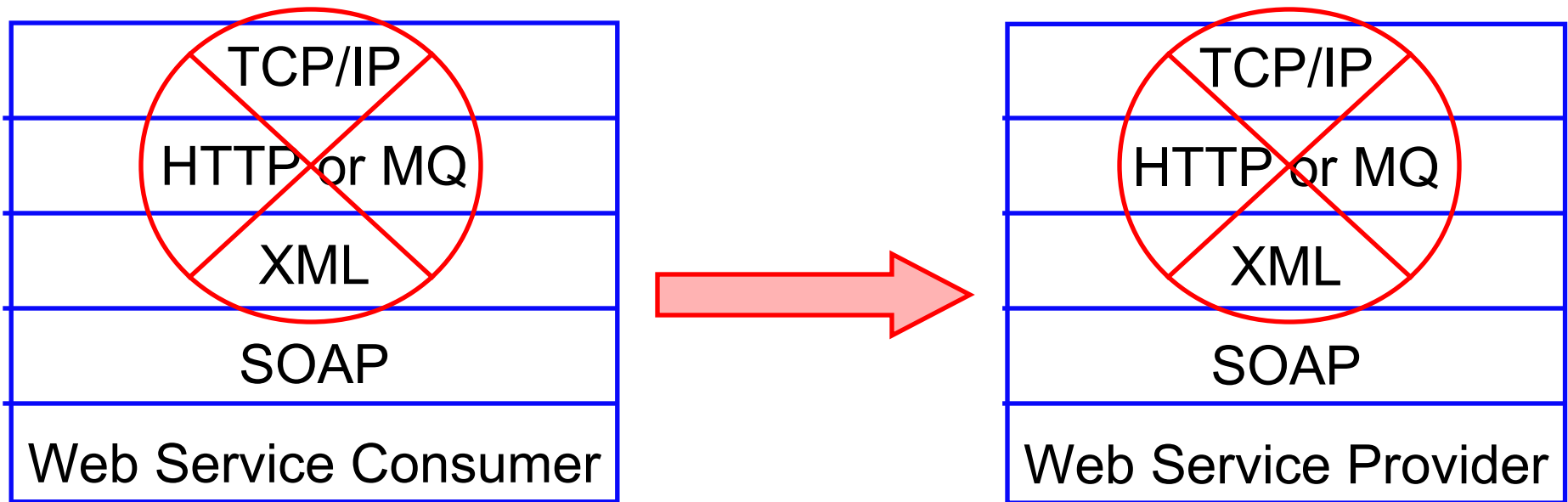


z/TPF Web Service Consumer Stacks

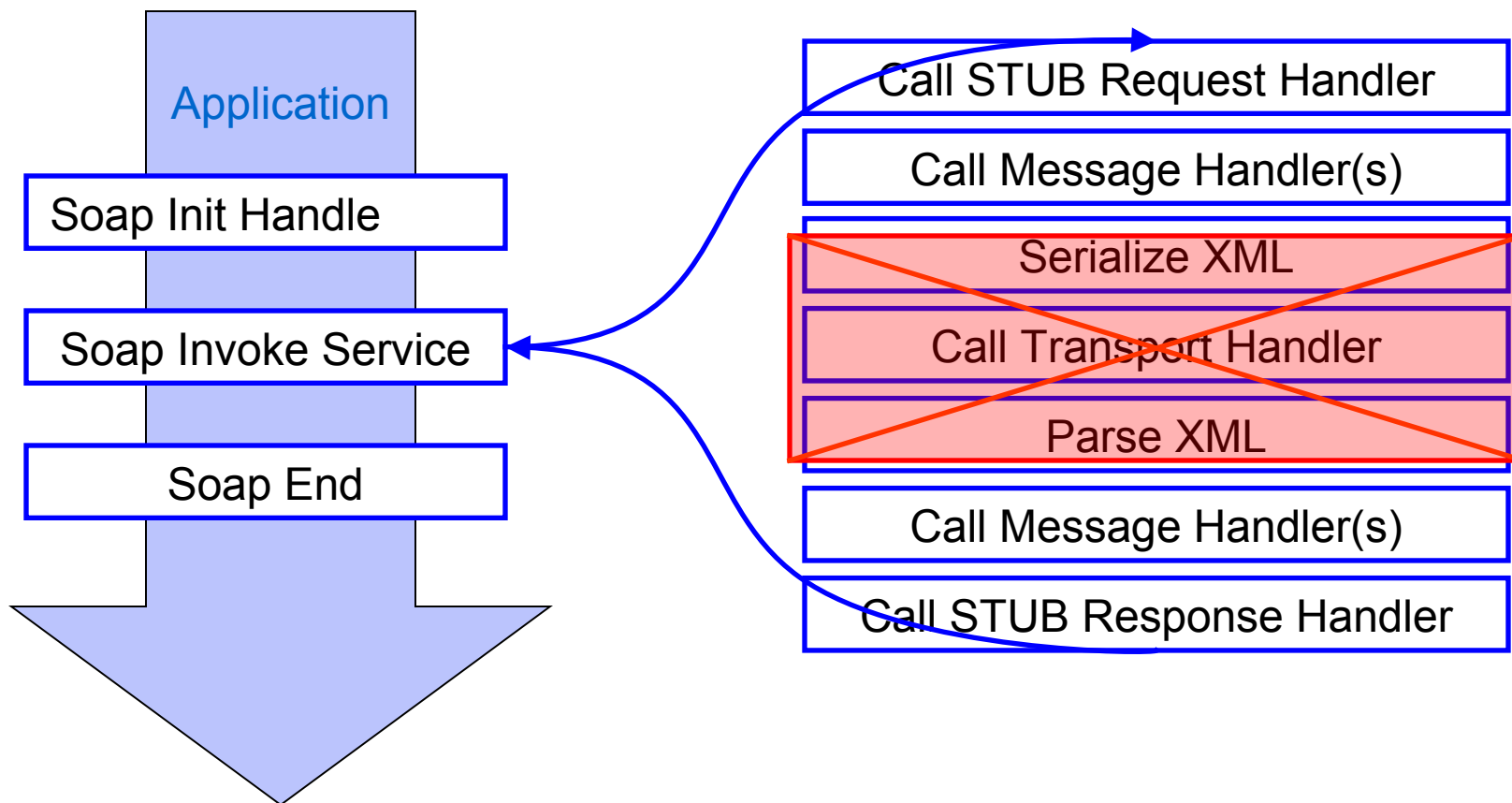


z/TPF Calling Web Services Locally

- **Consumer WS Descriptor:**
 - TPFTransport = TPFLocal



z/TPF Web Service Consumer

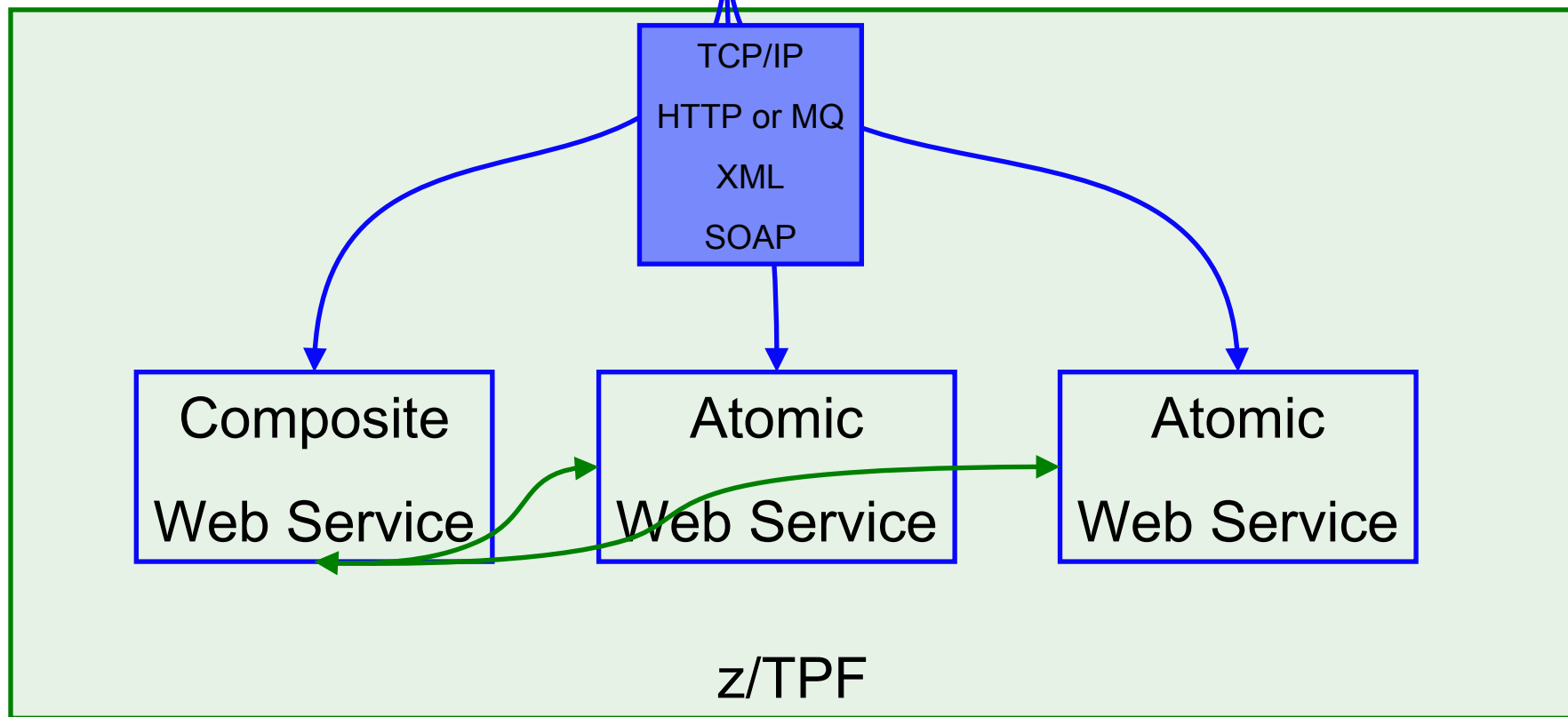


z/TPF Using Consumer Web Services to Create Composite Web Services

- **Composite Web Service**
 - Web service that invokes other web services
 - Is a provider, but also a consumer of (child) web services
 - The composite web services aggregates child services into a bigger web service
 - Service composition

z/TPF Using Consumer Web Services to Create Composite Web Services

Remote Web Service Consumer



References

- **z/TPF Web Services Support**

<http://publib.boulder.ibm.com/infocenter/tpfhelp/current/>



Trademarks

- **IBM** is a trademark of International Business Machines Corporation in the United States, other countries, or both.
- **Apache** is a trademark of The Apache Software Foundation.
- Other company, product, or service names may be trademarks or service marks of others.
- **Notes**
- Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.
- All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.
- This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.
- All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
- Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.
- Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.
- This presentation and the claims outlined in it were reviewed for compliance with US law. Adaptations of these claims for use in other geographies must be reviewed by the local country counsel for compliance with local laws.