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WS-BPEL 2.0

Web Services Business Process Execution Language
Technical Introduction

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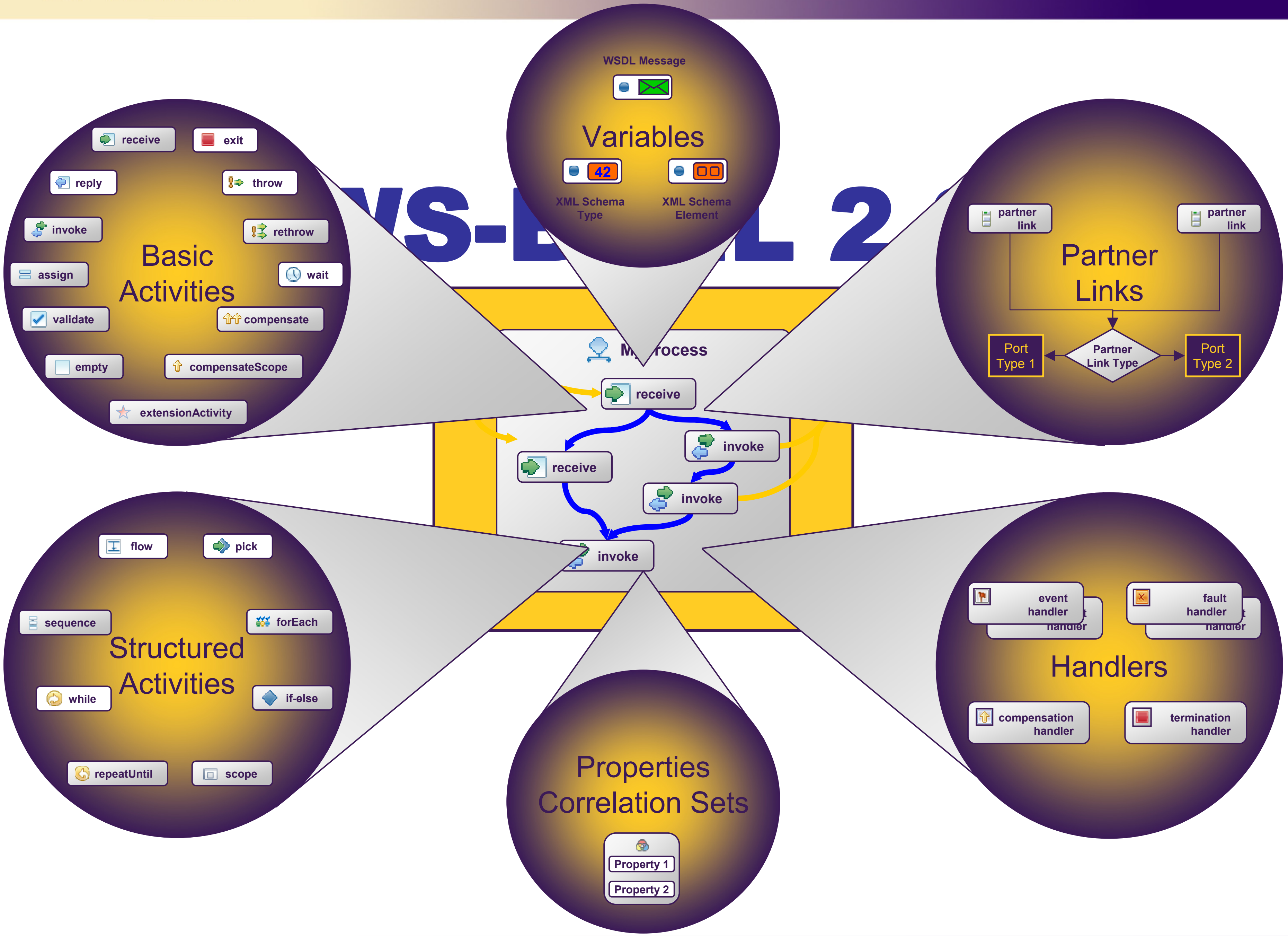
WS-BPEL 2.0
WSDL Message
Variables
42
XML Schema Type
XML Schema Element
Basic Activities
receive
exit
reply
throw
invoke
rethrow
assign
wait
validate
compensate
empty
compensateScope
extensionActivity
Partner Links
partner link
partner link
Port Type 1
Partner Link Type
Port Type 2
My Process
receive
receive
invoke
invoke
invoke
Structured Activities
flow
pick
sequence
forEach
while
if-else
repeatUntil
scope
Properties Correlation Sets
Property 1
Property 2
Handlers
event handler
fault handler
compensation handler
termination handler

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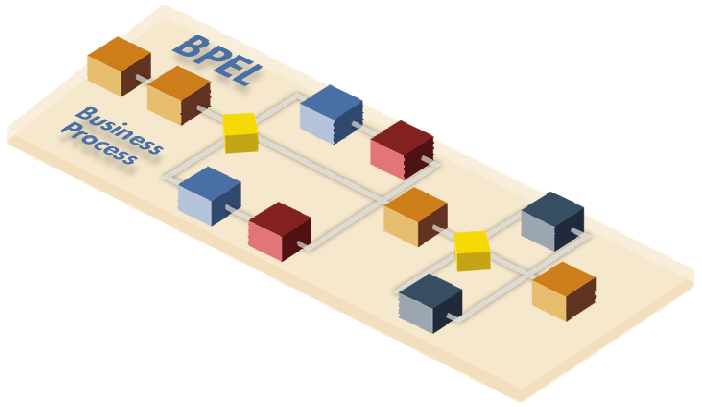
WS-BPEL 2.0

- BPEL is the Web Services Orchestration standard from OASIS
  - bee•pel', beep'•uhl, bip'•uhl
- An XML-based grammar for describing the logic to orchestrate the interaction between Web services in a business process



BPEL Historical Timeline

Dec 2000
Microsoft publishes XLANG

March 2001
IBM publishes WSFL

July 2002
IBM, Microsoft and BEA converge WSFL & XLANG into BPEL4WS 1.0

March 2003
BPEL4WS is submitted to OASIS

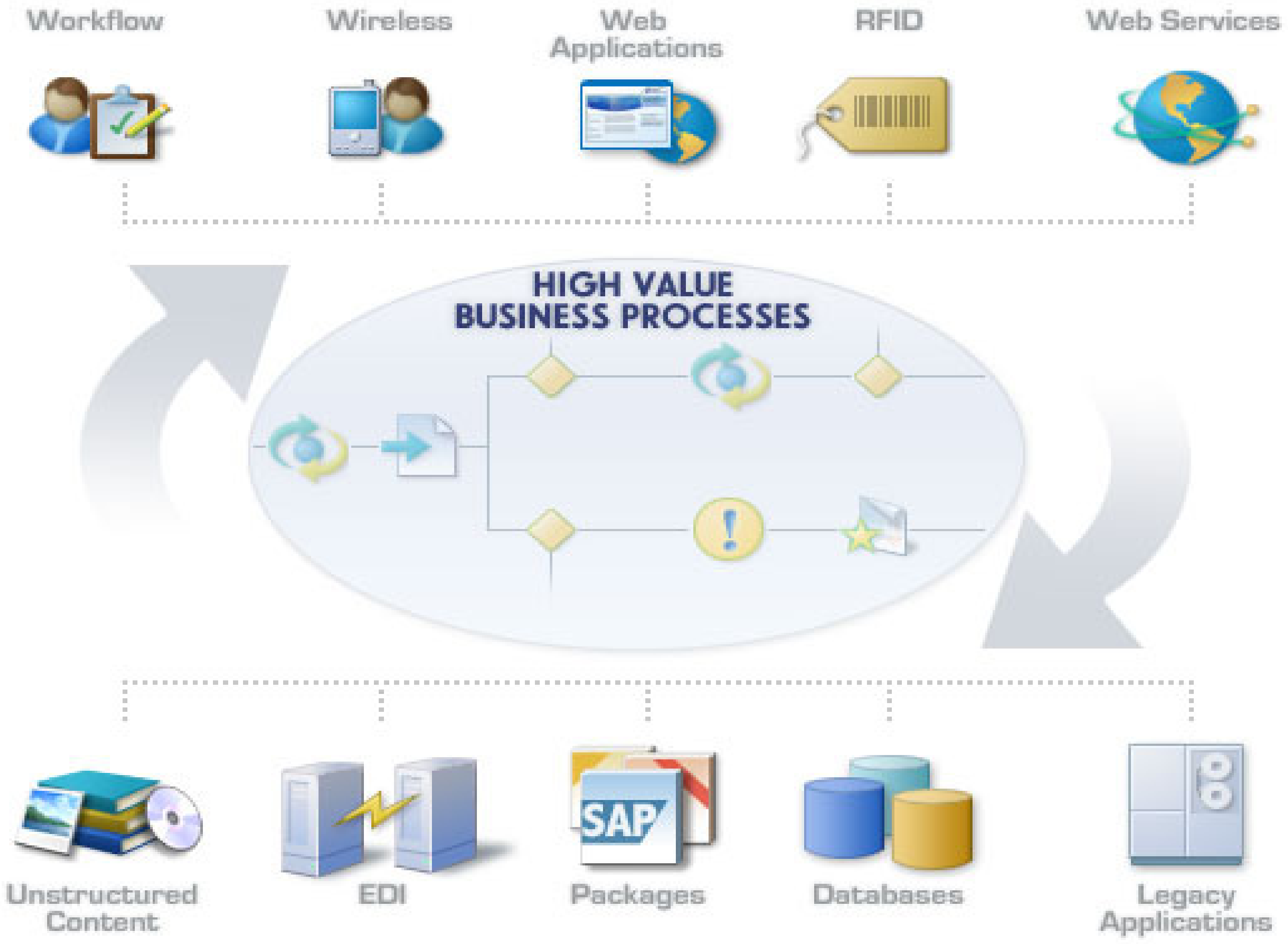
May 2003
OASIS publishes BPEL4WS 1.1

1stH 2007
WS-BPEL 2.0 released

Motivation

- Integration continues to be a key problem facing businesses
  - Intra-enterprise integration (Enterprise Application Integration)
  - Integrating with partners (Business-to-Business Integration)
  - Syndication
- Web services → move towards service-oriented computing
  - Applications are viewed as “services”
  - Loosely coupled, dynamic interactions
  - Heterogeneous platforms
  - No single party has complete control
- Service composition
  - How do you compose services in this domain?

Integration



Why the Need For BPEL?

- WSDL defined Web services have a stateless interaction model
  - Messages are exchanged using
    - Synchronous invocation
    - Uncorrelated asynchronous invocations
- Most “real-world” business processes require a more robust interaction model
  - Messages exchanged in a two-way, peer-to-peer conversation lasting minutes, hours, days, etc.
- BPEL provides the ability to express stateful, long-running interactions

Two Programming Levels

- Programming in the large
  - Non-programmers implementing flows
    - Flow logic deals with combining functions in order to solve a more complex problem (such as processing an order)
- Programming in the small
  - Programmers implementing functions
    - Function logic deals with a discrete fine-grained task (such as retrieving an order document or updating a customer record)

Process Usage Patterns

- Aiming for a single approach for both
  - Executable processes
    - Contain the partner’s business logic behind an external protocol
  - Abstract processes
    - Define the publicly visible behavior of some or all of the services an executable process offers
    - Define a process template embodying domain-specific best practices

Process Model Requirements

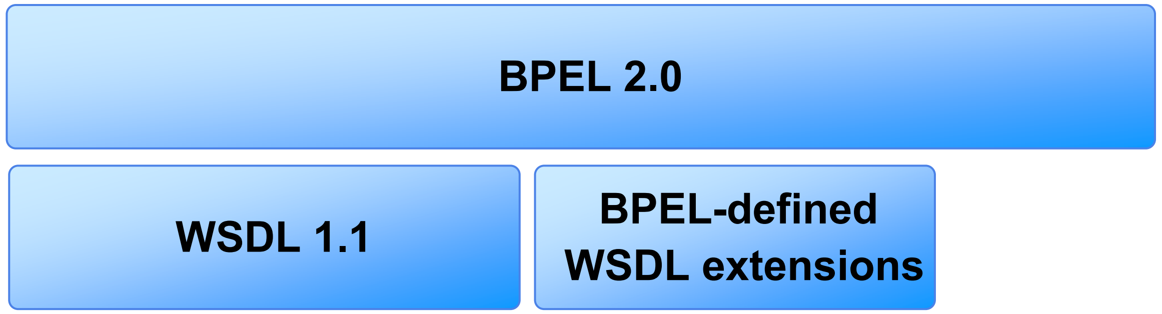
- Portability and Interoperability
- Flexible Integration
  - Rich, and easily adaptable to changes in underlying services
- Recursive, type-based composition, enables
  - Third-party composition of existing services
  - Providing different views on a composition to different parties
  - Increased scalability and reuse
- Stateful conversations and lifecycle management
  - Supports multiple stateful long-running conversations
- Recoverability
  - Long running business processes need fault handling and compensation mechanisms to manage and recover from errors

Benefits of BPEL

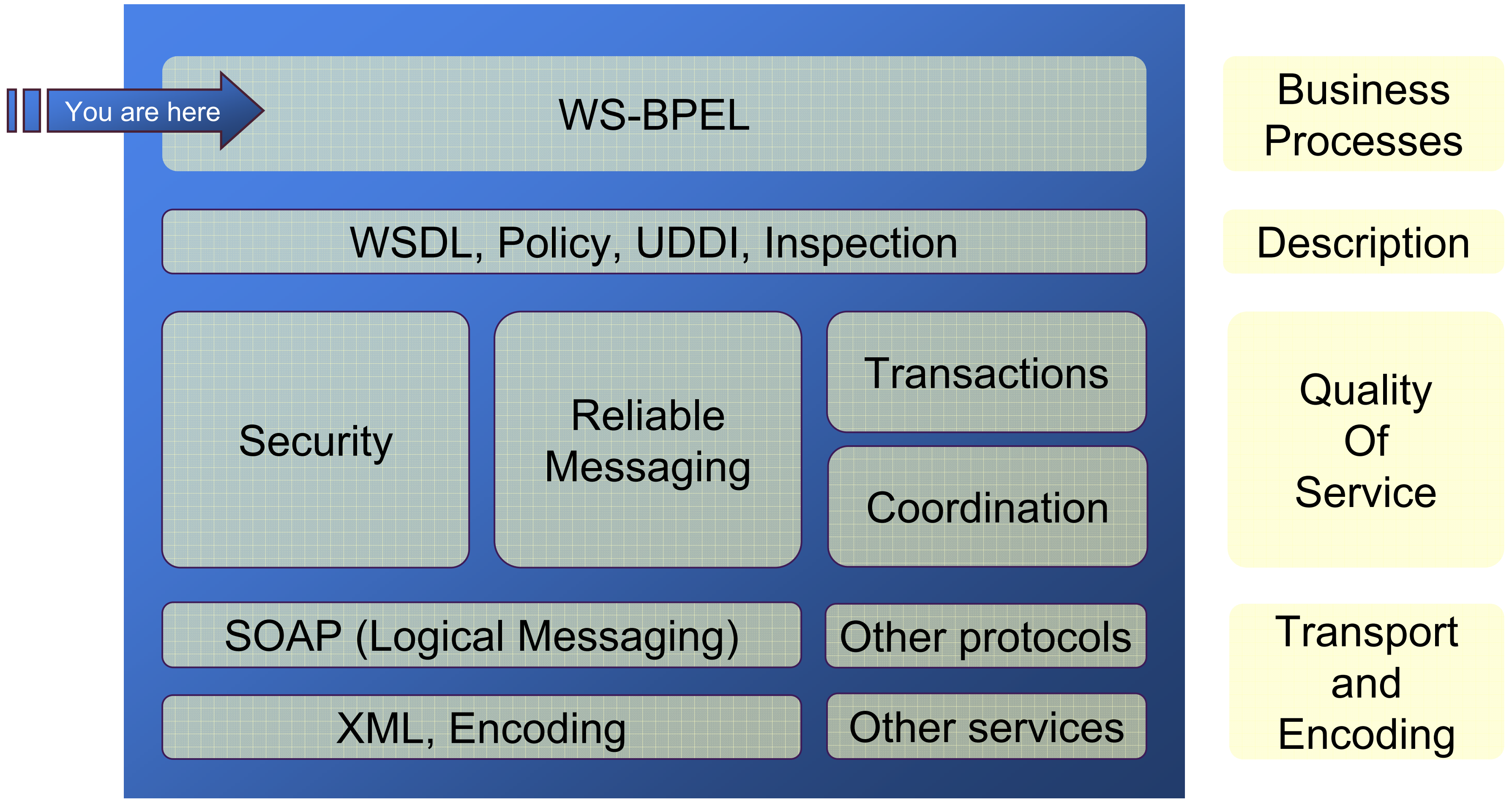
- Industry standard language for expressing business processes
  - Leverage a common skill set and language
- Designed to fit naturally into the Web services stack
  - Expressed entirely in XML
  - Uses and extends WSDL 1.1
  - Uses XML Schema 1.0 for the data model
- Portable across platform and vendor
  - Will run on any BPEL-compliant engine
- Interoperable between interacting processes
  - Layering on top of Web services stack

Relationship with WSDL

- BPEL is layered on top of and extends the WSDL service model
  - WSDL defines the specific operations allowed
  - BPEL defines how WSDL operations are orchestrated to satisfy a business process
  - BPEL also specifies extensions to WSDL in support of long-running asynchronous business processes



WS-BPEL in the WS-* Stack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WS-BPEL
WSDL, Policy, UDDI, Inspection
Security
Reliable Messaging
Transactions
Coordination
SOAP (Logical Messaging)
Other protocols
XML, Encoding
Other services
Business Processes
Description
Quality Of Service
Transport and Encoding