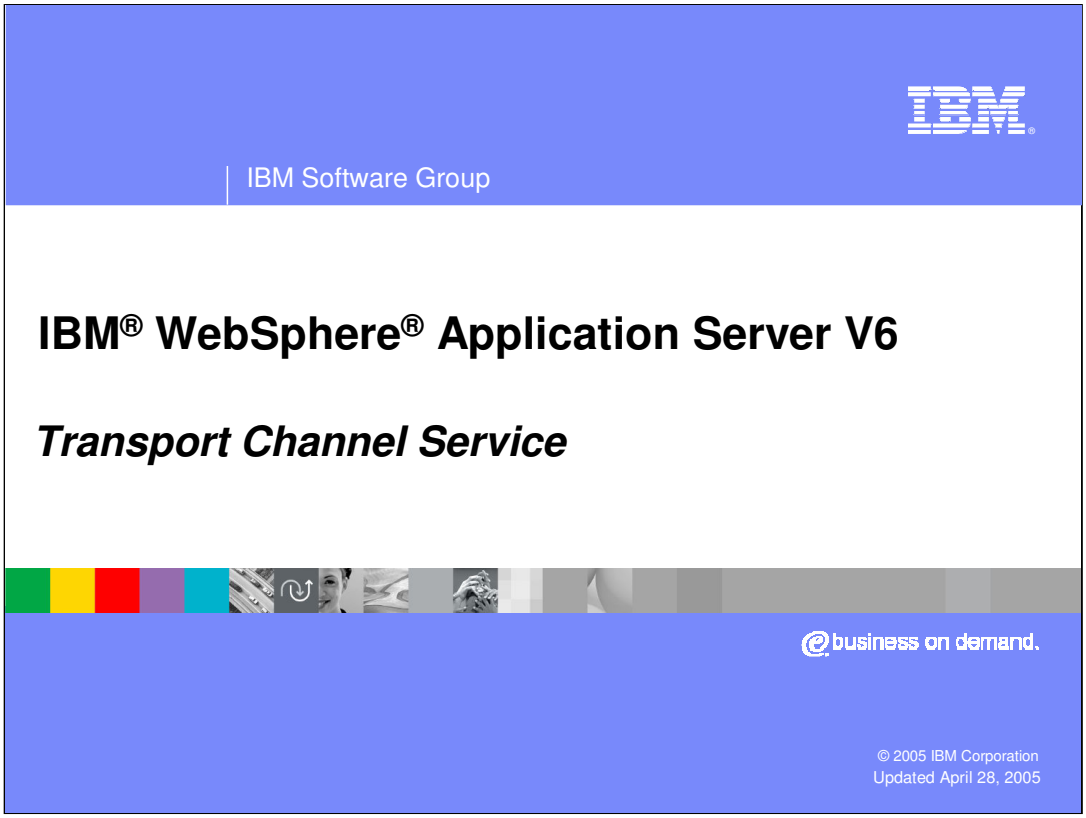


This presentation will cover the Transport Channel Service.

Goals

- Introduce the Transport Channel Service
- Explain the benefits
  - Networking code reuse
  - Port sharing

The goals of this presentation are to introduce the Transport Channel Service, and explain some of the resulting benefits to the WebSphere Application Server environment.

This section will discuss the Transport Channel Service at a high level.

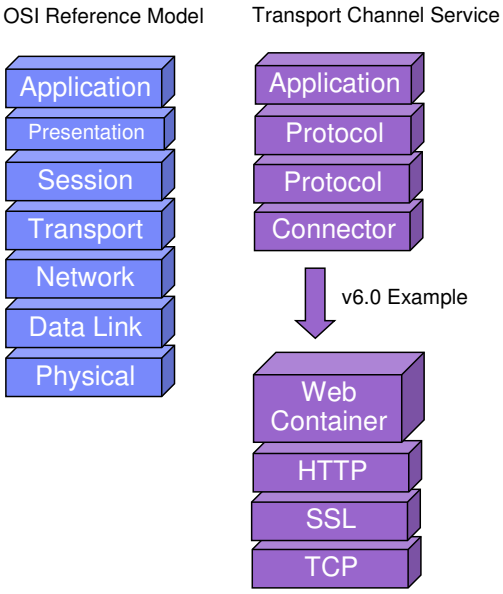
Overview

- A new framework for creating and facilitating transports
- Common network transport services available to all components
- Enables common dispatching and threading model

The Transport Channel Service is a rewritten network transport layer for WebSphere Application Server. It provides common network transport services, and also provides common dispatching and threading services.

Conceptual Model

- Extends the Open System Interconnection (OSI) network protocol stack model into the Application Server
- Each layer is a Channel
- Channels are modular, and get assembled into Chains
  - Lowest level is the Connector Channel
  - Highest level is the Application Channel



Conceptually, the Transport Channel Service extends the OSI Reference Model into the Application Server. Inside the Application Server, each layer is referred to as a Channel. These Channels are modular, and are assembled functional protocol stacks called Chains.

In the example chain shown here, the connector Channel, TCP, is linked to the Application Channel, the Web Container, by two protocol Channels, SSL and HTTP.

Channels and Chains

- The Transport Channel Service is responsible for channel creation and lifecycle
- Each channel is responsible for handling particular tasks, then passing the connection to the next channel in the chain
  - For example, the SSL Channel deals with SSL encryption and decryption

The Transport Channel Service is the Application Server component responsible for managing the lifecycle of the individual channels. Each channel handles a particular task (such as SSL encryption and decryption), then passes the connection to the next channel in the transport chain. Through this chain, the connection travels from the Connector channel (TCP) to the Application Channel that is the ultimate destination of the connection.

Transport Channel Service Utilization

- Many services make use of the Transport Channel Service
  - Web Container
    - Always used in Servant Region (SR)
    - Use in Controller Region (CR) is dependent on configuration
  - IBM Service Integration Technologies (messaging)
  - Distribution and Consistency Services (DCS)
  - Web Services SOAP/HTTP client
- Some services do not yet use the Transport Channel Service
  - Object Request Broker (ORB), Java Management Extensions (JMX) connector

In WebSphere Application Server V6, several services utilize the Transport Channel Service, including the Web Container; the messaging and Web Services capabilities provided by IBM Service Integration Technologies; the protocol used for many server-to-server communications, called DCS; and the Web Services SOAP/HTTP client.

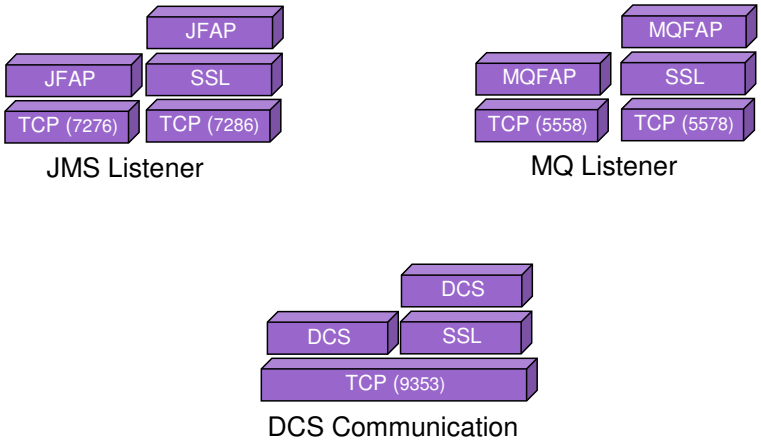
Not all services take advantage of the Transport Channel Service at this time. For example, the ORB and the JMX connector do not use the Transport Channel Service.

Channels

Channel	Requires	Provides	Description
TCP	-	TCP	Manages sockets, timeouts, reads and writes, timeouts, initial thread handling
SSL	TCP	TCP	Handles SSL encryption and decryption
HTTP	TCP	HTTP	Implements HTTP 1.0 and 1.1 logic, access and error logging
HTTP Tunnel	HTTP	TCP	Transparently tunnels TCP data through an HTTP connection
DCS	TCP	DCS	Provides the communication layer for HA Manager, Data Replication Service, and Core Group Bridge service
JFAP	TCP	-	Implements formats and protocols for JMS messaging
MQFAP	TCP	-	Implements MQ formats and protocols for JMS messaging over MQ links
Web Container	HTTP	-	Connects an inbound HTTP channel to the Servlet and JSP engine
HA Manager	DCS	-	Connects the High Availability Manager with a DCS channel
Cross Memory	TCP	TCP	Bridge between CR and SR

This table shows a list of available channels and the interfaces that they require and provide. The interfaces define how channels can be assembled. The HTTP Tunnel channel is of particular interest. It can transparently tunnel any of the channels that require a TCP interface through an HTTP connection.

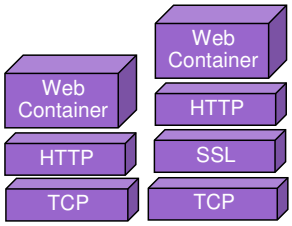
Default Inbound Chain Configurations



The inbound chains that are created with a default installation are shown here. The Default Messaging Provider has inbound chains for JFAP connections as well as JFAP over SSL. There are also secure and insecure chains for the MQ Link. Lastly, DCS has an interesting default setup. There are chains for both secure and insecure DCS traffic, but they share a TCP port. This is because they have their TCP channel in common.

HTTP Transport

- By default, the V5 optimized HTTP transport still used
- Some functions are only supported on the optimized HTTP transport.
  - Fast Response Cache Accelerator (FRCA), Advanced FastPath Cache Accelerator (AFPA), Edge Side Include (ESI), External Cache Adaptor (ECA)
- No HTTP transport chains pre-configure
  - IPv6 and WebServices Atomic Transactions (WS-AT) are only supported on HTTP transport chains
- Possible to configure HTTP chain:



HTTP and HTTPS chains

Configuring transport chains

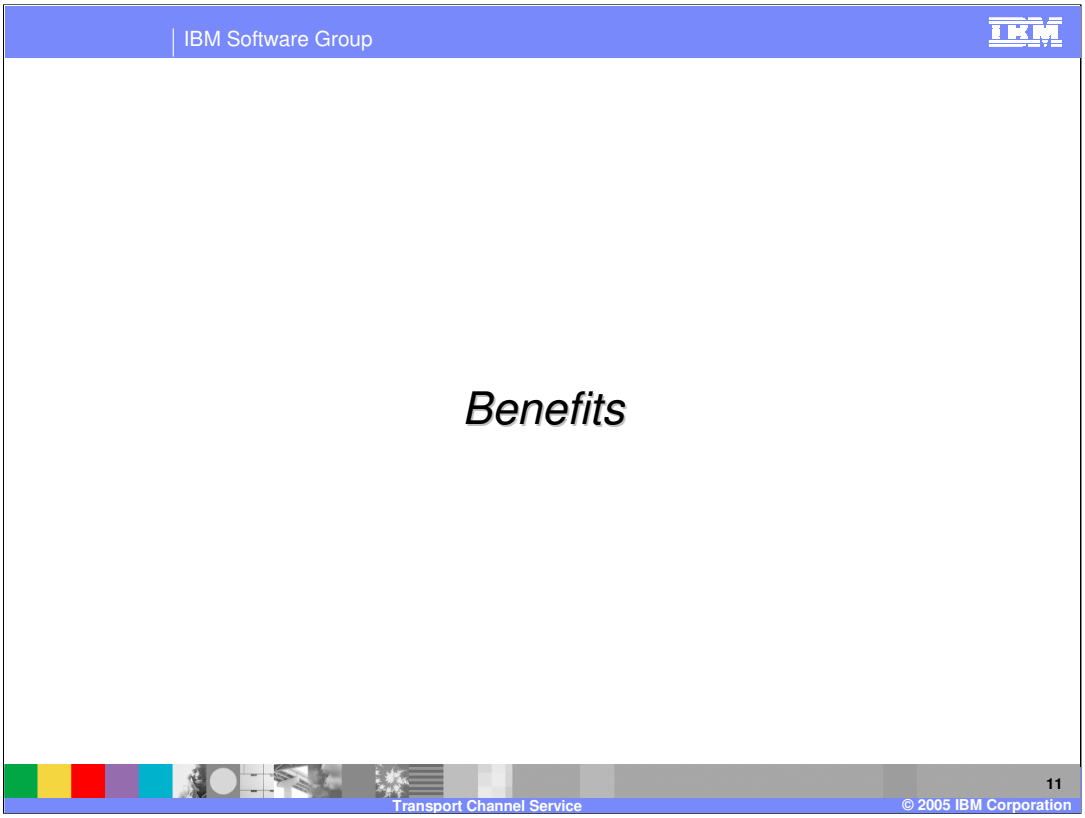
In WebSphere Application Server V6, the optimized HTTP transport that was used in V5, is still used by default. Customers should use the default optimized HTTP transport, unless there is a compelling reason to use the Transport Channel Service. The optimized transport is more scalable than the Transport Channel Service, and provides better throughput.

No HTTP transport chains are pre-configured. However, IPv6 and WebServices Atomic Transactions are only

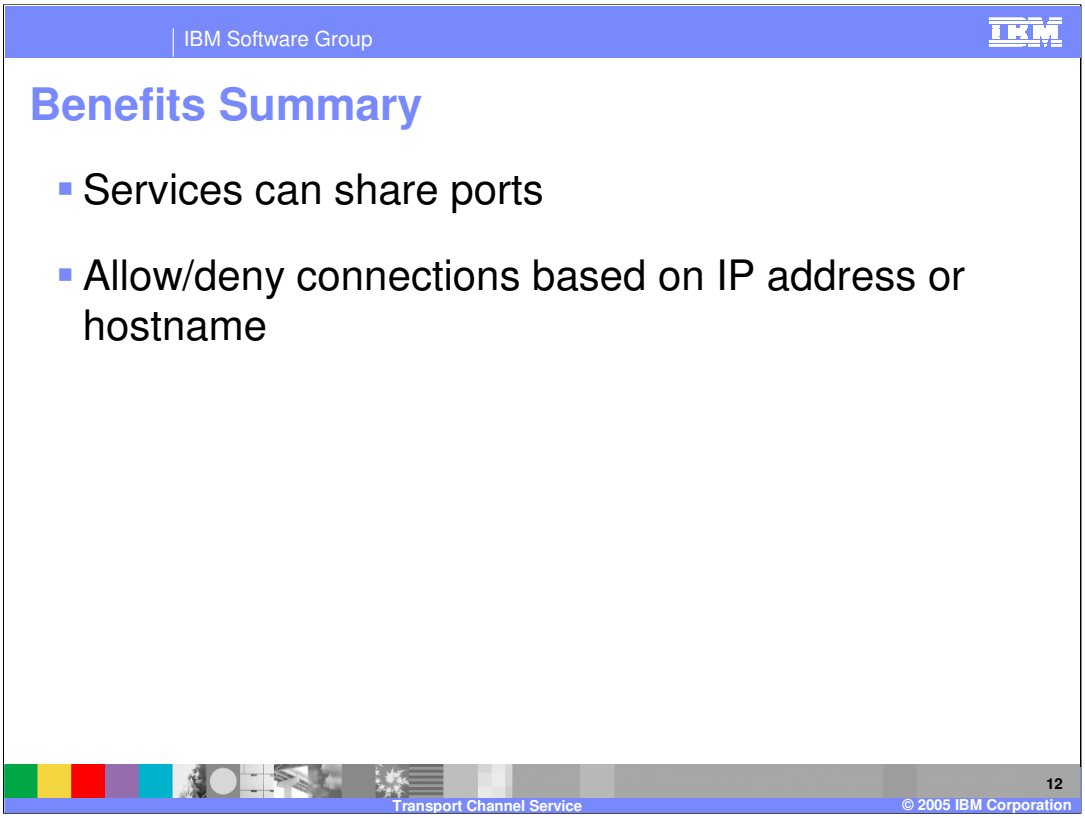
supported on the new Transport Channel Service. So, if you wish to utilize these features, you will need to

configure an HTTP transport chain.

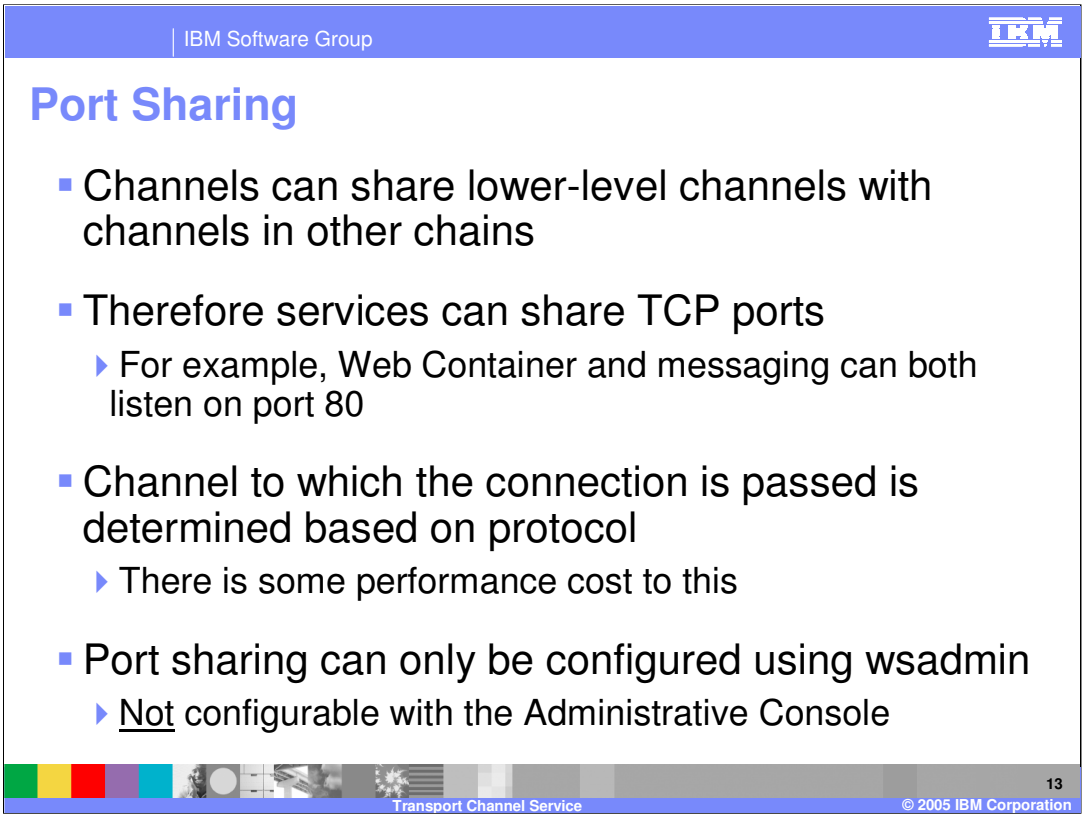
The “Show Me” link on this page will show you how to configure transport chains using the Administrative Console.



This section will discuss the benefits of the Transport Channel Service.



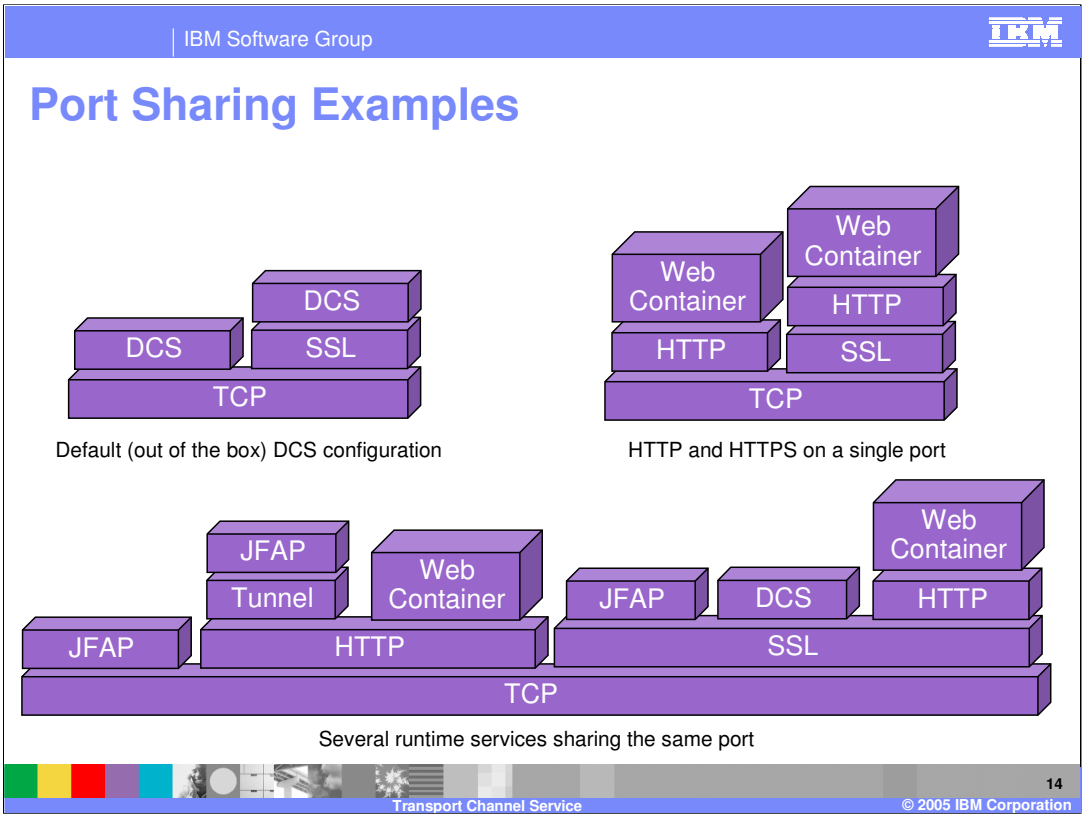
The Transport Channel Service gives WebSphere Application Server V6 some advantages over previous releases. These benefits include port sharing among services, and connection filtering.



Another advantage of the Transport Channel Service is that services can now share TCP ports. This is because channels can share lower-level channels with channels in other chains. For instance, a Web Container chain and a JFAP messaging chain might share a TCP channel that listens on port 80.

In a case like this, the channel to which the connection is passed is determined based on the protocol of the connection. Obviously, there is a performance cost to this protocol discrimination, so services that share a port will not perform quite as well as those that do not.

Note that port sharing is an advanced concept that can only be configured using wsadmin. There is no capability for configuring port sharing through the Administrative Console.



The first example shown here is the default configuration for DCS. Both plain DCS traffic and secured DCS traffic travel over the same port. You could also create the configuration shown in the second example, where the Web Container listens for both HTTP and HTTPS traffic on a single port. The third example is considerably more complicated, but is fully supported. It shows several services sharing a single TCP channel, and therefore a single TCP port.

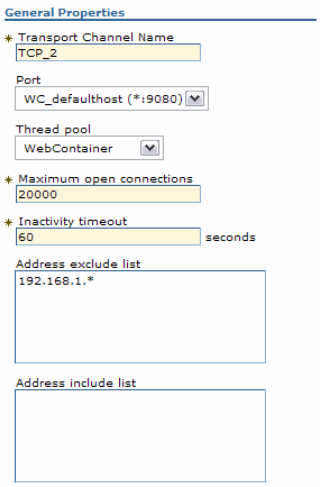
Protocol Discrimination

- Channels have configurable priority that determines the discrimination order
  - Lowest number (1) gets first chance to claim the traffic
  - Best practice: assign higher numbers to more complicated channels (e.g. SSL) for better performance

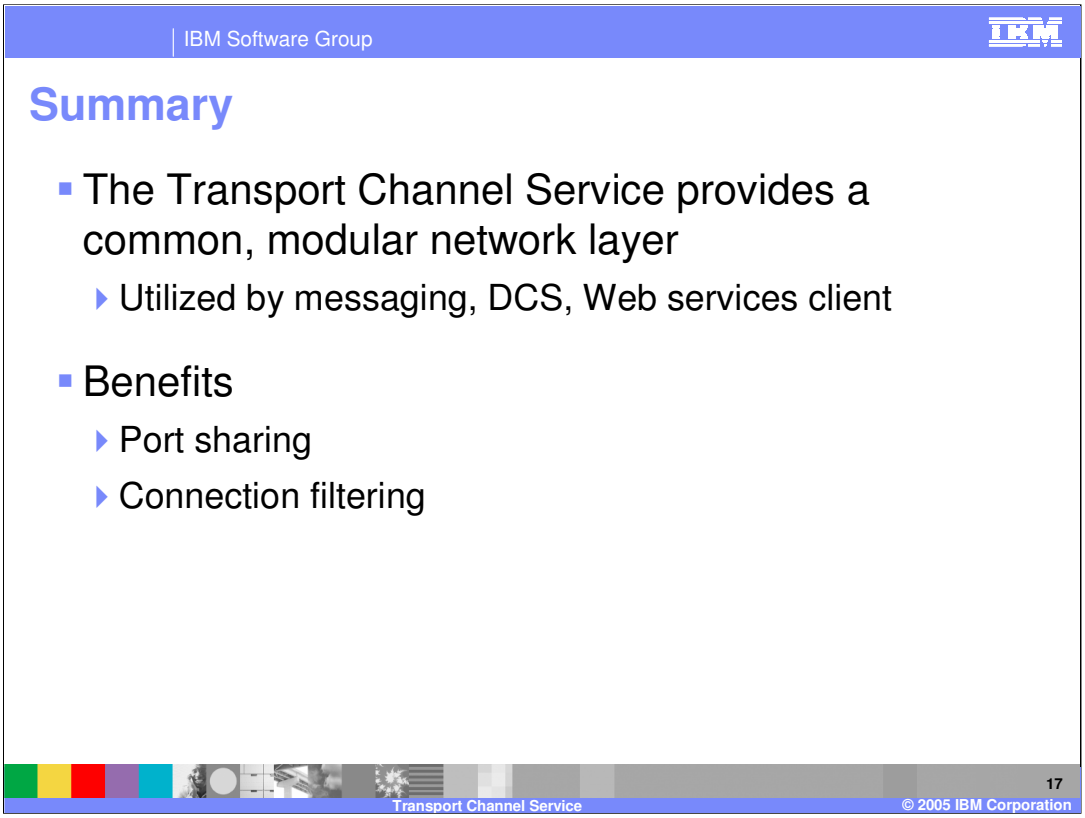
Each channel has a configurable priority that determines the order in which it has the opportunity to accept a connection when sharing a port. The channel with the lowest number has the first option to accept the connection. It is recommended that more complicated protocols, such as SSL, have higher values. This results in slightly better performance since the more expensive operations only have to be performed on connections intended for that channel.

Include and Exclude Lists

- TCP Channels can explicitly allow or deny connections
  - By IP address (shown at right)
    - IPv4 or IPv6
  - By hostname
- Wildcards are valid
- An address that appears in both an include list and an exclude list will be excluded



TCP channels have the capability to explicitly allow or deny connections based on IP address or hostname. You can also block entire ranges of addresses or hostnames using an asterisk as a wildcard. An address that appears in both an include list and an exclude list will be excluded.



In summary, the Transport Channel Service provides a common network transport layer that is utilized by several components. The implementation of the Transport Channel Service has resulted in many benefits, including TCP port sharing, and connection filtering based on IP address or hostname.

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