

Basic Routing Concept

- Routing is the process of moving data between Layer 3 networks.

- Components of routing

- End-to-end communication path

- Routing information on participating Layer 3 devices.

↳ Devices running Junos OS

use forwarding information base (FIB)

- FIB is a subset of information found in the routing table (also known as routing information base (RIB))

Routing & Forwarding Tables

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The Routing Table

- Compiles information learned from routing protocols and other routing information sources
- Selects an active route to each destination

```
graph LR; subgraph Inputs [ ]; OSPF[OSPF]; StaticDir[Static]; end; subgraph RoutingTable [Routing Table]; end; subgraph ForwardingTable [Forwarding Table]; end; OSPF --> RoutingTable; StaticDir --> RoutingTable; RoutingTable --> ForwardingTable;
```

Outgoing • Forwarding

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The Routing Table

Common Predefined Routing Tables	
inet.0	Used for IPv4 unicast routes
inet.1	Used for the multicast forwarding cache
inet.2	Used for Multicast BGP (MBGP) routes to provide reverse path forwarding (RPF) checks
inet.3	Used for MPLS path information
inet.4	Used for Multicast Source Discovery Protocol (MSDP) route entries
inet6.0	Used for IPv6 unicast routes
mpls.0	Used for MPLS next hops

- route preference

The screenshot shows a slide from the Juniper Networks Introduction to the JUNOS Operating System. The title bar includes the Juniper Networks logo, the slide title 'INTRODUCTION TO THE JUNOS OPERATING SYSTEM: Routing Fundamentals Routing and Forwarding Tables', the time '00:33/02:03', the page number 'Page: 03/10', and the word 'Setting'. The main content is titled 'Route Preference'. Below it is a table titled 'Route Preference Values' showing the default preference values for various routing information sources. To the right of the table is a vertical scale with arrows indicating that lower values are more preferred.

Route Preference Values	
Routing Information Source	Default Preference
Direct	0
Local	0
Static	5
OSPF internal	10
RIP	100
OSPF AS external	150
BGP (both EBGP and IBGP)	170

More Preferred ↑
↓ Less Preferred

- Lower preferences values are preferred over highly preferences

- Forwarding Table

- stores only the best routes to a particular destination.
Its contents include the destination

prefixes and the associated outgoing interfaces

[Show route forwarding-table]

- default forwarding entry.

- Determining the Next Hop

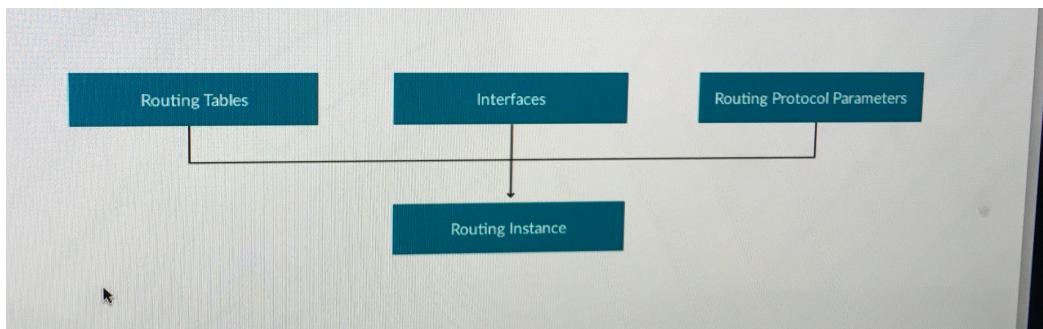
• Device compares incoming packets against forwarding table entries to determine the appropriate next hop.

→ packets for local devices are processed locally

→ packets for remote devices are forwarded out the next-hop port

Routing instances

- A routing instance is a unique grouping of routing tables, interfaces, and routing protocol parameters



Default Routing Instances

↳ The master routing instance

↳ The default instance for all

devices running JUNOS OS

↳ Includes inet.0 route table

User-Defined Routing Instances

Routing Instance Types	
forwarding	Used to implement FBF for common Access Layer applications
l2vpn	Used in Layer 2 VPN implementations
no-forwarding	Used to separate large networks into smaller administrative entities
virtual-router	Used for non-VPN-related applications, such as system virtualization
vpls	Used for point-to-multipoint LAN implementations between a set of sites in a VPN
vrf	Used in Layer 3 VPN implementations

Configuring a Routing Instance

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Working with Routing Instances (1)

- Reference the corresponding IP unicast table for a given instance to view the route table contents
 - For IPv4 routing, the software creates an IPv4 unicast routing table with the name format <instance-name>.inet.0
 - For IPv6 routing, the software creates an IPv6 unicast routing table, and it follows the format <instance-name>.inet6.0

```
user@router> show route table new-instance.inet.0
new-instance.inet.0: 7 destinations, 7 routes (7 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
0.0.0.0/0      *[Static/5] 02:06:18
                > to 172.26.25.1 via ge-0/0/0.0
172.25.182.0/24 * [Direct/0] 02:06:18
                  > via ge-0/0/1.0
172.25.182.5/32 * [Local/0] 02:06:18
                  Local via ge-0/0/1.0
172.26.25.0/24  * [Direct/0] 02:06:18
                  > via ge-0/0/0.0
172.26.25.5/32 * [Local/0] 02:06:18
                  Local via ge-0/0/0.0
```

Software automatically creates IP unicast table when you configure the corresponding routing instance.

ff LAB!



