Chapter 2

Complete Routing and Routing Protocol Configuration Statements

This chapter shows the complete configuration statement hierarchy for the portions of the configuration discussed in this manual, listing all possible configuration statements and showing their level in the configuration hierarchy. When you are configuring the JUNOS software, your current hierarchy level is shown in the banner on the line preceding the user@host# prompt.

For a list of the complete configuration statement hierarchy, see the *JUNOS System Basics Configur ation Guide* .

This chapter is organized as follows:

[edit logical-routers] Hierarchy Level on page 15

[edit protocols] Hierarchy Level on page 16

[edit routing-instances] Hierarchy Level on page 27

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[edit logical-routers] Hierarchy Level

The following lists the statements that can be configured at the [edit logical-routers] hierarchy level and are also documented in this manual.

Logical Router

```
logical-routers {
   logical-router-name {
      protocols {
         bgp {
            bgp-configuration;
         }
         isis {
            isis-configuration;
         }
         ospf {
            ospf-configuration;
         }
```

```
        ospf3 {
            ospf3-configuration;
        }
        rip {
            rip-configuration;
        }
        ripng {
            ripng-configuration;
        }
        router-advertisement {
            router-advertisement-configuration;
        }
        router-discovery {
            router-discovery-configuration;
        }
    }
    routing-instances {
        routing-instance-name {
            routing-instance-configuration;
        }
    }
    routing-options {
        routing-option-configuration;
    }
  }
}
```

[edit protocols] Hierarchy Level

The following statements can also be configured at the [edit logical-routers *logical-router-name*] hierarchy level.

```
protocols {
```

BGP

```
    bgp {
        advertise-inactive;
        advertise-peer-as;
        authentication-key key;
        cluster cluster-identifier;
        damping;
        description text-description;
        disable;
        export [ policy-names ];
        family {
            (inet | inet6 | inet-vpn | inet6-vpn | l2-vpn) {
                (any | multicast | unicast) {
                    prefix-limit {
                        maximum number;
                        teardown <percentage> <idle-timeout (forever | minutes)>;
                    }
                    rib-group group-name;
                }
```

```
        labeled-unicast {
            aggregate-label {
                community community-name;
            }
            explicit-null {
                connected-only;
            }
            prefix-limit {
                maximum number;
                teardown <percentage> <idle-timeout (forever | minutes)>;
            }
            resolve-vpn;
            rib inet.3;
            rib-group group-name;
        }
    }
    route-target {
        advertise-default;
        external-paths number;
        prefix-limit {
            maximum number;
            teardown <percentage> <idle-timeout (forever | minutes)>;
        }
    }
}
graceful-restart {
    disable;
    restart-time seconds;
    stale-routes-time seconds;
}
hold-time seconds;
import [ policy-names ];
include-mp-next-hop;
ipsec-sa ipsec-sa;
keep (all | none);
local-address address;
local-as autonomous-system <private>;
local-preference local-preference;
log-updown;
metric-out (metric | minimum-igp <offset> | igp <offset>);
multihop {
    <ttl-value>;
    no-nexthop-change;
}
no-advertise-peer-as;
no-aggregator-id;
no-client-reflect;
out-delay seconds;
passive;
path-selection (cisco-non-deterministic | always-compare-med);
peer-as autonomous-system;
preference preference;
remove-private;
```

```
traceoptions {
   file name <replace> <size size> <files number> <no-stamp>
      <(world-readable | no-world-readable)>;
   flag flag <flag-modifier> <disable>;
}
vpn-apply-export;
group group-name {
   advertise-inactive;
   advertise-peer-as;
   [network/mask-length];
   as-override;
   authentication-key key;
   cluster cluster-identifier;
   damping;
   description text-description;
   export [ policy-names ];
   family {
      (inet | inet6 | inet-vpn | inet6-vpn | l2-vpn) {
         (any | multicast | unicast) {
            explicit-null {
               connected-only;
            }
            prefix-limit {
               maximum number;
               teardown <percentage> <idle-timeout (forever | minutes)>;
            }
            rib-group group-name;
         }
         labeled-unicast {
            prefix-limit {
               maximum number;
               teardown <percentage> <idle-timeout (forever | minutes)>;
            }
            resolve-vpn;
            rib inet.3;
            rib-group group-name;
         }
      }
      route-target {
         advertise-default;
         external-paths number;
         prefix-limit {
            maximum number;
            teardown <percentage> <idle-timeout (forever | minutes)>;
         }
      }
   }
   graceful-restart {
      disable;
      restart-time seconds;
      stale-routes-time seconds;
   }
   hold-time seconds;
   import [ policy-names ];
   ipsec-sa ipsec-sa;
   keep (all | none);
   local-address address;
```

```
local-as autonomous-system <private>;
local-preference local-preference;
log-updown;
metric-out (metric | minimum-igp <offset> | igp <offset>);
mtu-discovery;
multihop <ttl-value>;
multipath;
no-advertise-peer-as;
no-aggregator-id;
no-client-reflect;
out-delay seconds;
passive;
peer-as autonomous-system;
preference preference;
protocol protocol;
remove-private;
traceoptions {
   file name <replace> <size size> <files number> <no-stamp>
      <(world-readable | no-world-readable)>;
   flag flag <flag-modifier> <disable>;
}
type type;
vpn-apply-export;
neighbor address {
   advertise-inactive;
   advertise-peer-as;
   as-override;
   authentication-key key;
   cluster cluster-identifier;
   damping;
   description text-description;
   export [ policy-names ];
   family {
      (inet | inet6 | inet-vpn | inet6-vpn | l2-vpn) {
         (any | multicast | unicast) {
            explicit-null {
               connected-only;
            }
            prefix-limit {
               maximum number;
               teardown <percentage> <idle-timeout (forever | minutes)>;
            }
            rib-group group-name;
         }
         labeled-unicast {
            prefix-limit {
               maximum number;
               teardown <percentage> <idle-timeout (forever | minutes)>;
            }
            resolve-vpn;
            rib inet.3;
            rib-group group-name;
         }
      }
```

```
                route-target {
                  advertise-default;
                  external-paths number;
                  prefix-limit {
                    maximum number;
                    teardown <percentage> <idle-timeout (forever | minutes)>;
                  }
                }
              }
              graceful-restart {
                disable;
                restart-time seconds;
                stale-routes-time seconds;
              }
              hold-time seconds;
              import [ policy-names ];
              ipsec-sa ipsec-sa;
              keep (all | none);
              local-address address;
              local-as autonomous-system <private>;
              local-interface interface-name;
              local-preference local-preference;
              log-updown;
              metric-out (metric | minimum-igp <offset> | igp <offset>);
              mtu-discovery;
              multihop <ttl-value>;
              multipath;
              no-advertise-peer-as;
              no-aggregator-id;
              no-client-reflect;
              out-delay seconds;
              passive;
              peer-as autonomous-system;
              preference preference;
              remove-private;
              traceoptions {
                file name <replace> <size size> <files number> <no-stamp>
                  <(world-readable | no-world-readable)>;
                flag flag <flag-modifier> <disable>;
              }
              vpn-apply-export;
            }
          }
        }

IS-IS   isis {
          disable;
          export [ policy-names ];
          ignore-attached-bit;
          graceful-restart {
            disable;
            helper-disable;
            restart-duration seconds;
          }
          label-switched-path name level level metric metric;
```

```
level level-number {
    authentication-key key;
    authentication-type authentication;
    external-preference preference;
    ipv6-multicast-metric number;
    no-csnp-authentication;
    no-hello-authentication;
    no-psnp-authentication;
    preference preference;
    prefix-export-limit number;
    wide-metrics-only;
}
loose-authentication-check;
lsp-lifetime seconds;
no-authentication-check;
no-ipv4-routing;
no-ipv6-routing;
overload {
    advertise-high-metrics;
    timeout seconds>;
}
reference-bandwidth reference-bandwidth;
rib-group {
    inet group--name;
    inet6 group--name;
}
spf-delay milliseconds;
topologies {
    ipv4-multicast;
    ipv6-multicast;
    ipv6-unicast;
}
traceoptions {
    file name <replace> <size size> <files number> <no-stamp>
        <(world-readable | no-world-readable)>;
    flag flag <flag-modifier> <disable>;
}
traffic-engineering {
    disable;
    shortcuts;
}
interface interface-name {
    disable;
    bfd-liveness-detection {
        minimum-interval milliseconds;
        minimum-receive-interval milliseconds;
        minimum-transmit-interval milliseconds;
        multiplier number;
    }
    checksum;
    csnp-interval (seconds | disable);
    lsp-interval milliseconds;
    mesh-group (value | blocked);
    no-ipv4-multicast;
    no-ipv6-multicast
    no-ipv6-unicast;
    passive;
```

```
        point-to-point;
        level level-number {
            disable;
            hello-authentication-key key;
            hello-authentication-type authentication;
            hello-interval seconds;
            hold-time seconds;
            ipv4-multicast-metric number;
            ipv6-multicast-metric number;
            ipv6-unicast-metric number;
            metric metric;
            passive;
            priority number;
            te-metric metric;
        }
    }
}
```

OSPF

```
ospf {
    disable;
    export [ policy-names ];
    external-preference preference;
    graceful-restart {
        disable;
        helper-disable;
        notify-duration seconds;
        restart-duration seconds;
    }
    import [ policy-names ];
    overload {
        <timeout seconds>;
    }
    preference preference;
    reference-bandwidth reference-bandwidth;
    rib-group group-name;
    spf-delay;
    traffic-engineering {
        no-topology;
        shortcuts {
            lsp-metric-into-summary;
        }
    }
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    area area-id {
        area-range network/mask-length <restrict>;
        authentication-type authentication;
```

```
interface interface-name {
    disable;
    bfd-liveness-detection {
        minimum-interval milliseconds;
        minimum-receive-interval milliseconds;
        minimum-transmit-interval milliseconds;
        multiplier number;
    }
    authentication {
        md5 key-id;
        simple-password key-id;
    }
    dead-interval seconds;
    hello-interval seconds;
    interface-type type;
    metric metric;
    neighbor address <eligible>;
    passive;
    p2p;
    poll-interval seconds;
    priority number;
    retransmit-interval seconds;
    te-metric metric;
    transit-delay seconds;
}
label-switched-path name metric metric;
nssa {
    area-range network/mask-length <restrict>;
    default-lsa {
        default-metric metric;
        metric-type type;
        type-7;
    }
    (no-summaries | summaries);
}
peer-interface interface-name {
    disable;
    dead-interval seconds;
    hello-interval seconds;
    retransmit-interval seconds;
    transit-delay seconds;
}
sham-link {
    local-endpoint address;
    remote-endpoint address {
        metric metric;
    }
}
stub <default-metric metric> <(no-summaries | summaries)>;
virtual-link neighbor-id router-id transit-area area-id {
    disable;
    authentication {
        md5 key-id;
        simple-password key-id;
    }
    dead-interval seconds;
    hello-interval seconds;
```

```
            retransmit-interval seconds;
            transit-delay seconds;
        }
    }
}
```

OSPFv3

```
ospf3 {
    disable;
    export [ policy-names ];
    external-preference preference;
    import [ policy-names ];
    overload {
        <timeout seconds>;
    }
    preference preference;
    reference-bandwidth reference-bandwidth;
    rib-group group-name;
    spf-delay;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    area area-id {
        area-range network/mask-length <restrict>;
        interface interface-name {
            disable;
            dead-interval seconds;
            hello-interval seconds;
            metric metric;
            neighbor address <eligible>;
            passive;
            priority number;
            retransmit-interval seconds;
            transit-delay seconds;
        }
        nssa {
            area-range network/mask-length <restrict>;
            default-lsa {
                default-metric metric;
                metric-type type;
                type-7;
            }
            (no-summaries | summaries);
        }
        stub <default-metric metric> <(no-summaries | summaries)>;
        virtual-link neighbor-id router-id transit-area area-id {
            disable;
            dead-interval seconds;
            hello-interval seconds;
            retransmit-interval seconds;
            transit-delay seconds;
        }
    }
}
```

RIP

```
rip {
   authentication-key password;
   type;
   (check-zero | no-check-zero);
   graceful-restart {
      disable;
      restart-time seconds;
   }
   holddown seconds;
   import [ policy-names ];
   message-size number;
   metric-in metric;
   receive receive-options;
   rib-group group-name;
   send send-options;
   traceoptions {
      file name <replace> <size size> <files number> <no-stamp>
         <(world-readable | no-world-readable)>;
      flag flag <flag-modifier> <disable>;
   }
   group group-name {
      export [ policy-names ];
      metric-out metric;
      preference preference;
      neighbor neighbor-name {
         authentication-key password;
         type;
         (check-zero | no-check-zero);
         import [ policy-names ];
         message-size number;
         metric-in metric;
         receive receive-options;
         send send-options;
      }
   }
}
```

RIPng

```
ripng {
   graceful-restart {
      disable;
      restart-time seconds;
   }
   holddown seconds;
   import [ policy-names ];
   metric-in metric;
   receive <none>;
   send <none>;
   traceoptions {
      file name <replace> <size size> <files number> <no-stamp>
         <(world-readable | no-world-readable)>;
      flag flag <flag-modifier> <disable>;
   }
```

```
    group group-name {
      export [ policy-names ];
      metric-out metric;
      preference number;
      neighbor neighbor-name {
        import [ policy-names ];
        metric-in metric;
        receive <none>;
        send <none>;
      }
    }
}
```

Router Advertisement

```
router-advertisement {
  interface interface-name {
    current-hop-limit number;
    default-lifetime seconds;
    (managed-configuration | no-managed-configuration);
    max-advertisement-interval seconds;
    min-advertisement-interval seconds;
    (other-stateful-configuration | no-other-stateful-configuration);
    prefix prefix {
      (autonomous | no-autonomous);
      (on-link | no-on-link);
      preferred-lifetime seconds;
      valid-lifetime seconds;
    }
    reachable-time milliseconds;
    retransmit-timer milliseconds;
    traceoptions {
      file name <replace> <size size> <files number> <no-stamp>
        <(world-readable | no-world-readable)>;
      flag flag <detail> <disable>;
    }
  }
}
```

Router Discovery

```
router-discovery {
  disable;
  traceoptions {
    file name <replace> <size size> <files number> <no-stamp>
      <(world-readable | no-world-readable)>;
    flag flag <detail> <disable>;
  }
  interface interface-name {
    min-advertisement-interval seconds;
    max-advertisement-interval seconds;
    lifetime seconds;
  }
  address address {
    (advertise | ignore);
    (broadcast | multicast);
    (priority number | ineligible);
  }
}
```

[edit routing-instances] Hierarchy Level

The following statements can also be configured at the [edit logical-routers *logical-router-name*] hierarchy level.

```
routing-instances {
    routing-instance-name {
        description text;
        forwarding-options;
        interface interface-name;
        (forwarding | l2vpn | no-forwarding | virtual-router | vpls | vrf);
        no-vrf-advertise;
        route-distinguisher (as-number:number  |  ip-address:number);
        vrf-import [ policy-names ];
        vrf-export [ policy-names ];
        vrf-table-label;
        vrf-target {
            export community-name;
            import community-name;
        }
        protocols {
            bgp {
                bgp-configuration;
            }
            isis {
                isis-configuration;
            }
            l2vpn {
                l2vpn-configuration;
            }
            ldp {
                ldp-configuration;
            }
            ospf {
                domain-id domain-id;
                domain-vpn-tag number;
                route-type-community (vendor | iana);
                ospf-configuration;
            }
            ospf 3 {
                domain-id domain-id;
                domain-vpn-tag number;
                route-type-community (vendor | iana);
                ospf3-configuration;
            }
            pim {
                pim-configuration;
            }
            rip {
                rip-configuration;
            }
            vpls {
                vpls-configuration;
            }
        }
```

```
routing-options {
   aggregate {
      defaults {
         aggregate-options;
      }
      route destination-prefix {
         policy policy-name;
         aggregate-options;
      }
   }
   auto-export {
      (disable | enable);
      family {
         inet {
            multicast {
               (disable | enable);
               rib-group rib-group;
            }
            unicast {
               (disable | enable);
               rib-group rib-group;
            }
         }
      }
      traceoptions {
         file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
         flag flag <flag-modifier> <disable>;
      }
   }
   autonomous-system autonomous-system <loops number> {
      independent-domain;
   }
   confederation confederation-autonomous-systems
      members autonomous-system;
   dynamic-tunnels tunnel-name {
      destination-prefix prefix;
      source-address address;
      tunnel-type type-of-tunnel;
   }
   fate-sharing {
      group group-name;
      cost value;
      from address {
         to address;
      }
   }
   forwarding-table {
      export [ policy-names ];
   }
```

```
generate {
   defaults {
      generate-options;
   }
   route destination-prefix {
      policy policy-name;
      generate-options;
   }
}
instance-export [ policy-names ];
instance-import [ policy-names ];
interface-routes {
   family (inet | inet6) {
      export {
         lan;
         point-to-point;
      }
   }
   rib-group group-name;
}
martians {
   destination-prefix match-type <allow>;
}
maximum-routes route-limit <log-only | threshold value>;
multicast {
   forwarding-cache {
      threshold (suppress | reuse) value value;
   }
   scope scope-name {
      interface interface-name;
      prefix destination-prefix;
   }
   ssm-groups {
      addresses;
   }
}
options {
   syslog (level level | upto level);
}
resolution {
   rib routing-table-name {
      import [ policy-names ];
      resolution-ribs [ routing-table-names ];
   }
}
rib routing-table-name {
   aggregate {
      defaults {
         aggregate-options;
      }
      route destination-prefix {
         policy policy-name;
         aggregate-options;
      }
   }
```

```
    filter {
        input filter-name;
    }
    generate {
        defaults {
            generate-options;
        }
        route destination-prefix {
            policy policy-name;
            generate-options;
        }
    }
    martians {
        destination-prefix match-type <allow>;
    }
    static {
        defaults {
            static-options;
        }
        rib-group group-name;
        route destination-prefix {
            lsp-next-hop {
                metric metric;
                preference preference;
            }
            next-hop;
            p2mp-lsp-next-hop {
                metric metric;
                preference preference;
            }
            qualified-next-hop address {
                metric metric;
                preference preference;
            }
            static-options;
        }
    }
}
rib-groups {
    group-name {
        import-policy [ policy-names ];
        import-rib [ group-names ];
        export-rib group-name;
    }
}
route-distinguisher-id address;
route-record;
router-id address ;
static {
    defaults {
        static-options;
    }
    rib-group group-name;
```

```
            route destination-prefix {
                lsp-next-hop {
                    metric metric;
                    preference preference;
                }
                next-hop;
                qualified-next-hop address {
                    metric metric;
                    preference preference;
                }
                static-options;
            }
        }
        traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
            flag flag <flag-modifier> <disable>;
        }
    }
}
```

[edit routing-options] Hierarchy Level

The following statements can also be configured at the [edit logical-routers *logical-router-name*] hierarchy level.

```
routing-options {
    aggregate {
        defaults {
            aggregate-options;
        }
        route destination-prefix {
            policy policy-name;
            aggregate-options;
        }
    }
    auto-export {
        (disable | enable);
        family {
            inet {
                multicast {
                    (disable | enable);
                    rib-group rib-group;
                }
                unicast {
                    (disable | enable);
                    rib-group rib-group;
                }
            }
        }
```

```
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
}
autonomous-system autonomous-system <loops number>;
confederation confederation-autonomous-system members autonomous-system;
dynamic-tunnels tunnel-name {
    destination-prefix prefix;
    source-address address;
    tunnel-type type-of-tunnel;
}
fate-sharing {
    group group-name;
    cost value;
    from address {
        to address;
    }
}
forwarding-table {
    export [ policy-names ];
    unicast-reverse-path (active-paths | feasible-paths);
}
generate {
    defaults {
        generate-options;
    }
    route destination-prefix {
        policy policy-name;
        generate-options;
    }
}
graceful-restart {
    disable;
    path-selection-defer-time-limit time-limit;
}
instance-export [ policy-names ];
instance-import [ policy-names ];
interface-routes {
    family (inet | inet6) {
        export {
            lan;
            point-to-point;
        }
    }
    rib-group group-name;
}
martians {
    destination-prefix match-type <allow>;
}
maximum-routes route-limit <log-only | threshold value>;
multicast {
    forwarding-cache {
        threshold (suppress | reuse) value value;
    }
```

```
    scope scope-name {
        interface interface-name;
        prefix destination-prefix;
    }
    ssm-groups {
        address;
    }
}
options {
    syslog (level level | upto level);
}
resolution {
    rib routing-table-name {
        import [ policy-names ];
        resolution-ribs [ routing-table-names ];
    }
}
rib routing-table-name {
    aggregate {
        defaults {
            aggregate-options;
        }
        rib-group group-name;
        route destination-prefix {
            policy policy-name;
            aggregate-options;
        }
    }
    filter {
        input filter-name;
    }
    generate {
        defaults {
            generate-options;
        }
        route destination-prefix {
            policy policy-name;
            generate-options;
        }
    }
    martians {
        destination-prefix match-type <allow>;
    }
    static {
        defaults {
            static-options;
        }
        rib-group group-name;
        route destination-prefix {
            lsp-next-hop {
                metric metric;
                preference preference;
            }
            next-hop;
```

```
            qualified-next-hop address {
               metric metric;
               preference preference;
            }
            static-options;
         }
      }
   }
   rib-groups {
      group-name {
         import-policy [ policy-names ];
         import-rib [ group-names ];
         export-rib group-name;
      }
   }
   route-distinguisher-id address;
   route-record;
   router-id address;
   static {
      defaults {
         static-options;
      }
      rib-group group-name;
      route destination-prefix {
         lsp-next-hop {
            metric metric;
            preference preference;
         }
         next-hop;
         p2mp-lsp-next-hop {
            metric metric;
            preference preference;
         }
         qualified-next-hop address {
            metric metric;
            preference preference;
         }
         static-options;
      }
   }
   traceoptions {
      file name <replace> <size size> <files number> <no-stamp>
         <(world-readable | no-world-readable)>;
      flag flag <flag-modifier> <disable>;
   }
}
```