Chapter 4

Complete Configuration Mode Commands and Statements for J-series Services Routers

This chapter shows the complete configuration mode commands and the complete configuration statement hierarchy for J-series Service routers. The J-series Services configuration statement hierarchy includes some statements from the full JUNOS configuration (for M-series and T-series platforms) and also has some unique configuration statements. Using these commands and statements is described in the *J-series Services User Guide* .

For information about command-line interface (CLI) operational mode commands, see the *JUNOS Protocols, Class of Service, and System Basics Command Reference*. For information about the complete configuration mode commands and statements for M-series and T-series platforms, see the “Complete Configuration Mode Commands and Statements for M-series and T-series Platforms” on page 43.

Complete Configuration Mode Commands

The following is the complete list of configuration mode commands, listing all possible commands in the hierarchy.

```
user@host# ?
Possible completions:
<[Enter]>       Execute this command
  activate      Remove the inactive tag from a statement
  annotate      Annotate the statement with a comment
  commit        Commit current set of changes
  copy          Copy a statement
  deactivate    Add the inactive tag to a statement
  delete        Delete a data element
  edit          Edit a sub-element
  exit          Exit from this level
  help          Provide help information
  insert        Insert a new ordered data element
  load          Load configuration from an ASCII file
  quit          Quit from this level
  rename        Rename a statement
  rollback      Roll back database to last committed version
  run           Run an operational-mode command
  save          Save configuration to an ASCII file
  set           Set a parameter
  show          Show a parameter
  status        Display database user status
  top           Exit to top level of configuration
  up            Exit one level of configuration
  wildcard      Wildcard operations
```

Complete Configuration Statement Hierarchy

This section shows the complete configuration statement hierarchy for J-series Services routers, listing all supported 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.

This section is organized as follows:

[edit access] Hierarchy Level

```
access {
    profile profile-name {
        authentication-order [ authentication-methods ];
        client name {
            chap-secret chap-secret;
        }
    }
    traceoptions {
        flag {
            all;
            authentication;
            chap;
            configuration;
            radius;
        }
    }
} # End of [edit access] hierarchy level
```

[edit accounting-options] Hierarchy Level

```
accounting-options {
    class-usage-profile profile-name {
        destination-classes {
            class-name;
        }
        source-classes {
            class-name;
        }
    }
    file filename {
        size bytes;
        files number;
        transfer-interval minutes;
        archive-sites {
            url;
        }
    }
    filter-profile profile-name {
        file filename;
        interval minutes;
        counters {
            counter-name;
        }
    }
    interface-profile profile-name {
        fields {
            field-name;
        }
        file filename;
        interval minutes;
    }
```

```
    routing-engine-profile profile-name {
        file name;
        fields {
            field-name;
        }
        interval seconds;
    }
} # End of [edit accounting-options] hierarchy level
```

[edit applications] Hierarchy Level

```
applications {
    application application-name {
        application-protocol protocol-name;
        destination-port port-number;
        icmp-code value;
        icmp-type value;
        inactivity-timeout value;
        protocol type;
        rpc-program-number number;
        snmp-command command;
        source-port port-number;
        ttl-threshold value;
        uuid hex-value;
    }
    application-set application-set-name {
        [ application application-name ];
    }
} # End of [edit applications] hierarchy level
```

[edit chassis] Hierarchy Level

```
chassis {
    alarm {
        interface-type {
            alarm-name (ignore | red | yellow);
        }
    }
    fpc slot-number {
        pic pic-number {
            mlfr-uni-nni-bundles number;
        }
    }
    (source-route | no-source-route);
} # End of [edit chassis] hierarchy level
```

[edit class-of-service] Hierarchy Level

```
class-of-service {
    adaptive-shapers {
        adaptive-shaper-name {
            trigger becn;
        }
    }
    classifiers {
        type classifier-name {
            import (classifier-name | default);
            forwarding-class class-name {
                loss-priority (high | low | medium-high | medium-low) {
                    code-points [ aliases ] [ 6-bit-patterns ];
                }
            }
        }
    }
    code-point-aliases {
        (dscp | ieee-802.1 | inet-precedence) {
            alias-name bits;
        }
    }
    drop-profiles {
        profile-name {
            fill-level percentage drop-probability percentage;
            interpolate {
                drop-probability [ value ];
                fill-level [ value ];
            }
        }
    }
    forwarding-classes {
        queue queue-number class-name priority (low | high);
    }
    interfaces interface-name {
        scheduler-map map-name;
        unit logical-unit-number {
            adaptive-shaper adaptive-shaper;
            classifiers {
                (dscp | ieee-802.1 | inet-precedence) (classifier-name | default);
            }
            forward-class class-name;
            loss-priority-maps {
                frame-relay-de (loss-priority-map-name | default);
            }
            rewrite-rules {
                dscp (rewrite-name | default);
                frame-relay-de (rewrite-name | default);
                ieee-802.1 (rewrite-name | default);
                inet-precedence (rewrite-name | default);
            }
```

```
            scheduler-map map-name;
            shaping-rate rate;
            virtual-channel-group group-name;
          }
        }
      }
      loss-priority-maps {
        frame-relay-de name {
          loss-priority level code-points [ values ];
        }
      }
      rewrite-rules {
        (dscp | frame-relay-de | ieee-802.1 | inet-precedence) rewrite-name {
          import (rewrite-name | default);
          forwarding-class class-name {
            loss-priority level code-point (alias | bits);
          }
        }
      }
      scheduler-maps {
        map-name {
          forward-class class-name scheduler scheduler-name;
        }
      }
      schedulers {
        scheduler-name {
          buffer-size (percent percentage | remainder | temporal microseconds);
          drop-profile-map loss-priority (any | high | low) protocol (any | non-tcp | tcp)
                drop-profile profile-name;
          priority priority-level;
          shaping-rate (rate | percent percentage);
          transmit-rate (rate | percent percentage | remainder) <exact>;
        }
      }
      traceoptions {
        flag flag <disable>;
      }
      virtual-channel-groups {
        group-name {
          channel-name {
            default;
            scheduler-map map-name;
            shaping-rate (rate | percent percentage);
          }
        }
      }
      virtual-channels {
        virtual-channel-name;
      }
} # End of [edit class-of-service] hierarchy level
```

[edit firewall] Hierarchy Level

```
firewall {
    family family-name {
        filter filter-name {
            term term-name {
                from {
                    match-conditions;
                }
                then {
                    action;
                    action-modifiers;
                }
            }
        }
        service-filter filter-name {
            term term-name {
                from {
                    match-conditions;
                }
                then {
                    action;
                    action-modifiers;
                }
            }
        }
    }
    filter filter-name {
        term term-name {
            from {
                match-conditions;
            }
            then {
                action;
                action-modifiers;
            }
        }
    }
    policer policer-name;
        filter-specific;
        if-exceeding {
            bandwidth-limit bps;
            bandwidth-percent number;
            burst-size-limit bytes;
        }
        then {
            policer-action;
        }
    }
} # End of [edit firewall] hierarchy level
```

[edit forwarding-options] Hierarchy Level

```
forwarding-options {
    accounting group-name {
        output {
            cflowd [ host-names ] {
                aggregation {
                    autonomous-system;
                    destination-prefix;
                    protocol-port;
                    source-destination-prefix {
                        caida-compliant;
                    }
                    source-prefix;
                }
                autonomous-system-type (origin | peer);
                port port-number;
                version format;
            }
            flow-active-timeout seconds;
            flow-inactive-timeout seconds;
            interface [ interface-names ] {
                engine-id number;
                engine-type number;
                source-address address;
            }
        }
    }
    family family-name {
        filter {
            input filter-name;
        }
    }
    hash-key {
        family inet {
            layer-3;
            layer-4;
        }
    }
    helpers {
        bootp {
            description description-of-service;
            interface interface-group {
                description description-of-interface;
                maximum-hop-count number;
                minimum-wait-time seconds;
                no-listen;
                server [ addresses ];
            }
            maximum-hop-count number;
            minimum-wait-time seconds;
            server address;
        }
```

```
    domain {
        description description-of-service;
        server address;
        interface interface-name {
        description description-of-interface;
        no-listen;
        server address;
        }
    }
    tftp {
        description description-of-service;
        server address < [ routing-instance routing-instance-name ] >;
        interface interface-name {
            description description-of-interface;
            no-listen;
            server address;
        }
    }
    traceoptions {
        file {
            files number;
            size kilobytes;
        }
        flag flag;
        level level;
    }
}
sampling {
    disable;
    input {
        family inet {
            max-packets-per-second number;
            rate number;
            run-length number;
        }
    }
    output {
    aggregate-export-interval seconds;
    cflowd [ host-names ] {
        aggregation {
            autonomous-system;
            destination-prefix;
            protocol-port;
            source-destination-prefix {
                caida-compliant;
            }
            source-prefix;
        }
        autonomous-system-type (origin | peer);
        (local-dump | no-local-dump);
        source-address address;
        port port-number;
        version format;
    }
```

```
        file {
            disable;
            filename filename;
            files number;
            size bytes;
            (stamp | no-stamp);
            (world-readable | no-world-readable);
        }
        flow-active-timeout seconds;
        flow-inactive-timeout seconds;
        interface [ interface-names ] {
            engine-id num;
            engine-type num;
            source-address address;
        }
    }
} # End of [edit forwarding-options] hierarchy level
```

[edit groups] Hierarchy Level

```
groups {
    group-name {
        configuration-data;
    }
} # End of [edit groups] hierarchy level
```

[edit interfaces] Hierarchy Level

```
interfaces {
    interface-name {
        disable;
        accounting-profile name;
        description text;
        clocking clock-source;
        dce;
        description text;
        disable;
        e1-options {
            bert-error-rate rate;
            bert-period seconds;
            fcs (32 | 16);
            framing (g704 | g704-no-crc4 | unframed);
            idle-cycle-flag (flags | ones);
            invert data;
            loopback (local | remote);
            start-end-flag (shared | filler);
            timeslots time-slot-range;
        }
        encapsulation type;
```

```
fastether-options {
   (flow-control | no-flow-control);
   ingress-rate-limit rate;
   (loopback | no-loopback);
   source-address-filter {
      mac-address;
   }
   (source-filtering | no-source-filtering);
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
hold-time up milliseconds down milliseconds;
keepalives <down-count number> <interval seconds> <up-count number>;
link-mode mode;
lmi {
   lmi-type (ansi | itu);
   n391dte number;
   n392dce number;
   n392dte number;
   n393dce number;
   n393dte number;
   t391dte seconds;
   t392dce seconds;
}
mac mac-address;
mtu bytes;
no-keepalives;
per-unit-scheduler;
ppp-options {
   chap {
      access-profile name;
      local-name name;
      passive;
   }
}
receive-bucket {
   overflow (discard | tag);
   rate percentage;
   threshold bytes;
}
serial-options {
   clock-rate rate;
   clocking-mode (dce | dte | loop);
   control-leads {
      control-signal (assert | de-assert | normal);
      cts (ignore | normal | require);
      dcd (ignore | normal | require);
      dsr (ignore | normal | require);
      dtr signal-handling-option;
      ignore-all;
      indication (ignore | normal | require);
      rts (assert | de-assert | normal);
      tm (ignore | normal | require);
   }
```

```
    control-polarity (positive | negative);
    cts-polarity (positive | negative);
    dcd-polarity (positive | negative);
    dsr-polarity (positive | negative);
    dtr-circuit (balanced | unbalanced);
    dtr-polarity (positive | negative);
    encoding (nrz | nrzi);
    indication-polarity (positive | negative);
    line-protocol protocol;
    loopback mode;
    rts-polarity (positive | negative);
    tm-polarity (positive | negative);
    transmit-clock invert;
}
speed (10m | 100m);
t1-options {
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    buildout value;
    byte-encoding (nx64 | nx56);
    fcs (32 | 16);
    framing (sf | esf);
    idle-cycle-flags (flags | ones);
    invert-data;
    line-encoding (ami | b8zs);
    loopback (local | payload | remote);
    remote-loopback-respond;
    start-end-flag (shared | filler);
    timeslots slot-number;
}
t3-options {
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    buildout feet;
    (cbit-parity | no-cbit-parity);
    compatibility-mode (adtran | digital-link | kentrox | larscom | verilink)
        <subrate value>;
    fcs (32 | 16);
    (feac-loop-respond | no-feac-loop-respond);
    idle-cycle-flag value;
    (long-buildout | no-long-buildout);
    (loop-timing | no-loop-timing);
    loopback (local |payload | remote);
    (mac | no-mac);
    (payload-scrambler | no-payload-scrambler);
    start-end-flag value;
}
traceoptions {
    flag flag <flag-modifier> <disable>;
}
transmit-bucket {
    overflow (tag | discard);
    rate percentage;
    threshold bytes;
}
```

```
(traps | no-traps);
vlan-tagging;
unit logical-unit-number {
   accounting-profile name;
   bandwidth rate;
   description text;
   disable;
   dlci dlci-identifier ;
   encapsulation type;
   inverse-arp;
   multicast-dlci dlci-identifier ;
   multipoint;
   passive-monitor-mode;
   point-to-point;
   (traps | no-traps);
   vlan-id number ;
   family family {
      filter {
         input filter-name;
         output filter-name;
         group filter-group-number ;
      }
      mtu bytes;
      no-redirects;
      policer {
         arp policer-template-name;
         output policer-template-name;
         group policer-template-name;
      }
      primary;
      rpf-check <fail-filter filter-name> {
         <mode loose>;
      }
      sampling {
         [ input output ];
      }
      service {
         input {
            [ service-set service-set-name <service-filter filter-name> ];
            post-service-filter filter-name; {
         }
         output {
            [ service-set service-set-name <service-filter filter-name> ];
         }
      }
```

```
            address address {
               arp ip-address (mac | multicast-mac) mac-address <publish>;
               destination destination-address;
               broadcast address;
               preferred;
               primary;
               vrrp-group group-number {
                  (accept-data | no-accept-data):
                  advertise-interval seconds;
                  authentication-type authentication;
                  authentication-key key;
                  fast-interval milliseconds;
                  (preempt | no-preempt) {
                     hold-time seconds;
                  }
                  priority number;
                  }
                  track {
                     interface interface-name priority-cost cost;
                  }
                  virtual-address [ addresses ];
               }
            }
         }
      }
      traceoptions {
         file filename <files number> <size size>
                        <(world-readable | no-world-readable)>;
         flag flag <disable>;
      }
} # End of [edit interfaces] hierarchy level
```

[edit policy-options] Hierarchy Level

```
policy-options {
   as-path name regular-expression;
   as-path-group group-name;
   community name {
      invert-match;
      members [ community-ids ];
   }
   damping name {
      disable;
      half-life minutes;
      max-suppress minutes;
      reuse number;
      suppress number;
   }
```

```
    policy-statement policy-name {
      term term-name {
        from {
          family family-name;
          match-conditions;
          policy subroutine-policy-name;
          prefix-list name;
          route-filter destination-prefix match-type <actions>;
          source-address-filter destination-prefix match-type <actions>;
        }
        to {
          match-conditions;
          policy subroutine-policy-name;
        }
        then actions;
        default-action (accept | reject);
      }
    }
    prefix-list name {
      ip-addresses;
    }
} # End of [edit policy-options] hierarchy level
```

[edit protocols] Hierarchy Level

```
protocols {
```

Bidirectional Forwarding Detection (BFD)

```
    bfd {
      traceoptions {
        file {
          filename;
          files number;
          no-world-readable;
          size bytes;
          world-readable;
        }
      }
      flag {
        adjacency;
        all;
        error;
        event;
        packet;
        pipe;
        state;
        timer;
      }
    } # End of [edit protocols bfd] hierarchy level
```

Border Gateway Protocol (BGP)

```
bgp {
    advertise-inactive;
    (advertise-peer-as | no-advertise-peer-as);
    authentication-key key;
    cluster cluster-identifier;
    damping;
    description text-description;
    disable;
    export [ policy-names ];
    family inet {
        (any | multicast | unicast) {
            prefix-limit {
                maximum number;
                teardown <percentage> <idle-timeout (forever | minutes)>;
            }
            rib-group group-name;
        }
        labeled-unicast {
            aggregate-label {
                community match-origin;
            }
            explicit-null {
                connected-only;
            }
            prefix-limit {
                maximum number;
                teardown <percentage> <idle-timeout (forever | minutes)>;
            }
            resolve-vpn;
            rib inet.3;
            rib-group group-name;
        }
    }
    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>);
    mtu-discovery;
    multihop {
        <ttl-value>;
        no-nexthop-change;
    }
    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;
route-target {
   advertise-default;
   external-paths number;
   prefix-limit {
      maximum number;
      teardown <percentage> <idle-timeout (forever | minutes)>;
      }
   }
}
traceoptions {
   file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
   flag flag <flag-modifier> <disable>;
}
group group-name {
   advertise-inactive;
   (advertise-peer-as | no-advertise-peer-as);
   allow [network/mask-length];
   as-override;
   authentication-key key;
   cluster cluster-identifier;
   damping;
   description text-description;
   export [ policy-names ];
   family inet {
      (any | multicast | unicast) {
         prefix-limit {
            maximum number;
            teardown <percentage> <idle-timeout (forever | minutes)>;
         }
         rib-group group-name;
      }
   }
   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-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>;
}
type type;
neighbor address {
   advertise-inactive;
   as-override;
   authentication-key key;
   cluster cluster-identifier;
   damping;
   description text-description;
   export [ policy-names ];
   family inet {
      (any | multicast | unicast) {
         prefix-limit {
            maximum number;
            teardown <percentage> <idle-timeout (forever | time-in-minutes)>;
         }
         rib-group group-name;
      }
   }
   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-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>;
        }
    }
}
} # End of [edit protocols bgp] hierarchy level
```

Distance Vector Multicast Routing Protocol (DVMRP)

```
dvmrp {
    disable;
    export [ policy-names ];
    import [ policy-names ];
    interface interface-name {
        disable;
        hold-time seconds;
        metric metric;
        mode (forwarding | unicast-routing);
    }
    rib-group group-name;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
} # End of [edit protocols dvmrp] hierarchy level
```

Internet Group Management Protocol (IGMP)

```
igmp {
    interface interface-name {
        disable;
        static {
            group group {
                source source;
            }
        }
        version version;
    }
    query-interval seconds;
    query-last-member-interval seconds;
    query-response-interval seconds;
    robust-count number;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
        }
    }
} # End of [edit protocols igmp] hierarchy level
```

Intermediate System-to-Intermediate System (IS-IS)

```
isis {
    disable;
    export [ policy-names ];
    graceful-restart {
        disable;
        helper-disable;
        restart-duration seconds;
    }
    ignore-attached-bit;
    level level-number {
        authentication-key key;
        authentication-type authentication;
        external-preference preference;
        no-csnp-authentication;
        no-hello-authentication;
        no-psnp-authentication;
        preference preference;
        prefix-export-limit num;
        wide-metrics-only;
    }
    loose-authentication-check;
    lsp-lifetime seconds;
    no-authentication-check;
    no-ipv4-routing;
    overload {
        advertise-high-metrics;
        <timeout seconds>;
    }
    reference-bandwidth reference-bandwidth;
    rib-group group name;
    spf-delay milliseconds;
    topologies {
        ipv4-multicast;
    }
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>;
                    <(world-readable | no-world-readable)>;
    flag flag <flag-modifier> <disable>;
    }
    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;
        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;
            metric metric;
            passive;
            priority number;
        }
    }
} # End of [edit protocols isis] hierarchy level
```

Multicast Source Discovery Protocol (MSDP)

```
msdp {
    active-source-limit {
        maximum number;
        threshold number;
    }
    data-encapsulation <(disable | enable)>;
    disable;
    export [ policy-names ];
    import [ policy-names ];
    local address address;
    rib-group group-name;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    peer address {
        authentication-key peer-key;
        default-peer;
        disable;
        export [ policy-name ];
        import [ policy-name ];
        local-address address;
        traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
                    <(world-readable | no-world-readable)>;
            flag flag <flag-modifier> <disable>;
        }
    }
```

```
    group group-name {
      authentication-key peer-key;
      disable;
      export [ policy-names ];
      import [ policy-names ];
      local-address address;
      mode <(mesh-group | standard)>;
      traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
      }
      peer address; {
        default-peer;
        disable;
        export [ policy-name ];
        import [ policy-name ];
        local-address address;
        traceoptions {
          file name <replace> <size size> <files number> <no-stamp>
                  <(world-readable | no-world-readable)>;
          flag flag <flag-modifier> <disable>;
        }
      }
    }
  } # End of [edit protocols msdp] hierarchy level
```

Open Shortest Path First (OSPF)

```
  ospf {
    disable;
    export [ policy-names ];
    external-preference preference;
    graceful-restart {
      disable;
      helper-disable;
      notify-duration seconds;
      rest-duration seconds;
    }
    import [policy-names];
    overload {
      <timeout seconds>;
    }
    preference preference;
    reference-bandwidth reference-bandwidth;
    rib-group group-name;
    route-type-community (vendor | iana);
    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/masklen <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/masklen <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;
    }
```

```
    stub <default-metric metric> < (no-summaries | summaries)>;
    virtual-link neighbor-id router-id transit-area area-id {
      authentication {
        md5 key-id;
        simple-password key-id;
      }
      dead-interval seconds;
      disable;
      hello-interval seconds;
      retransmit-interval seconds;
      transit-delay seconds;
    }
  }
} # End of [edit protocols ospf] hierarchy level
```

Pragmatic General Multicast (PGM)

```
pgm {
  traceoptions {
    file name <replace> <size size> <files number > <no-stamp>
          <(world-readable | no-world-readable)>;
    flag flag <flag-modifier >;
  }
} # End of [edit protocols pgm] hierarchy level
```

Protocol Independent Multicast (PIM)

```
pim {
  disable;
  assert-timeout seconds;
  dense-groups {
    addresses;
  }
  graceful-restart {
    disable;
    restart-duration seconds;
  }
  import [ policy-names ];
  interface interface-name {
    disable;
    mode (dense | sparse | sparse-dense);
    priority number;
    version version;
  }
  rib-group group-name;
  rp {
    auto-rp (announce | discovery | mapping);
    bootstrap-export [ policy-names ];
    bootstrap-import [ policy-names ];
    bootstrap-priority number;
    embedded-rp {
      maximum-rps limit;
      group-ranges {
        destination-mask;
      }
    }
  }
```

```
    static {
      address address {
        version version;
        group-ranges {
          destination-mask;
        }
        traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
                    <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
      }
    }
  } # End of [edit protocols pim] hierarchy level
```

Routing Information Protocol (RIP)

```
  rip {
    authentication-key password;
    authentication-type type;
    (check-zero | no-check-zero);
    graceful-restart {
      disable;
      restart-time seconds;
    }
    hold-down 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;
        authentication-type type;
        (check-zero | no-check-zero);
        import [ policy-names ];
        message-size number;
        metric-in metric;
        receive receive-options;
        send send-options;
      }
    }
  } # End of [edit protocols rip] hierarchy level
```

Router Discovery

```
router-discovery {
    disable;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    interface interface-name {
        min-advertisement-interval seconds;
        max-advertisement-interval seconds;
        lifetime seconds;
    }
    address address {
        (advertise | ignore);
        (broadcast | multicast);
        (priority number | ineligible);
    }
} # End of [edit protocols router-discovery] hierarchy level
```

Session Announcement Protocol / Session Description Protocol (SAP / SDP)

```
sap {
    disable;
    listen <address> <port port>;
} # End of [edit protocols sap] hierarchy level
```

Virtual Router Redundancy Protocol (VRRP)

```
vrrp {
    traceoptions {
        file {
            filename filename;
            files number;
            size size;
            (world-readable | no-world-readable);
        }
        flag flag
    }
} # End of [edit protocols vrrp] hierarchy level
} # End of [edit protocols] hierarchy level
```

[edit routing-options] Hierarchy Level

```
routing-options {
    aggregate {
        defaults {
            aggregate-options;
        }
        route destination-prefix {
            policy policy-name;
            aggregate-options;
        }
    }
    autonomous-system autonomous-system <loops number>;
    confederation confederation-autonomous-system members autonomous-system;
    dynamic-tunnels tunnel-name {
        destination-networks prefix;
        source-address address;
        tunnel-type tunnel-type;
    }
```

```
forwarding-table {
   export [ policy-names ];
   unicast-reverse-paths (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;
}
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 value <reuse 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;
            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-names ];
    }
}
```

```
        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>;
        }
    } # End of [edit routing-options] hierarchy level
```

[edit security] Hierarchy Level

```
security {
    certificate {
        cache-size bytes;
        cache-timeout-negative seconds;
        certification-authority ca-profile-name {
            ca-name certificate-authority-name;
            crl file-name;
            encoding (binary | pem);
            file certificate-filename;
            enrollment-url url-name;
            ldap-url url-name;
        }
        enrollment-retry number;
        local certificate-name;
        maximum-certificates maximum-number;
        path-length bytes;
    }
    ike {
        policy ike-peer-address {
            description policy-description;
            encoding (binary | pem);
            identity identity-name;
            local certificate-name;
            local-key-pair private-public-key-file;
            mode (aggressive | main);
            pre-shared-key (ascii-text key | hexadecimal key);
            proposals [ proposal-names ];
        }
```

```
        proposal ike-proposal-name {
            authentication-algorithm (md5 | sha1);
            authentication-method (dsa-signatures | pre-shared-keys | rsa-signatures);
            dh-group (group1 | group2);
            encryption-algorithm (3des-cbc | des-cbc);
            lifetime-seconds seconds;
        }
    }
    ipsec {
        proposal ipsec-proposal-name {
            authentication-algorithm (hmac-md5-96 | hmac-sha1-96);
            encryption-algorithm (3des-cbc | des-cbc);
            lifetime-seconds seconds;
            protocol (ah | esp | bundle);
        }
        policy ipsec-policy-name {
            perfect-forward-secrecy {
                keys (group1 | group2);
            }
            proposals [ proposal-names];
        }
        security-association name {
            dynamic {
                <security-association (32 | 64)>;
                ipsec-policy policy-name;
            }
            manual {
                direction (inbound | outbound | bi-directional) {
                    authentication {
                        algorithm (hmac-md5-96 | hmac-sha1-96);
                        key (ascii-text key | hexadecimal key);
                    }
                    auxiliary-spi auxiliary-spi-value;
                    encryption {
                        algorithm (des-cbc | 3des-cbc);
                        key (ascii-text key | hexadecimal key);
                    }
                    protocol (ah | esp | bundle);
                    spi spi-value;
                }
            }
            mode (tunnel | transport);
            traceoptions {
                file <files number> <size size>;
                flag all;
                flag database;
                flag general;
                flag ike;
                flag parse;
                flag policy-manager;
                flag routing-socket;
                flag timer;
            }
        }
    }
} # End of [edit security] hierarchy level
```

[edit services] hierarchy level

```
services {
    adaptive-services-pics {
        traceoptions {
            flag flag;
        }
    }
    ids {
        rule rule-name {
            match-direction (input | output | input-output);
            term term-name {
                from {
                    applications [ application-names ];
                    application-sets [ set-names ];
                    destination-address address;
                    source-address address;
                }
                then {
                    aggregation {
                        destination-prefix prefix-value;
                        source-prefix prefix-value;
                    }
                    (force-entry | ignore-entry);
                    logging {
                        syslog;
                        threshold rate;
                    }
                    syn-cookie {
                        mss value;
                        threshold rate;
                    }
                }
            }
        }
        rule-set rule-set-name {
            [ rule rule-names ];
        }
    }
    ipsec-vpn {
        ike {
            proposal-name {
                authentication-algorithm (md5 | sha1);
                authentication method (dsa-signatures | pre-shared-keys | rsa-signatures);
                description description;
                dh-group (group1 | group2);
                encryption-algorithm (3des-cbc | des-cbc);
                lifetime-seconds seconds;
            }
            policy policy-name {
                description description;
                local-id {
                    fqdn [ values ];
                    ipv4_addr [ values ];
                    key_id [ values ];
                }
                mode (aggressive | main);
```

```
        pre-shared-key (ascii-text key | hexadecimal key);
        proposals [ proposal-names ];
        remote-id {
          fqdn [ values ];
          ipv4_addr [ values ];
          key_id [ values ];
        }
      }
    }
}
nat {
    pool nat-pool-name {
      address (address | address-range low minimum-value high maximum-value);
      port (automatic | range low minimum-value high maximum-value);
    }
    rule rule-name {
      match-direction (input | output);
      term term-name {
        from {
          applications [ application-names ];
          application-sets [ set-names ];
          destination-sets address;
          source-address address;
        }
        then {
          translated {
            destination-pool nat-pool-name;
            source-pool nat-pool-name;
            translation-type (destination type | source type);
          }
          syslog;
        }
      }
    }
    rule-set rule-set-name {
      [ rule rule-names ];
    }
}
rpm {
    probe owner {
      test test-name {
            data-fill data;
            data-size size;
            destination-port port;
            dscp-code-point DSCP bits;
            history-size size;
            probe-count count;
            probe-interval seconds;
            probe-type type;
            routing-instance instance-name;
            source-address address;
            target-url (url | address);
            test-interval interval;
            thresholds thresholds;
            traps traps;
      }
    }
```

```
            probe-server {
               tcp port;
               udp port;
            }
            probe-limit limit;
            }
         }
         service-set service-set-name {
            ([ ids-rules rule-names ] | ids-rule-sets rule-set-name);
            ([ ipsec-vpn-rules rule-names ] | ipsec-vpn-rule-sets rule-set-name);
            ([ nat-rules rule-names ] | nat-rule-sets rule-set-name);
            ([ stateful-firewall-rules rule-names ] | stateful-firewall-rule-sets rule-set-name);
            interface-service {
               service-interface interface-name;
            }
            ipsec-vpn-options {
               local-gateway address;
            }
            next-hop-service {
               inside-service-interface name.number;
               outside-service-interface name.number;
            }
            syslog {
               host hostname {
                  services priority-level;
                  facility-override facility-name;
                  log-prefix prefix-number;
               }
            }
         }
         stateful-firewall {
            rule rule-name {
               match-direction (input | output | input-output);
               term term-name {
                  from {
                     applications [ application-names ];
                     application-sets [ set-names ];
                     destination-address address;
                     source-address address;
                  }
                  then {
                     (accept | discard | reject);
                     allow-ip-option [ values ];
                     syslog;
                  }
               }
            }
            rule-set rule-set-name {
               [ rule rule-names ];
            }
         }
      } # End of [edit services] hierarchy level
```

[edit snmp] Hierarchy Level

```
snmp {
    community community-name {
        authorization authorization;
        clients {
            address restrict;
        }
        view view-name;
    }
    contact contact;
    description description;
    engine-id {
        (local engine-id | use-mac-address | use-default-ip-address);
    }
    interface [ interface-name ];
    filter-duplicates;
    location location;
    name name;
    nonvolatile {
        commit-delay seconds;
    }
    rmon {
        alarm index {
            description description;
            falling-event-index index;
            falling-threshold integer;
            interval seconds;
            rising-event-index index;
            rising-threshold integer;
            sample-type (absolute-value | delta-value);
            startup-alarm (falling-alarm | rising-alarm | rising-or-falling alarm);
            variable oid-variable;
        }
        event index {
            community community-name;
            description description;
            type type;
        }
    }
    traceoptions {
        file size size files number;
        flag flag;
    }
    trap-group group-name {
        categories [ categories ];
        destination-port <port-number>;
        targets {
            address;
        }
        version (all | v1 | v2);
    }
    trap-options {
        agent-address outgoing-interface;
        source-address address;
    }
```

```
v3 {
    notify name {
        tag tag-name;
        type trap;
    }
    notify-filter name {
        oid oid (include | exclude);
    }
    snmp-community community-index {
        community-name community-name;
        security-name security-name;
        tag tag-name;
    }
    target-address target-address-name {
        address address;
        address-mask address-mask;
        port port-number;
        tag-list tag-list;
        target-parameters target-parameters-name;
    }
    target-parameters target-parameters-name {
        notify-filter name;
        parameters {
            message-processing-model (v1 | v2c | V3);
            security-model ( usm | v1 | v2c);
            security level (authentication | none | privacy);
            security-name security-name;
        }
    }
    usm {
        local-engine {
            user username {
                authentication-md5 {
                    authentication-password password;
                }
                authentication-sha {
                    authentication-password password;
                }
                authentication-none;
                    privacy-password password;
                }
                privacy-aes128 {
                    privacy-password password;
                }
                privacy-des {
                    privacy-password password;
                }
                privacy-none;
            }
        }
    }
```

```
    vacm {
      access {
        group group-name {
          default-context-prefix {
            security-model (any | usm | v1 | v2c) {
              security-level (authentication | none | privacy) {
                notify-view notify-view;
                read-view read-view;
                write-view write-view;
              }
            }
          }
        }
      }
      security-to-group {
        security-model (usm | v1 | v2c) {
          security-name security-name {
            group group-name;
          }
        }
      }
    }
    view view-name; {
      oid object-identifier (include | exclude);
    }
} # End of [edit snmp] hierarchy level
```

[edit system] Hierarchy Level

```
system {
    accounting {
      events [ login change-log interactive-commands ];
      destination {
        tacplus {
          server {
            server-address {
              port port-number;
              server password;
              single-connection;
              source-address source-address;
              timeout seconds;
            }
          }
        }
      }
    }
    archival {
      configuration {
        archive-sites {
          ftp://<username>:<password>@<host>:<port>/<url-path>;
        }
        transfer-interval interval;
        transfer-on-commit;
      }
    }
```

```
authentication-order [ authentication-methods ];
autoinstallation {
    interfaces {
        interface-name {
            bootp;
            rarp;
            slarp;
        }
    }
    configuration-servers {
        url;
    }
}
backup-router address <destination destination-address>;
(compress-configuration-files | no-compression-configuration-files);
default-address-selection;
diag-port-authentication {
    disable;
    maximum-hop-count;
    minimum-wait-time seconds;
    server [ address ];
    interface interface-group {
        no-listen;
        maximum-hop-count;
        minimum-wait-time seconds;
        server [ address ];
    }
}
domain-name domain-name;
domain-search [ domain-list ];
dump-device (compact-flash | remove-compact | usb);
host-name hostname;
internet-options address <destination destination-address>;
internet-options {
    path-mtu-discovery;
    source-quench;
    source-port upper-limit <upper-limit>;
}
location {
    altitude feet;
    building name;
    country-code code;
    floor number;
    hcoord horizontal-coordinate;
    lata service-area;
    latitude degrees;
        longitude degrees;
    npa-nxx number;
    postal-code postal-code;
    rack number;
    vcoord vertical-coordinate;
}
```

```
login {
   message text;
   class class-name {
      allow-commands "regular-expression";
      allow-configuration "regular-expression";
      deny-commands "regular-expression";
      deny-configuration "regular-expression";
      idle-timeout minutes;
      permissions [ permissions ];
   }
   user username {
      full-name complete-name;
      uid uid-value;
      class class-name;
      authentication {
         (encrypted-password "password" | plain-text-password);
         ssh-rsa "public-key";
         ssh-dsa "public-key";
      }
   }
}
max-configurations-on-flash number;
mirror-flash-on-disk;
name-server {
   address;
}
no-redirects;
ntp {
   authentication-key key-number type type value password;
   boot-server address;
   broadcast <address> <key key-number> <version value> <ttl value>;
   broadcast-client;
   multicast-client <address>;
   peer address <key key-number> <version value> <prefer>;
   server address <key key-number> <version value> <prefer>;
   trusted-key [ key-numbers ];
}
pic-console-authentication {
   encrypted-password encrypted-password;
   plain-text-password;
}
ports {
   auxiliary {
      type terminal-type;
   }
   console {
      insecure;
      log-out-on-disconnect;
      type terminal-type;
   }
}
```

```
processes {
   disk-monitoring (enable | disable);
   inet-process (enable | disable) failover (alternate-media | other-routing-engine);
   interface-control (enable | disable) failover (alternate-media |
   other-routing-engine);
   mib-process (enable | disable) failover (alternate-media | other-routing-engine);
      ntp (enable | disable) failover (alternate-media | other-routing-engine);
      routing (enable | disable) failover (alternate-media | other-routing-engine);
      snmp (enable | disable) failover (alternate-media | other-routing-engine);
      watchdog (enable | disable) failover (alternate-media | other-routing-engine)
   web-management (enable | disable) failover (alternate-media
   other-routing-engine);
      timeout seconds;
   }
}
radius-server server-address {
   port number;
   retry number;
   secret password;
   source-address source-address;
   timeout seconds;
}
root-authentication {
   (encrypted-password "password" | plain-text-password);
   ssh-rsa "public-key";
   ssh-dsa "public-key";
}
(saved-core-context | no-saved-core-context);
saved-core-files files;
services {
   finger {
      <connection-limit limit>;
      <rate-limit limit>;
   }
   ftp {
      <connection-limit limit>;
      <rate-limit limit>;
   }
   service-deployment {
      servers server-address {
         port port-number;
      }
      source-address source-address;
   }
   ssh {
      <connection-limit limit>;
      protocol-version [ versions ];
      <rate-limit limit>;
      root-login (allow | deny | deny-password);
   }
   telnet {
      <connection-limit limit>;
      <rate-limit limit>;
   }
```

```
    web-management {
        http {
            port port;
        }
        https {
            local-certificate name;
            port port;
        }
    }
    xnm-clear-text {
        <connection-limit limit>;
        <rate-limit limit>;
    }
    xnm-ssl {
        <connection-limit limit>;
        local-certificate name;
        <rate-limit limit>;
    }
}
static-host-mapping {
    host-name {
        alias [ alias ];
        inet [ address ];
        sysid system-identifier;
    }
}
syslog {
    archive {
        files number;
        size size;
        (world-readable | no-world-readable);
    }
    console {
        facility severity;
    }
    file filename {
        facility severity;
        explicit-priority;
        archive {
            files number;
            size size;
            (world-readable | no-world-readable);
        }
    }
    host (hostname | other-routing-engine) {
        facility severity;
        explicit-priority;
        facility-override facility;
        log-prefix string;
    }
    source-address source-address;
    time-format (year | millisecond | year millisecond);
    user (username | *) {
        facility level;
    }
}
```

```
        tacplus-options service-name service-name;
        tacplus-server server-address {
            secret password;
            single-connection;
            source-address source-address;
            timeout seconds;
        }
        time-zone time-zone;
    } # End of [edit system] hierarchy level
```