

Example: Configuring Dynamic Hierarchical Scheduling and Queuing for Subscriber Access

In this example, subscribers are provided with a data and voice service defined in an access profile when they initially log in. The RADIUS administrator supplies the initial values on the RADIUS server, and the service activation is performed at subscriber login.

After the initial login, the subscriber adds an assured forwarding service that is not defined in the original access profile. A service profile is used to configure the schedulers and a RADIUS CoA activates the service. The queues defined for the schedulers in the initial scheduler map and the new scheduler map are merged.

In addition, the values for the initial data and voice service are upgraded by the RADIUS administrator through a separate RADIUS CoA message.

To configure the initial service and enable the activation through a RADIUS CoA:

1. Configure the access profile for the service activation.
 - a. Configure the VLAN interface for the access profile.

```
[edit]
dynamic-profiles access-profile {
  interfaces {
    $junos-interface-ifd-name {
      unit $junos-underlying-interface-unit {
        family inet;
      }
    }
  }
}
```

- b. Configure the class of service parameters in the access profile. In this example, you configure JUNOS predefined variables that provide the initial scheduler name and scheduler parameters obtained from the RADIUS authentication server when the subscriber logs in.

Include the configurations for the interfaces, schedulers, and the scheduler maps.

```
[edit]
dynamic-profiles access-profile {
  class-of-service {
    traffic-control-profiles {
      tcp1 {
        scheduler-map $junos-cos-scheduler-map;
        shaping-rate $junos-cos-shaping-rate;
        guaranteed-rate $junos-cos-guaranteed-rate;
        delay-buffer-rate $junos-cos-delay-buffer-rate;
      }
    }
  }
  interfaces {
    $junos-interface-ifd-name {
```

```

        unit "$junos-underlying-interface-unit" {
            classifiers {
                ieee-802.1 l2_classifier;
            }
            rewrite-rules {
                ieee-802.1 l2_rewrite;
            }
            output-traffic-control-profile tcp1;
        }
    }
}
schedulers {
    $junos-cos-scheduler {
        buffer-size percent $junos-cos-scheduler-bs;
        priority $junos-cos-scheduler-pri;
        transmit-rate percent $junos-cos-scheduler-tx;
        drop-profile-map loss-priority low protocol any
            $junos-cos-scheduler-low;
        drop-profile-map loss-priority medium-low protocol any
            $junos-cos-scheduler-medium-low;
        drop-profile-map loss-priority medium-high protocol any
            $junos-cos-scheduler-medium-high;
        drop-profile-map loss-priority high protocol any
            $junos-cos-scheduler-high;
    }
}
scheduler-maps {
    data_voice_smap {
        forwarding-class be scheduler be_sch;
        forwarding-class ef scheduler ef_sch;
    }
}
}
}

```

Table 1 lists the initial values defined by the RADIUS administrator for the scheduler map and shaping rates.

Table 1: Initial Scheduler Map and Shaping Values at Subscriber Login

Predefined Variable	RADIUS Tag	Value
\$junos-cos-scheduler-map	T01	data_voice_smap
\$junos-cos-shaping-rate	T02	6m
\$junos-cos-guaranteed-rate	T03	4m
\$junos-cos-delay-buffer-rate	T04	4m

Table 2 lists the initial values defined by the RADIUS administrator for the voice (expedited forwarding) scheduler.

Table 2: Initial CoS Values for the Voice Scheduler at Subscriber Login

Predefined Variable	Tag	Value
\$junos-cos-scheduler	—	ef_sch
\$junos-cos-scheduler-tx	T01	10
\$junos-cos-scheduler-bs	T02	10
\$junos-cos-scheduler-pri	T03	medium-high
\$junos-cos-scheduler-dropfile-low	T04	d3
\$junos-cos-scheduler-dropfile-medium-low	T05	d2
\$junos-cos-scheduler-dropfile-medium-high	T06	d1
\$junos-cos-scheduler-dropfile-high	T07	d0

Table 3 lists the initial values defined by the RADIUS administrator for the data (best effort) scheduler.

Table 3: Initial CoS Values for the Data Scheduler at Subscriber Login

Predefined Variable	Tag	Value
\$junos-cos-scheduler	—	be_sch
\$junos-cos-scheduler-tx	T01	10
\$junos-cos-scheduler-bs	T02	10
\$junos-cos-scheduler-pri	T03	low
\$junos-cos-scheduler-dropfile-low	T04	d0
\$junos-cos-scheduler-dropfile-medium-low	T05	d1
\$junos-cos-scheduler-dropfile-medium-high	T06	d2
\$junos-cos-scheduler-dropfile-high	T07	d3

2. Configure the classifiers, drop profiles, forwarding classes, and rewrite rules in the static [edit class-of-service] hierarchy.

```
[edit]
class-of-service {
  classifiers {
    dscp dscp_classifier {
      forwarding-class be {
        loss-priority low code-points 000000;
```

```

    }
    forwarding-class af {
        loss-priority medium-low code-points 000001;
    }
}
ieee-802.1 l2_classifier {
    forwarding-class be {
        loss-priority medium-low code-points 000;
    }
    forwarding-class ef {
        loss-priority medium-low code-points 100;
    }
    forwarding-class af {
        loss-priority medium-low code-points 010;
    }
}
}
drop-profiles {
    d0 {
        fill-level 25 drop-probability 100;
        fill-level 0 drop-probability 0;
    }
    d1 {
        fill-level 50 drop-probability 100;
        fill-level 0 drop-probability 0;
    }
    d2 {
        fill-level 75 drop-probability 100;
        fill-level 0 drop-probability 0;
    }
    d3 {
        fill-level 0 drop-probability 0;
        fill-level 100 drop-probability 100;
    }
}
forwarding-classes {
    queue 0 be;
    queue 1 ef;
    queue 2 af;
    queue 3 nc;
}
interfaces {
    ge-1/2/9 {
        shaping-rate 100m;
    }
}
rewrite-rules {
    ieee-802.1 l2_rewrite {
        forwarding-class be {
            loss-priority medium-low code-point 000;
        }
        forwarding-class ef {
            loss-priority medium-low code-point 001;
        }
        forwarding-class af {
            loss-priority medium-low code-point 100;
        }
    }
}

```

```

    }
    dscp l2_rewrite {
        forwarding-class be {
            loss-priority medium-low code-points 000;
        }
        forwarding-class ef {
            loss-priority medium-low code-points 001;
        }
        forwarding-class af {
            loss-priority medium-low code-points 001;
        }
    }
}

```

3. Configure the service profile enable RADIUS to activate the video service after login. The video service corresponds to assured forwarding PHB.

In this example, you configure JUNOS predefined variables that provide the initial scheduler name and scheduler parameters obtained from the RADIUS authentication server when the subscriber logs in.

```

[edit]
dynamic-profiles service-af {
    variables {
        af_fc default-value video;
        af_sch default-value af_sch;
        sch-drop-any default-value all;
        sch-pri-2 default-value strict-high;
        sch-bs-2 default-value 40;
        sch-tx-2 default-value 3m;
        smap default-value any
    }
    class-of-service {
        scheduler-maps {
            "$smap" {
                forwarding-class "$af_fc" scheduler "$af_sch";
            }
        }
        schedulers {
            "$af_sch" {
                transmit-rate percent "$sch-tx-2";
                buffer-size percent "$sch-bs-2";
                priority "$sch-pri-2";
                drop-profile-map loss-priority any protocol any drop-profile
                    "$sch-drop-any";
            }
        }
    }
}

```

After the three services are activated, subscribers receive upgraded values for the data and voice service when RADIUS sends a change of authorization (CoA). In this case, the CoS parameters are replaced, because multiple subscribers were not enabled on the logical interface.

Table 4 lists the upgraded values defined by the RADIUS administrator.

Table 4: Upgraded CoS Values for the Video Service

Variable	RADIUS Tag	Value
junos-cos-scheduler-map	T01	data_voice_smap
junos-cos-shaping-rate	T02	14m
junos-cos-guaranteed-rate	T03	13m
junos-cos-delay-buffer-rate	T04	12m

Table 5 lists the values defined by the RADIUS administrator for the video (assured forwarding) scheduler.

Table 5: Upgraded CoS Values for the Video Scheduler

Predefined Variable	Tag	Value
\$junos-cos-scheduler	—	af_sch
\$junos-cos-scheduler-tx	T01	10
\$junos-cos-scheduler-bs	T02	10
\$junos-cos-scheduler-pri	T03	medium
\$junos-cos-scheduler-dropfile-low	T04	d3
\$junos-cos-scheduler-dropfile-medium-low	T05	d2
\$junos-cos-scheduler-dropfile-medium-high	T06	d1
\$junos-cos-scheduler-dropfile-high	T07	d0

Table 6 lists the values defined by the RADIUS administrator for the expedited forwarding scheduler in the CoA message. The values are the same as the initial service.

Table 6: Initial CoS Values for the Expedited Forwarding Scheduler at Subscriber Login

Predefined Variable	Tag	Value
\$junos-cos-scheduler	—	ef_sch
\$junos-cos-scheduler-tx	T01	10
\$junos-cos-scheduler-bs	T02	10

Table 6: Initial CoS Values for the Expedited Forwarding Scheduler at Subscriber Login (continued)

Predefined Variable	Tag	Value
\$junos-cos-scheduler-pri	T03	medium-high
\$junos-cos-scheduler-dropfile-low	T04	d3
\$junos-cos-scheduler-dropfile-medium-low	T05	d2
\$junos-cos-scheduler-dropfile-medium-high	T06	d1
\$junos-cos-scheduler-dropfile-high	T07	d0

Table 7 lists the values defined by the RADIUS administrator for the best effort scheduler in the CoA message. The values are the same as the initial service.

Table 7: Initial CoS Values for the Best Effort Scheduler at Subscriber Login

Predefined Variable	Tag	Value
\$junos-cos-scheduler	—	be_sch
\$junos-cos-scheduler-tx	T01	10
\$junos-cos-scheduler-bs	T02	10
\$junos-cos-scheduler-pri	T03	low
\$junos-cos-scheduler-dropfile-low	T04	d0
\$junos-cos-scheduler-dropfile-medium-low	T05	d1
\$junos-cos-scheduler-dropfile-medium-high	T06	d2
\$junos-cos-scheduler-dropfile-high	T07	d3

- Related Topics**
- Changing CoS Services Overview
 - Configuring User-Defined CoS Variables in a Dynamic Service Profile

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