Generic Commands

description

Syntax **description** *description-string*
no description

Context config>qos>scheduler-policy
config>qos>scheduler-policy>tier>scheduler
config>qos>port-scheduler-policy

Description This command creates a text description stored in the configuration file for a configuration context.

The **description** command associates a text string with a configuration context to help identify the context in the configuration file.

The **no** form of this command removes any description string from the context.

Default No description is associated with the configuration context.

Parameters *description-string* — A text string describing the entity. Allowed values are any string up to 80 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, $, spaces, etc.), the entire string must be enclosed within double quotes.

Operational Commands

copy

Syntax **copy scheduler-policy** *src-name dst-name* [**overwrite**]
copy port-scheduler-policy *src-name dst-name* [**overwrite**]

Context config>qos

Description This command copies existing QoS policy entries for a QoS policy to another QoS policy.

The **copy** command is a configuration level maintenance tool used to create new policies using existing policies. It also allows bulk modifications to an existing policy with the use of the **overwrite** keyword.

If **overwrite** is not specified, an error will occur if the destination policy exists.

Parameters **scheduler-policy** *src-name dst-name* — Indicates that the source policy and the destination policy are scheduler policy. Specify the source policy that the copy command will attempt to copy from and specify the destination policy to which the command will copy a duplicate of the policy.

port-scheduler-policy *src-name dst-name* — Indicates that the source policy and the destination policy are port scheduler policy IDs. Specify the source policy that the copy command will attempt to copy from and specify the destination policy name to which the command will copy a duplicate of the policy.

overwrite — Forces the destination policy name to be copied as specified. When forced, everything in the existing destination policy will be completely overwritten with the contents of the source policy.

Scheduler Policy Commands

scheduler-policy

Syntax **scheduler-policy** *scheduler-policy-name*
no scheduler-policy *scheduler-policy-name*

Context config>qos

Description Each scheduler policy is divided up into groups of schedulers based on the tier each scheduler is created under. A tier is used to give structure to the schedulers within a policy and define rules for parent scheduler associations.

The **scheduler-policy** command creates a scheduler policy or allows you to edit an existing policy.The policy defines the hierarchy and operating parameters for virtual schedulers. Merely creating a policy does not create the schedulers; it only provides a template for the schedulers to be created when the policy is associated with a SAP or multi-service site.

Each scheduler policy must have a unique name within the context of the system. Modifications made to an existing policy are executed on all schedulers that use the policy. This can cause queues or schedulers to become orphaned (invalid parent association) and adversely affect the ability of the system to enforce service level agreements (SLAs).

If a **scheduler-policy-name** does not exist, it is assumed that an attempt is being made to create a new policy. The success of the command execution is dependent on the following:

1. The maximum number of scheduler policies has not been configured.
2. The provided scheduler-policy-name is valid.
3. The **create** keyword is entered with the command if the system is configured to require it (enabled in the **environment create** command).

When the maximum number of scheduler policies has been exceeded a configuration error occurs, the command will not execute, and the CLI context will not change.

If the provided scheduler-policy-name is invalid according to the criteria below, a name syntax error occurs, the command will not execute, and the CLI context will not change.

Default **none** — Each scheduler policy must be explicitly created.

Parameters *scheduler-policy-name* — The name of the scheduler policy.

Values Valid names consist of any string up to 32 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, $, spaces, etc.), the entire string must be enclosed within double quotes.

frame-based-accounting

Syntax **frame-based-accounting**
no frame-based-accounting

Context config>qos>scheduler-policy

Description The frame-based-accounting command is used to enable frame based for both the children queues parented to the scheduling policy and for the schedulers within the scheduler policy.

Once frame based accounting is enabled on the policy, all queues associated with the scheduler (through the parent command on each queue) will have their rate and CIR values interpreted as frame based values. When shaping, the queues will include the 12 byte Inter-Frame Gap (IFG) and 8 byte preamble for each packet scheduled out the queue. The profiling CIR threshold will also include the 20 byte frame encapsulation overhead. Statistics associated with the queue do not include the frame encapsulation overhead.

The scheduler policy's scheduler rate and CIR values will be interpreted as frame based values.

The configuration of *parent-location* and **frame-based-accounting** in a scheduler policy is mutually exclusive to ensure consistency between the different scheduling levels.

The **no** frame-based-accounting command is used to return all schedulers within the policy and queues associated with the policy to the default packet based accounting mode. If frame based accounting is not currently enabled for the scheduling policy, the no frame-based-accounting command has no effect.

parent-location

Syntax **parent-location** {**none** | **sub** | **vport**}
no parent-location

Context config>qos>scheduler-policy

Description This command determines the expected location of the parent schedulers for the tier 1 schedulers configured with a parent command within the scheduler-policy. The parent schedulers must be configured within a scheduler-policy applied at the location corresponding to the parent-location parameter.

If a parent scheduler name does not exist at the specified location, the schedulers will not be parented and will be orphaned.

The configuration of parent-location and frame-based accounting in a scheduler policy is mutually exclusive in order to ensure consistency between the different scheduling levels.

The **no** form of the command reverts to the default.

Default none

Parameters **none** — This parameter indicates that the tier 1 schedulers do not have a parent scheduler and the configuration of the parent under a tier 1 scheduler is blocked. Conversely, this parameter is blocked when any tier 1 scheduler has a parent configured.

sub — When the scheduler-policy is applied to an sla-profile for a subscriber, the parent schedulers of the tier 1 schedulers need to be configured in the scheduler-policy applied to the subscriber's sub-profile.

If this parameter is configured within a scheduler-policy that is applied to any object except for the egress of an sla-profile, the configured parent schedulers will not be found and so the tier 1 schedulers will not be parented and will be orphaned.

vport — When the scheduler-policy is applied to an sla-profile, a sub-profile for a subscriber or to the egress of a pseudowire SAP, the parent schedulers of the tier 1 schedulers need to be configured in the scheduler-policy applied to the vport to which the subscriber will be assigned.

If this parameter is configured within a scheduler-policy that is applied to to any object except for the egress of an sla-profile or sub-profile, or to the egress of a PW SAP, the configured parent schedulers will not be found and so the tier 1 schedulers will not be parented and will be orphaned.

tier

Syntax **tier** *tier*

Context config>qos>scheduler-policy

Description This command identifies the level of hierarchy that a group of schedulers are associated with. Within a tier level, a scheduler can be created or edited. Schedulers created within a tier can only be a child (take bandwidth from a scheduler in a higher tier). Tier levels increase sequentially with 1 being the highest tier. All tier 1 schedulers are considered to be root and cannot be a child of another scheduler. Schedulers defined in tiers other than 1 can also be root (parentless).

3 tiers (levels 1, 2 and 3) are supported.

The **save config** and **show config** commands only display information on scheduler tiers that contain defined schedulers. When all schedulers have been removed from a level, that level ceases to be included in output from these commands.

Parameters *tier* — This parameter is required to indicate the group of schedulers to create or be edited. Tier ***levels*** cannot be created or deleted. If a value for level is given that is out-of-range, an error will occur and the current context of the CLI session will not change.

Values 1 — 3

Default None

scheduler

Syntax **scheduler** *scheduler-name*
no scheduler *scheduler-name*

Context config>qos>scheduler-policy>tier ***level***

Description This command creates a new scheduler or edits an existing scheduler within the scheduler policy tier. A scheduler defines bandwidth controls that limit each child (other schedulers and queues) associated with the

scheduler. Scheduler objects are created within the hierarchical tiers of the policy. It is assumed that each scheduler created will have queues or other schedulers defined as child associations. The scheduler can be a child (take bandwidth from a scheduler in a higher tier, except for schedulers created in tier 1). A total of 32 schedulers can be created within a single scheduler policy with no restriction on the distribution between the tiers.

Each scheduler must have a unique name within the context of the scheduler policy; however the same name can be reused in multiple scheduler policies. If ***scheduler-name*** already exists within the policy tier level (regardless of the inclusion of the keyword create), the context changes to that scheduler name for the purpose of editing the scheduler parameters. Modifications made to an existing scheduler are executed on all instantiated schedulers created through association with the policy of the edited scheduler. This can cause queues or schedulers to become orphaned (invalid parent association) and adversely affect the ability of the system to enforce service level agreements (SLAs).

If the ***scheduler-name*** exists within the policy on a different tier (regardless of the inclusion of the keyword create), an error occurs and the current CLI context will not change.

If the ***scheduler-name*** does not exist in this or another tier within the scheduler policy, it is assumed that an attempt is being made to create a scheduler of that name. The success of the command execution is dependent on the following:

1. The maximum number of schedulers has not been configured.
2. The provided ***scheduler-name*** is valid.
3. The **create** keyword is entered with the command if the system is configured to require it (enabled in the **environment create** command).

When the maximum number of schedulers has been exceeded on the policy, a configuration error occurs and the command will not execute, nor will the CLI context change.

If the provided scheduler-name is invalid according to the criteria below, a name syntax error will occur, the command will not execute, and the CLI context will not change.

Parameters *scheduler-name* — The name of the scheduler.

Values Valid names consist of any string up to 32 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, $, spaces, etc.), the entire string must be enclosed within double quotes.

Default None. Each scheduler must be explicitly created.

create — This optional keyword explicitly specifies that it is acceptable to create a scheduler with the given ***scheduler-name***. If the **create** keyword is omitted, **scheduler-name** is not created when the system environment variable create is set to true. This safeguard is meant to avoid accidental creation of system objects (such as schedulers) while attempting to edit an object with a mistyped name or ID. The keyword has no effect when the object already exists.

limit-unused-bandwidth

Syntax **[no] limit-unused-bandwidth**

Context config>qos>scheduler-policy>tier>scheduler

Description This command is used to enable (or disable) aggregate rate overrun protection on the agg-rate context.

parent

Syntax **parent** *scheduler-name* [**weight** *weight*] [**level** *level*] [**cir-weight** *cir-weight*] [**cir-level** *cir-level*]
no parent

Context config>qos>scheduler-policy>tier ***level***>scheduler ***scheduler-name***

Description This command defines an optional parent scheduler that is higher up the policy hierarchy. Only schedulers in tier levels 2 and 3 can have a parental association. When multiple schedulers and/or queues share a child status with the scheduler on the parent, the weight or strict parameters define how this scheduler contends with the other children for the parent's bandwidth. The parent scheduler can be removed or changed at anytime and is immediately reflected on the schedulers created by association of this scheduler policy.

When a parent scheduler is defined without specifying weight or strict parameters, the default bandwidth access method is weight with a value of 1.

The **no** form of the command removes a child association with a parent scheduler. If a parent association does not currently exist, the command has no effect and returns without an error. Once a parent association has been removed, the former child scheduler attempts to operate based on its configured rate parameter. Removing the parent association on the scheduler within the policy will take effect immediately on all schedulers with ***scheduler-name*** that have been created using the ***scheduler-policy-name***.

Parameters *scheduler-name* — The ***scheduler-name*** must already exist within the context of the scheduler policy in a tier that is higher (numerically lower).

Values Any valid **scheduler-name** existing on a higher tier within the scheduler policy.

Default None. Each parental association must be explicitly created.

weight *weight* — **Weight** defines the relative weight of this scheduler in comparison to other child schedulers and queues at the same strict level defined by the **level** parameter. Within the level, all weight values from active children at that level are summed and the ratio of each active child's weight to the total is used to distribute the available bandwidth at that level. A weight is considered to be active when the queue or scheduler the weight pertains to has not reached its maximum rate and still has packets to transmit.

A 0 (zero) weight value signifies that the child scheduler will receive bandwidth only after bandwidth is distributed to all other non-zero weighted children in the strict level.

Values 0 to 100

Default 1

level *level* — The **level** keyword defines the strict priority level of this scheduler in comparison to other child schedulers and queues vying for bandwidth on the parent scheduler-name during the 'above CIR' distribution phase of bandwidth allocation. During the above CIR distribution phase, any queues or schedulers defined at a lower strict level receive no parental bandwidth until all queues and schedulers defined with a higher (numerically larger) strict level on the parent have reached their maximum bandwidth or have satisfied their offered load requirements.

When the similar **cir-level** parameter default (undefined) are retained for the child scheduler, bandwidth is only allocated to the scheduler during the above CIR distribution phase.

Children of the parent scheduler with a lower strict priority level will not receive bandwidth until all children with a higher strict priority level have either reached their maximum bandwidth or are idle. Children with the same strict level are serviced according to their weight.

Values 1 — 8

Default 1

cir-weight *cir-weight* — The **cir-weight** keyword defines the relative weight of this scheduler in comparison to other child schedulers and queues at the same ***cir-level*** defined by the **cir-level** parameter. Within the strict **cir-level**, all **cir-weight** values from active children at that level are summed and the ratio of each active child's **cir-weight** to the total is used to distribute the available bandwidth at that level. A **cir-weight** is considered to be active when the queue or scheduler that the **cir-weight** pertains to has not reached the CIR and still has packets to transmit.

A 0 (zero) **cir-weight** value signifies that the child scheduler will receive bandwidth only after bandwidth is distributed to all other non-zero weighted children in the strict cir-level.

Values 0 — 100

Default 1

cir-level *cir-level* — The **cir-level** keyword defines the strict priority CIR level of this scheduler in comparison to other child schedulers and queues vying for bandwidth on the parent ***scheduler-name*** during the 'within CIR' distribution phase of bandwidth allocation. During the 'within CIR' distribution phase, any queues or schedulers defined at a lower strict CIR level receive no parental bandwidth until all queues and schedulers defined with a higher (numerically larger) strict CIR level on the parent have reached their CIR bandwidth or have satisfied their offered load requirements.

If the scheduler's **cir-level** parameter retains the default (undefined) state, bandwidth is only allocated to the scheduler during the above CIR distribution phase.

Children with the same strict cir-level are serviced according to their cir-weight.

Values Undefined, 1 — 8

Default Undefined

port-parent

Syntax **port-parent** [**weight** *weight*] [**level** *level*] [**cir-weight** *cir-weight*] [**cir-level** *cir-level*]
no port-parent

Context config>qos>scheduler-policy>tier>scheduler

Description The **port-parent** command defines a child/parent association between an egress queue and a port based scheduler or between an intermediate service scheduler and a port based scheduler. The command may be issued in three distinct contexts; **sap-egress queue** *queue-id*, **network-queue queue** *queue-id* and **scheduler-policy scheduler** *scheduler-name*. The **port-parent** command allows for a set of within-CIR and above-CIR parameters that define the port priority levels and weights for the queue or scheduler. If the **port-parent** command is executed without any parameters, the default parameters are assumed.

In this context, the **port-parent** command is mutually exclusive to the **parent** command (used to create a parent/child association between a queue and an intermediate scheduler). Executing a **port-parent** command when a parent definition is in place causes the current intermediate scheduler association to be removed and replaced by the defined port-parent association. Executing a **parent** command when a port-parent definition exists causes the port scheduler association to be removed and replaced by the defined intermediate scheduler name.

Changing the parent context on a SAP egress policy queue may cause a SAP or subscriber context of the queue (policy associated with a SAP or subscriber profile) to enter an orphaned state. If an instance of a queue is created on a port or channel that does not have a port scheduler enabled and the sap-egress policy creating the queue has a port-parent association, the queue will be allowed to run according to its own rate parameters and will not be controlled by a virtual scheduling context. If an instance of a queue is on a port or channel that has a port scheduler configured and the sap-egress policy defines the queue as having a non-existent intermediate scheduler parent, the queue will be treated as an orphan and will be handled according to the current orphan behavior on the port scheduler.

The **no** form of this command removes a port scheduler parent association for the queue or scheduler. If a port scheduler is defined on the port which the queue or scheduler instance exists, the queue or scheduler will become orphaned if an port scheduler is configured on the egress port of the queue or scheduler.

Default **no port-parent**

Parameters **weight** *weight* — Defines the weight the queue or scheduler will use at the above-cir port priority level (defined by the **level** parameter).

Values 0 — 100

Default 1

level *level* — Defines the port priority the queue or scheduler will use to receive bandwidth for its above-cir offered-load.

Values 1 — 8 (8 is the highest priority)

Default 1

cir-weight *cir-weight* — Defines the weight the queue or scheduler will use at the within-cir port priority level (defined by the cir-level parameter). The weight is specified as an integer value from 0 to 100 with 100 being the highest weight. When the **cir-weight** parameter is set to a value of 0, the queue or

scheduler does not receive bandwidth during the port scheduler's within-cir pass and the **cir-level** parameter is ignored. If the **cir-weight** parameter is 1 or greater, the **cir-level** parameter comes into play.

Values 0 — 100

Default 1

cir-level *cir-level* **—** Defines the port priority the queue or scheduler will use to receive bandwidth for its within-cir offered-load. If the cir-weight parameter is set to a value of 0 (the default value), the queue or scheduler does not receive bandwidth during the port scheduler's within-cir pass and the cir-level parameter is ignored. If the cir-weight parameter is 1 or greater, the cir-level parameter comes into play.

Values 0 — 8 (8 is the highest priority)

Default 0

rate

Syntax **rate** [*pir-rate*] [**cir** *cir-rate*]
no rate

Context config>qos>scheduler-policy>tier>scheduler
config>qos>port-scheduler-policy>max-rate

Description The **rate** command defines the maximum bandwidth that the scheduler can offer its child queues or schedulers. The maximum rate is limited to the amount of bandwidth the scheduler can receive from its parent scheduler. If the scheduler has no parent, the maximum rate is assumed to be the amount available to the scheduler. When a parent is associated with the scheduler, the CIR parameter provides the amount of bandwidth to be considered during the parent scheduler's 'within CIR' distribution phase.

The actual operating rate of the scheduler is limited by bandwidth constraints other then its maximum rate. The scheduler's parent scheduler may not have the available bandwidth to meet the scheduler's needs or the bandwidth available to the parent scheduler could be allocated to other child schedulers or child queues on the parent based on higher priority. The children of the scheduler may not need the maximum rate available to the scheduler due to insufficient offered load or limits to their own maximum rates.

When a scheduler is defined without specifying a rate, the default rate is **max**. If the scheduler is a root scheduler (no parent defined), the default maximum rate must be changed to an explicit value. Without this explicit value, the scheduler will assume that an infinite amount of bandwidth is available and allow all child queues and schedulers to operate at their maximum rates.

The **no** form of this command returns all queues created with this *queue-id* by association with the QoS policy to the default PIR and CIR parameters.

Parameters **pir** *pir* — TThe pir parameter configures the PIR rate of the scheduler in kbps or it can be set to the maximum using the max keyword.

Values 1 — 3200000000, **max**

Default max

cir *cir* — The cir parameter configures the CIR rate of the scheduler in kbps or it can be set to the maximum using the max keyword. The sum keyword can also be used which sets the CIR to the sum of child CIR Values.

Values 1 — 3200000000, **max, sum**

Default sum

Port Scheduler Policy Commands

port-scheduler-policy

Syntax [**no**] **port-scheduler-policy** *port-scheduler-name*

Context config>qos

Description When a port scheduler has been associated with an egress port, it is possible to override the following parameters:

- The max-rate allowed for the scheduler
- The maximum rate for each priority level (8 through 1)
- The cir associated with each priority level (8 through 1)

The orphan priority level (level 0) has no configuration parameters and cannot be overridden.

The **no** form of the command removes a port scheduler policy from the system. If the port scheduler policy is associated with an egress port or channel, the command will fail.

Parameters *port-scheduler-name* — Specifies an existing port scheduler name. Each port scheduler must be uniquely named within the system and can be up to 32 ASCII characters in length.

dist-lag-rate-shared

Syntax [**no**] **dist-lag-rate-shared**

Context config>qos>port-scheduler-policy

Description This command enables sharing of rates when the port on which this port-scheduler-policy is configured is part of a LAG configured in **distribute** mode.

When enabled, the absolute rate values configured as part of the max-rate, PIR/CIR group rates and PIR/CIR level rates are shared across the member ports of the LAG when configured in **distribute** mode.

This command does not have any affect when the port on which this **port-scheduler-policy** is configured is part of a LAG in **link** mode. Similarly when rates are configured as percent-active rates, the value of this object is irrelevant.

group

Syntax **group** *name* [**create**]
no group *name*

Context config>qos>port-scheduler-policy

Description This command defines a weighted scheduler group within a port scheduler policy.

The port scheduler policy defines a set of eight priority levels. The weighted scheduler group allows for the application of a scheduling weight to groups of child queues competing at the same priority level of the port scheduler policy applied to a vport defined in the context of the egress of an Ethernet port or applied to the egress of an Ethernet port.

Up to eight groups can be defined within each port scheduler policy. One or more levels can map to the same group. A group has a rate and optionally a cir-rate and inherits the highest scheduling priority of its member levels. In essence, a group receives bandwidth from the port or from the vport and distributes it within the member levels of the group according to the weight of each level within the group.

Each priority level will compete for bandwidth within the group based on its weight under a congestion situation. If there is no congestion, a priority level can achieve up to its rate (cir-rate) worth of bandwidth.

Note that CLI will enforce that mapping of levels to a group are contiguous. In other words, a user would not be able to add priority level to group unless the resulting set of priority levels is contiguous.

The **no** form of the command removes the group from the port scheduler policy.

Parameters *name* — Specifies the name of the weighted scheduler group and can be up to 32 ASCII characters in length.

create — This keyword is mandatory when creating the specified group.

percent-rate

Syntax **percent-rate** *pir-percent* [**cir** *cir-percent*]
no percent-rate

Context

Context config>qos>port-scheduler-policy>group

Description The percent-rate command within the port scheduler policy group enables supports for a policer's PIR and CIR rate to be configured as a percentage of the immediate parent root policer/arbiter rate or the FP capacity.

If the parent arbiter rate changes after the policer is created, the policer's PIR and CIR rates will be recalculated based on the defined percentage value.

The **rate** and **percent-rate** commands override one another. If the current rate for a policer is defined using the percent-rate command and the rate command is executed, the percent-rate values are deleted. In a similar fashion, the percent-rate command causes any rate command values to be deleted. A policer's rate may dynamically be changed back and forth from a percentage to an explicit rate at anytime.

The **no** form of this command returns the queue to its default shaping rate and cir rate.

Parameters *pir-percent* — Specifies the policer's PIR as a percentage of the immediate parent root policer/arbiter rate or the FP capacity.

Values Percentage ranging from 0.01 to 100.00.

Default 100.00

cir cir-percent — The **cir** keyword is optional and when defined the required cir-percent CIR parameter expresses the policer's CIR as a percentage of the immediate parent root policer/arbiter rate or the FP capacity.

Values Percentage ranging from 0.00 to 100.00.

Default 100.00

rate

Syntax **rate** *pir-rate* [**cir** *cir-rate*]
no rate

Context config>qos>port-scheduler-policy>group

Description This command specifies the total bandwidth and the within-cir bandwidth allocated to a weighted scheduler group.

Parameters *pir-rate* — Specifies PIR rates.

Values kilobits-per-second: 1 — 100000000, max, Kbps

cir *cir-rate* **—** Specifies CIR rates.

Values 0 — 100000000, max, Kbps

level

Syntax **level** *priority-level* **pir** *pir-rate* [**cir** *cir-rate*] **group** *name* [**weight** *weight*] [**monitor-threshold** *percent*]
level *priority-level* **percent-rate** *pir-percent* [**percent-cir** *cir-percent*] **group** *name* [**weight** *weight*] [**monitor-threshold** *percent*]
level *priority-level* **pri** *pir-rate* [**cir** *cir-rate*] [**monitor-threshold** *percent*]
level *priority-level* **percent-rate** *pir-percent* [**percent-cir** *cir-percent*] [**monitor-threshold** *percent*]
no level *priority-level*

Context config>qos>port-scheduler-policy

Description This command configures an explicit within-cir bandwidth limit and a total bandwidth limit for each port scheduler's priority level. To understand how to set the level rate and CIR parameters, a basic understanding of the port level scheduler bandwidth allocation mechanism is required. The port scheduler takes all

available bandwidth for the port or channel (after the max-rate and any port egress-rate limits have been accounted for) and offers it to each of the eight priority levels twice.

The first pass is called the within-cir pass and consists of providing the available port bandwidth to each of the 8 priority levels starting with level 8 and moving down to level 1. Each level takes the offered load and distributes it to all child members that have a port-parent cir-level equal to the current priority level. (Any child with a cir-weight equal to 0 is skipped in this pass.) Each child may consume bandwidth up to the child's frame based within-cir offered load. The remaining available port bandwidth is then offered to the next lower priority level until level 1 is reached.

The second pass is called the above-cir pass and consists of providing the remaining available port bandwidth to each of the eight priority levels a second time. Again, each level takes the offered load and distributes it to all child members that have a port-parent level equal to the current priority level. Each child may consume bandwidth up to the remainder of the child's frame based offered load (some of the offered load may have been serviced during the within-cir pass). The remaining available port bandwidth is then offered to the next priority level until level 1 is again reached.

If the port scheduling policy is using the default orphan behavior (orphan-override has not been configured on the policy), the system then takes any remaining port bandwidth and allocates it to the orphan queues and scheduler on priority level 1. In a non-override orphan state, all orphans are attached to priority level 1 using a weight of 0. The 0 weight value causes the system to allocate bandwidth equally to all orphans based on each orphan queue or scheduler's ability to use the bandwidth. If the policy has an orphan-override configured, the orphans are handled based on the override commands parameters in a similar fashion to properly parented queues and schedulers.

The port scheduler priority level command rate keyword is used to optionally limit the total amount of bandwidth that is allocated to a priority level (total for the within-cir and above-cir passes). The cir keyword optionally limits the first pass bandwidth allocated to the priority level during the within-cir pass.

When executing the level command, at least one of the optional keywords, **rate** or **cir,** must be specified. If neither keyword is included, the command will fail.

If a previous explicit value for rate or cir exists when the level command is executed, and either rate or cir is omitted, the previous value for the parameter is overwritten by the default value and the previous value is lost.

The configured priority level rate limits may be overridden at the egress port or channel using the egress-scheduler-override level priority-level command. When a scheduler instance has an override defined for a priority level, both the rate and cir values are overridden even when one of them is not explicitly expressed in the override command. For instance, if the cir kilobits-per-second portion of the override is not expressed, the scheduler instance defaults to not having a CIR rate limit for the priority level even when the port scheduler policy has an explicit CIR limit defined.

Default **no level priority-level**

Parameters *priority-level* — Specifies to which priority level the level command pertains. Each of the eight levels is represented by an integer value of 1 to 8, with 8 being the highest priority level.

Values 1 — 8 (8 is the highest priority)

pir *pir* — Specifies the total bandwidth limits allocated to priority-level.

Values 1 — 3200000000|max (Kilobits per second (1,000 bits per second))

percent-rate *pir-percent* — Specifies the percent bandwidth limits allocated to priority-level.

Values 0.01 — 100.00|max (Kilobits per second (1,000 bits per second))

cir *cir* — The cir specified limits the total bandwidth allocated in the within-cir distribution pass to priority-level. When cir is not specified, all the available port or channel bandwidth may be allocated to the specified priority level during the within-cir pass.

Values 0 — 3200000000|max (Kilobits per second (1,000 bits per second))

The value given for kilobits-per-second is expressed in kilobits-per-second on a base 10 scale that is usual for line rate calculations. If a value of 1 is given, the result is 1000 bits per second (as opposed to a base 2 interpretation that would be 1024 bits per second).

percent-cir *cir-percent* — Specifies the percent bandwidth limits allocated to priority-level.

Values 0.01 — 100.00|max (Kilobits per second (1,000 bits per second))

group *name* — specifies the existing group which specifies the weighted scheduler group this level maps to.

weight *weight* — Specifies and integer which specifies the weight of the level within this weighted scheduler group.

Values 1 — 100

Default 1

monitor-threshold *percent* — Specifies the percent of the configured rate. If the offered rate exceeds the configured threshold, a counter monitoring the threshold will be increased.

Values 0 — 100

max-rate

Syntax **max-rate** *pir-rate*
max-rate percent *percent-rate*
no max-rate

Context config>qos>port-scheduler-policy

Description This command defines an explicit maximum frame based bandwidth limit for the port scheduler policies scheduler context. By default, once a scheduler policy is associated with a port or channel, the instance of the scheduler on the port automatically limit the bandwidth to the lesser of port or channel line rate and a possible egress-rate value (for Ethernet ports). If a max-rate is defined that is smaller than the port or channel rate, the expressed kilobits-per-second value is used instead. The max-rate command is another way to sub-rate the port or channel.

The max-rate command may be executed at anytime for an existing port-scheduler-policy. When a new max-rate is given for a policy, the system evaluates all instances of the policy to see if the configured rate is smaller than the available port or channel bandwidth. If the rate is smaller and the maximum rate is not

currently overridden on the scheduler instance, the scheduler instance is updated with the new maximum rate value.

The max-rate value defined in the policy may be overridden on each scheduler instance. If the maximum rate is explicitly defined as an override on a port or channel, the policies max-rate value has no effect.

The **no** form of this command removes an explicit rate value from the port scheduler policy. Once removed, all instances of the scheduler policy on egress ports or channel are allowed to run at the available line rate unless the instance has a max-rate override in place.

Parameters *pir-rate* — Specifies the PIR rate.

Values 1 — 3200000000, max, in Kbps

percent *percent-rate* **—** Specifies the percent rate.

Values 0.01 — 100.00

monitor-threshold

Syntax **monitor-threshold** *percent*
no monitor-threshold

Context config>qos>port-scheduler-policy

Description This command defines the congestion monitoring threshold for the desired monitoring entity under the port-scheduler for per aggregate port-scheduler rate, per individual level, and per group that is aggregating multiple levels.

The congestion threshold is specified in percentages of the configured PIR rate for the entity for which congestion monitoring is desired. For example, if the configured PIR rate for level 1 is 100,000 Kbps, and the monitoring threshold is set to 90%, then an event where the offered rate is >90,000 Kbps will be recorded. This event is shown as part of the cumulative count of congestion threshold exceeds since the last clearing of the counters.

The **no** form of this command removes the congestion monitoring threshold.

Default **no monitor-threshold**

Parameters *percent* — Specifies the percent of the configured rate. If the offered rate exceeds the configured threshold, a counter monitoring the threshold will be increased.

Values 0 — 100

orphan-override

Syntax **orphan-override** [**level** *priority-level*] [**weight** *percent*] [**cir-level** *priority-level*] [**cir-weight** *cir-weight*]
no orphan-override

Context config>qos>port-scheduler-policy

Description This command override the default orphan behavior for port schedulers created using the port scheduler policy. The default orphan behavior is to give all orphan queues and schedulers bandwidth after all other properly parented queues and schedulers. Orphans by default do not receive any within-cir bandwidth and receive above-cir bandwidth after priority levels 8 through 1 have been allocated. The orphan-override command accepts the same parameters as the port-parent command in the SAP egress and network queue policy contexts. The defined parameters are used as a default port-parent association for any queue or scheduler on the port that the port scheduler policy is applied.

Orphan queues and schedulers are identified as:

- Any queue or scheduler that does not have a port-parent or parent command applied
- Any queue that has a parent command applied, but the specified scheduler name does not exist on the queue's SAP, MSS or SLA Profile instance.

A queue or scheduler may be properly parented to an upper level scheduler, but that scheduler may be orphaned. In this case, the queue or scheduler receives bandwidth from its parent scheduler based on the parent schedulers ability to receive bandwidth as an orphan.

Within-CIR Priority Level Parameters

The within-cir parameters define which port priority level the orphan queues and schedulers should be associated with when receiving bandwidth for the queue or schedulers within-cir offered load. The within-cir offered load is the amount of bandwidth the queue or schedulers could use that is equal to or less than its defined or summed CIR value. The summed value is only valid on schedulers and is the sum of the within-cir offered loads of the children attached to the scheduler. The parameters that control within-cir bandwidth allocation for orphans are the orphan-override commands cir-level and cir-weight keywords. The cir-level keyword defines the port priority level that the scheduler or queue uses to receive bandwidth for its within-cir offered load. The cir-weight is used when multiple queues or schedulers exist at the same port priority level for within-cir bandwidth. The weight value defines the relative ratio that is used to distribute bandwidth at the priority level when more within-cir offered load exists than the port priority level has bandwidth.

A cir-weight equal to zero (the default value) has special meaning and informs the system that the orphan queues and schedulers do not receive bandwidth from the within-cir distribution. Instead all bandwidth for the orphan queues and schedulers must be allocated from the port scheduler's above-cir pass.

Above-CIR Priority Level Parameters

The above-cir parameters define which port priority level the orphan queues and schedulers should be associated with when receiving bandwidth for the queue or schedulers above-cir offered load. The above-cir offered load is the amount of bandwidth the queue or schedulers could use that is equal to or less than its defined PIR value (based on the queue or schedulers rate command) less any bandwidth that was given to

the queue or scheduler during the above-cir scheduler pass. The parameters that control above-cir bandwidth allocation for orphans are the orphan-override commands level and weight keywords. The level keyword defines the port priority level that the scheduler or queue uses to receive bandwidth for its above-cir offered load. The weight is used when multiple queues or schedulers exist at the same port priority level for above-cir bandwidth. The weight value defines the relative ratio that is used to distribute bandwidth at the priority level when more above-cir offered load exists than the port priority level has bandwidth.

The **no** form of the command removes the orphan override port parent association for the orphan queues and schedulers on port schedulers created with the port scheduler policy. Any orphan queues and schedulers on a port associated with the port scheduler policy will revert to default orphan behavior.

Parameters **level** *priority-level* — Defines the port priority the orphan queues and schedulers will use to receive bandwidth for its above-cir offered-load.

Values 1 — 8 (8 is the highest priority)

Default 1

weight *percent* **—** Defines the weight the orphan queues and schedulers will use in the above-cir port priority level (defined by the level parameter).

Values 1 — 100

Default 1

cir-level *priority-level* **—** Defines the port priority the orphan queues and schedulers will use to receive bandwidth for its within-cir offered-load. If the cir-weight parameter is set to a value of 0 (the default value), the orphan queues and schedulers do not receive bandwidth during the port scheduler's within-cir pass and the cir-level parameter is ignored. If the cir-weight parameter is 1 or greater, the cir-level parameter comes into play.

Values 1 — 8 (8 is the highest level)

cir-weight *cir-weight* **—** Defines the weight the orphan queues and schedulers will use in the within-cir port priority level (defined by the cir-level parameter). When the cir-weight parameter is set to a value of 0 (the default value), the orphan queues and schedulers do not receive bandwidth during the port scheduler's within-cir pass and the cir-level parameter is ignored. If the cir-weight parameter is 1 or greater, the cir-level parameter comes into play.

Values 1 — 100 (100 is the highest weight)

Show Commands

scheduler-policy

Syntax **scheduler-policy** *scheduler-name* [**association | sap-ingress** *policy-id* **| sap-egress** *policy-id*]

Context show>qos

Description Use this command to display scheduler policy information.

Parameters *scheduler-name* — The name of a scheduler configured in the **config>qos>scheduler-policy** context.

association — Display the associations related to the specified scheduler name.

sap-ingress *policy-id* **—** Specify the SAP ingress QoS policy information.

sap-egress *policy-id* **—** Specify the SAP egress QoS policy information.

Output **Customer Scheduler-Policy Output —** The following table describes the customer scheduler hierarchy fields.

Table 40: Show QoS Scheduler-Policy Output Fields

Label	Description
Policy-Name	Specifies the scheduler policy name.
Description	A text string that helps identify the policy's context in the configuration file.
Tier	Specifies the level of hierarchy that a group of schedulers are associated with.
Scheduler	Specifies the scheduler name.
Lvl/Wt	Specifies the priority level of the scheduler when compared to other child schedulers and queues vying for bandwidth on the parent schedulers during the 'above CIR' distribution phase of bandwidth allocation. Weight defines the relative weight of this scheduler in comparison to other child schedulers and queues at the same level.
Cir Lvl/Wt	Specifies the level of hierarchy when compared to other schedulers and queues when vying for bandwidth on the parent scheduler. Weight defines the relative weight of this queue in comparison to other child schedulers and queues while vying for bandwidth on the parent scheduler.

Table 40: Show QoS Scheduler-Policy Output Fields (Continued)

Label	Description
PIR	Specifies the PIR rate.
CIR	Specifies the CIR rate.
Parent	Specifies the parent scheduler that governs the available bandwidth given the queue aside from the queue's PIR setting.
Service-Id	The ID that uniquely identifies the policy.
Customer-Id	The ID that uniquely identifies the customer.
SAP	Specifies the Service Access Point (SAP) within the service where the policy is applied.
Multi Service Site	Specifies the multi-service site name.
Orphan Queues	Specifies the number of queues in an orphaned state.
Hierarchy	Displays the scheduler policy tree structure.

Sample Output

```
A:ALA-12# show qos scheduler-policy SLA1
===============================================================================
QoS Scheduler Policy
===============================================================================
Policy-Name    : SLA1
Description    : NetworkControl(3), Voice(2) and NonVoice(1) have strict priorities
-------------------------------------------------------------------------------
Tier/Scheduler                     Lvl/Wt     PIR       Parent
                                   CIR Lvl/Wt CIR
-------------------------------------------------------------------------------
1 All_traffic                      1/1        11000     None
                                   -/-        max
2 NetworkControl                   3/1        100       All_traffic
                                   3/-        max
2 NonVoice                         1/1        11000     All_traffic
                                   1/-        max
2 Voice                            2/1        5500      All_traffic
                                   2/-        max
3 Internet_be                      1/1        max       NonVoice
                                   1/-        max
3 Internet_priority                2/1        max       NonVoice
                                   2/-        max
3 Internet_voice                   1/1        max       Voice
                                   -/-        max
3 VPN_be                           1/1        max       NonVoice
                                   1/-        max
3 VPN_nc                           1/1        100       NetworkControl
                                   -/-        36
3 VPN_priority                     2/1        max       NonVoice
```

```
                                    2/-         max
3 VPN_reserved                      3/1         max       NonVoice
                                    3/-         max
3 VPN_video                         5/1         1500      NonVoice
                                    5/-         1500
3 VPN_voice                         1/1         2500      Voice
                                    -/-         2500
===============================================================================
A:ALA-12#
A:ALA-12# show qos scheduler-policy SLA1 association
===============================================================================
QoS Scheduler Policy
===============================================================================
Policy-Name    : SLA1
Description    : NetworkControl(3), Voice(2) and NonVoice(1) have strict priorities
-------------------------------------------------------------------------------
Associations
-------------------------------------------------------------------------------
Service-Id     : 6000 (Epipe)                Customer-Id  : 274
 - SAP : 1/1/3.1:0 (Egress)
Service-Id     : 7000 (VPLS)                 Customer-Id  : 7
 - SAP : 1/1/5:0 (Egress)
 - Multi Service Site : west  (Ingress)
===============================================================================
A:ALA-12#


A:ALA-12# show qos scheduler-policy SLA1 sap-ingress 100
===============================================================================
Compatibility : Scheduler Policy SLA1 & Sap Ingress 100
===============================================================================
Orphan Queues :
None Found

Hierarchy     :

Root
|
|---(S) : All_traffic
|   |
|   |---(S) : NetworkControl
|   |   |
|   |   |---(S) : VPN_nc
|   |   |   |
|   |   |   |---(Q) : 17
|   |   |   |
|   |   |   |---(Q) : 27
|   |
|   |---(S) : NonVoice
|   |   |
|   |   |---(S) : Internet_be
|   |   |
|   |   |---(S) : Internet_priority
|   |   |
|   |   |---(S) : VPN_be
|   |   |   |
|   |   |   |---(Q) : 10
|   |   |   |
|   |   |   |---(Q) : 20
```

```
|   |   |
|   |   |---(S) : VPN_priority
|   |   |   |
|   |   |   |---(Q) : 12
|   |   |   |
|   |   |   |---(Q) : 22
|   |   |
|   |   |---(S) : VPN_reserved
|   |   |   |
|   |   |   |---(Q) : 13
|   |   |   |
|   |   |   |---(Q) : 23
|   |   |
|   |   |---(S) : VPN_video
|   |   |   |
|   |   |   |---(Q) : 15
|   |   |   |
|   |   |   |---(Q) : 25
|   |
|   |---(S) : Voice
|   |   |
|   |   |---(S) : Internet_voice
|   |   |
|   |   |---(S) : VPN_voice
|   |   |   |
|   |   |   |---(Q) : 16
|   |   |   |
|   |   |   |---(Q) : 26
|
|---(Q) : 1
|
|---(Q) : 2
===============================================================================
A:ALA-12#

A:ALA-12# show qos scheduler-policy SLA1 sap-egress 101
===============================================================================
Compatibility : Scheduler Policy SLA1 & Sap Egress 101
===============================================================================
Orphan Queues :

None Found

Hierarchy     :

Root
|
|---(S) : All_traffic
|   |
|   |---(S) : NetworkControl
|   |   |
|   |   |---(S) : VPN_nc
|   |
|   |---(S) : NonVoice
|   |   |
|   |   |---(S) : Internet_be
|   |   |
|   |   |---(S) : Internet_priority
|   |   |
```

```
|   |   |---(S) : VPN_be
|   |   |
|   |   |---(S) : VPN_priority
|   |   |
|   |   |---(S) : VPN_reserved
|   |   |
|   |   |---(S) : VPN_video
|   |
|   |---(S) : Voice
|   |   |
|   |   |---(S) : Internet_voice
|   |   |
|   |   |---(S) : VPN_voice
===============================================================================
A:ALA-12#
```

scheduler-hierarchy customer

Syntax **scheduler-hierarchy customer** *customer-id* **site** *customer-site-name* [**scheduler** *scheduler-name*] [**ingress** | **egress**] [**detail**]

Context show>qos

Description This command displays the scheduler hierarchy per customer multi-service-site.

Parameters *customer customer-id* — Specifies the ID number associated with a particular customer.

Values 1 — 2147483647

site *customer-site-name* — The unique name customer site name.

scheduler *scheduler-name* **—** The unique scheduler name created in the context of the scheduler policy.

ingress — Displays ingress SAP customer scheduler stats.

egress — Displays egress SAP customer scheduler stats.

detail — Displays detailed information.

Output **Show QoS Scheduler-Hierarchy Customer Output —** The following table describes the customer scheduler hierarchy fields.

Label	Description
Legend	Admin CIR/PIR: Specifies the configured value of CIR/PIR. Assigned CIR/PIR: Specifies the PIR/CIR rate given to a member by that parent level. Offered CIR/PIR: Specifies the offered load on that member. Consumed CIR/PIR: Specifies the amount of scheduler bandwidth used by this member.

Label	Description (Continued)
Lvl/Wt	Specifies the priority level of the scheduler when compared to other child schedulers and queues vying for bandwidth on the parent schedulers during the 'above CIR' distribution phase of bandwidth allocation. Weight defines the relative weight of this scheduler in comparison to other child schedulers and queues at the same level.
Cir Lvl/Wt	Specifies the level of hierarchy when compared to other schedulers and queues when vying for bandwidth on the parent scheduler. Weight defines the relative weight of this queue as compared to other child schedulers and queues while vying for bandwidth on the parent scheduler.
PIR	Specifies the PIR rate.
CIR	Specifies the CIR rate.
Parent	Specifies the parent scheduler that governs the available bandwidth given the queue aside from the queue's PIR setting.
Service-Id	The ID that uniquely identifies the policy.
Customer-Id	The ID that uniquely identifies the customer.
SAP	Specifies the Service Access Point (SAP) within the service where the policy is applied.
Multi Service Site	Specifies the multi-service site name.
Orphan Queues	Specifies the number of queues in an orphaned state.
Hierarchy	Displays the scheduler policy tree structure.

Sample Output

```
A:D# show qos scheduler-hierarchy customer 1 site bc
===============================================================================
Scheduler Hierarchy - Customer 1 MSS bc
===============================================================================
Root (Ing)
| slot(1)
|--(S) : gp
Root (Egr)
| slot(1)
|--(S) : gp
| |
| |--(S) : pb
| | |
| | |--(S) : pbs
```

```
| |
| |--(S) : mb
| | |
| | |--(S) : mbs
|
|--(S) : rb
| |
| |--(S) : rbs
===============================================================================
A:D#
```

scheduler-hierarchy port

Syntax **scheduler-hierarchy port** *port-id* [**detail**] **queue-group** *queue-group-name* [**scheduler** *scheduler-name*] [**ingress** | **egress**]
scheduler-hierarchy port *port-id* [**detail**]

Context show>qos

Description This command displays scheduler hierarchy information per port.

Parameters *port-id* — Specifies the port ID in the slot/mda/port[.channel] format.

detail — Displays detailed information.

queue-group *queue-group-name* **—** Displays information about the specified queue group on the port.

scheduler *scheduler-name* **—** Displays information about the specified scheduler policy on the port.

ingress — Specifies to display ingress queue group information.

egress — Specifies to display egress queue group information.

Output **Show QoS Scheduler-Hierarchy Port Output —** The following table describes port scheduler hierarchy fields.

Table 41: Show QoS Schedule-Hierarchy Port Output Fields

Label	Description
S	Displays the scheduler name.
Q	Displays the queue ID and information.
Admin CIR/PIR:	Specifies the configured value of CIR/PIR.
Assigned CIR/PIR:	Specifies the on-the-wire PIR/CIR rate given to a member by that parent level.
Offered CIR/PIR:	Specifies the on-the-wire offered load on that member.
Consumed CIR/PIR:	Specifies the amount of scheduler bandwidth used by this member.

Sample Output

```
*A:Dut-R# show qos scheduler-hierarchy port 1/2/1 detail
===============================================================================
Scheduler Hierarchy - Port 1/2/1
===============================================================================
Port-scheduler-policy p1
    Port Bandwidth : 10000000   Max Rate : max
    Consumed : 0          Offered : 0
[Within CIR Level 8]
    Rate : max
    Consumed : 0          Offered : 0

[Within CIR Level 7]
    Rate : max
    Consumed : 0          Offered : 0

[Within CIR Level 6]
    Rate : max
    Consumed : 0          Offered : 0

    (Q) : 2->1/2/1:1->3
    Assigned : 768        Offered : 0
    Consumed : 0
    Weight   : 0

[Within CIR Level 5]
    Rate : max
    Consumed : 0          Offered : 0

[Within CIR Level 4]
    Rate : max
    Consumed : 0          Offered : 0

[Within CIR Level 3]
    Rate : max
    Consumed : 0          Offered : 0

[Within CIR Level 2]
    Rate : max
    Consumed : 0          Offered : 0

    (S) voip(SAP 1/2/1:1)
    Assigned : 0          Offered : 0
    Consumed : 0
    Weight   : 40

    (S) all(SAP 1/2/1:1)
    Assigned : 19000      Offered : 0
    Consumed : 0
    Weight   : 50

[Within CIR Level 1]
    Rate : max
    Consumed : 0          Offered : 0

[Within CIR Level 0]
    Rate : 0
    Consumed : 0          Offered : 0
```

```
[Above CIR Level 8]
    Rate : max
    Consumed : 0          Offered : 0

[Above CIR Level 7]
    Rate : max
    Consumed : 0          Offered : 0

[Above CIR Level 6]
    Rate : max
    Consumed : 0          Offered : 0

[Above CIR Level 5]
    Rate : max
    Consumed : 0          Offered : 0

[Above CIR Level 4]
    Rate : max
    Consumed : 0          Offered : 0

[Above CIR Level 3]
    Rate : max
    Consumed : 0          Offered : 0

[Above CIR Level 2]
    Rate : max
    Consumed : 0          Offered : 0

    (S) voip(SAP 1/2/1:1)
    Assigned : 10000000   Offered : 0
    Consumed : 0
    Weight   : 30

    (S) all(SAP 1/2/1:1)
    Assigned : 960000     Offered : 0
    Consumed : 0
    Weight   : 50

[Above CIR Level 1]
    Rate : max
    Consumed : 0          Offered : 0

    (Q) : 2->1/2/1:1->3
    Assigned : 786        Offered : 0
    Consumed : 0
    Weight   : 1

===============================================================================
*A:Dut-R#
```

scheduler-hierarchy sap

Syntax **scheduler-hierarchy sap** *sap-id* [**scheduler** *scheduler-name*] [**ingress** | **egress**] [**detail**]

Context show>qos

Description This command displays the scheduler hierarchy per SAP.

Parameters **sap** *sap-id* — Specifies the SAP assigned to the service.

Values: *sap-id*

null	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id* | *aps-id*]	
dot1q	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id* | *aps-id*]:*qtag1*	
qinq	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id*]:*qtag1.qtag2*	
atm	[*port-id* | *aps-id*][:*vpi/vci*|*vpi*| *vpi1.vpi2*]	
frame	[*port-id* | *aps-id*]:*dlci*	
cisco-hdlc	*slot/mda/port.channel*	
cem	*slot/mda/port.channel*	
ima-grp	[*bundle-id*[:vpi/vci|vpi|*vpi1.vpi2*]	
port-id	*slot/mda/port*[*.channel*]	
bundle-id	bundle-*type-slot/mda.bundle-num*	
	bundle	keyword
	type	ima, fr, ppp
	bundle-num	1 — 336
bpgrp-id	bpgrp-*type-bpgrp-num*	
	bpgrp	keyword
	type	ima, ppp
	bpgrp-num	1 — 2000
aps-id	aps-*group-id*[*.channel*]	
	aps	keyword
	group-id	1 — 64
ccag-id	ccag-*id.path-id*[*cc-type*]:*cc-id*	
	ccag	keyword
	id	1 — 8
	path-id	a, b
	cc-type	.sap-net, .net-sap
	cc-id	0 — 4094
lag-id	lag-id	
	lag	keyword
	id	1 — 200
qtag1	0 — 4094	
qtag2	*, 0 — 4094	
vpi	NNI: 0 — 4095	
	UNI: 0 — 255	
vci	1, 2, 5 — 65535	
dlci	16 — 1022	
ipsec-id	ipsec-*id*.[private | public]:*tag*	
	ipsec	keyword
	id	1 — 4
	tag	0 — 4094

scheduler *scheduler-name* — The unique scheduler name created in the context of the scheduler policy

ingress — The keyword to display ingress SAP scheduler stats.

egress — The keyword to display egress SAP scheduler stats.

detail — Displays detailed information.

Output **Show Qos Scheduler-Hierarchy SAP Output —** The following table describes the SAP scheduler hierarchy fields.

Table 42: Show QoS Scheduler-Hierarchy SAP Output Fields

Label	Description
Legend	Admin CIR/PIR: Specifies the configured value of CIR/PIR. Assigned CIR/PIR: Specifies the PIR/CIR rate given to a member by that parent level. Offered CIR/PIR: Specifies the offered load on that member. Consumed CIR/PIR: Specifies the amount of scheduler bandwidth used by this member.
PIR	Specifies the PIR rate.
CIR	Specifies the CIR rate.
S	Displays the scheduler name.
Q	Displays the queue ID and information.

Sample Output

```
*A:Dut-R# show qos scheduler-hierarchy sap 1/2/1:1 ingress detail
===============================================================================
Scheduler Hierarchy - Sap 1/2/1:1
===============================================================================
Legend :
(*) real-time dynamic value
(w) Wire rates
-------------------------------------------------------------------------------
Root (Ing)
| slot(1)
|--(S) : tplay
|   |    AdminPIR:960000     AdminCIR:960000(sum)
|   |
|   |    [Within CIR Level 0 Weight 0]
|   |    Assigned:0          Offered:0
|   |    Consumed:0
|   |
|   |    [Above CIR Level 0 Weight 0]
|   |    Assigned:0          Offered:0
|   |    Consumed:0
|   |
|   |    TotalConsumed:0
|   |    OperPIR:960000
|   |
```

```
|   |    [As Parent]
|   |    Rate:960000
|   |    ConsumedByChildren:960000
|   |
|   |--(S) : voice
|   |   |    AdminPIR:max        AdminCIR:max(sum)
|   |   |
|   |   |    [Within CIR Level 6 Weight 1]
|   |   |    Assigned:960000     Offered:120000
|   |   |    Consumed:120000
|   |   |
|   |   |    [Above CIR Level 1 Weight 1]
|   |   |    Assigned:960000     Offered:120000
|   |   |    Consumed:0
|   |   |
|   |   |    TotalConsumed:120000
|   |   |    OperPIR:960000
|   |   |
|   |   |    [As Parent]
|   |   |    Rate:960000
|   |   |    ConsumedByChildren:120000
|   |   |
|   |   |--(S) : AccessIngress:2->1/2/1:1->3
|   |   |   |    AdminPIR:max        AdminCIR:max(sum)
|   |   |   |
|   |   |   |    [Within CIR Level 0 Weight 1]
|   |   |   |    Assigned:960000     Offered:0
|   |   |   |    Consumed:0
|   |   |   |
|   |   |   |    [Above CIR Level 1 Weight 1]
|   |   |   |    Assigned:960000     Offered:120000
|   |   |   |    Consumed:120000
|   |   |   |
|   |   |   |    TotalConsumed:120000
|   |   |   |    OperPIR:960000
|   |   |   |
|   |   |   |    [As Parent]
|   |   |   |    OperPIR:960000      OperCIR:960000
|   |   |   |    ConsumedByChildren:120000
|   |   |   |
|   |   |   |--(Q) : 2->1/2/1:1->3 5/1
|   |   |   |   |    AdminPIR:10000000   AdminCIR:10000000
|   |   |   |   |    CBS:6144            MBS:12288
|   |   |   |   |    Depth:0             HiPrio:2048
|   |   |   |   |
|   |   |   |   |    [CIR]
|   |   |   |   |    Assigned:960000     Offered:120000
|   |   |   |   |    Consumed:120000
|   |   |   |   |
|   |   |   |   |    [PIR]
|   |   |   |   |    Assigned:960000     Offered:120000
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    OperPIR:960000      OperCIR:960000
|   |   |   |   |
|   |   |   |--(Q) : 2->1/2/1:1->3 1/2
|   |   |   |   |    AdminPIR:10000000   AdminCIR:10000000
|   |   |   |   |    CBS:6144            MBS:12288
|   |   |   |   |    Depth:0             HiPrio:2048
```

```
|   |   |   |   |
|   |   |   |   |    [CIR]
|   |   |   |   |    Assigned:840000     Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    [PIR]
|   |   |   |   |    Assigned:840000     Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    OperPIR:840000      OperCIR:840000
|   |   |   |   |
|   |   |
|   |   |--(S) : vod
|   |   |   |    AdminPIR:max        AdminCIR:max(sum)
|   |   |   |
|   |   |   |    [Within CIR Level 2 Weight 75]
|   |   |   |    Assigned:840000     Offered:2400000
|   |   |   |    Consumed:840000
|   |   |   |
|   |   |   |    [Above CIR Level 2 Weight 75]
|   |   |   |    Assigned:840000     Offered:2400000
|   |   |   |    Consumed:0
|   |   |   |
|   |   |   |    TotalConsumed:840000
|   |   |   |    OperPIR:840000
|   |   |   |
|   |   |   |    [As Parent]
|   |   |   |    Rate:840000
|   |   |   |    ConsumedByChildren:840000
|   |   |   |
|   |   |   |--(S) : AccessIngress:2->1/2/1:1->2
|   |   |   |   |    AdminPIR:max        AdminCIR:max(sum)
|   |   |   |   |
|   |   |   |   |    [Within CIR Level 0 Weight 1]
|   |   |   |   |    Assigned:840000     Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    [Above CIR Level 1 Weight 1]
|   |   |   |   |    Assigned:840000     Offered:2400000
|   |   |   |   |    Consumed:840000
|   |   |   |   |
|   |   |   |   |    TotalConsumed:840000
|   |   |   |   |    OperPIR:840000
|   |   |   |   |
|   |   |   |   |    [As Parent]
|   |   |   |   |    OperPIR:840000      OperCIR:840000
|   |   |   |   |    ConsumedByChildren:840000
|   |   |   |   |
|   |   |   |   |--(Q) : 2->1/2/1:1->2 5/1
|   |   |   |   |   |    AdminPIR:10000000   AdminCIR:10000000
|   |   |   |   |   |    CBS:6144            MBS:12288
|   |   |   |   |   |    Depth:10236         HiPrio:2048
|   |   |   |   |   |
|   |   |   |   |   |    [CIR]
|   |   |   |   |   |    Assigned:840000     Offered:2400000
|   |   |   |   |   |    Consumed:840000
|   |   |   |   |   |
|   |   |   |   |   |    [PIR]
|   |   |   |   |   |    Assigned:840000     Offered:2400000
```

```
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    OperPIR:840000      OperCIR:840000
|   |   |   |   |
|   |   |   |   |--(Q) : 2->1/2/1:1->2 1/2
|   |   |   |   |    AdminPIR:10000000   AdminCIR:10000000
|   |   |   |   |    CBS:6144            MBS:12288
|   |   |   |   |    Depth:0             HiPrio:2048
|   |   |   |   |
|   |   |   |   |    [CIR]
|   |   |   |   |    Assigned:420000     Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    [PIR]
|   |   |   |   |    Assigned:420000     Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    OperPIR:420000      OperCIR:420000
|   |   |   |   |
|   |   |
|   |   |--(S) : hsi
|   |   |   |    AdminPIR:max        AdminCIR:0(sum)
|   |   |   |
|   |   |   |
|   |   |   |    [Within CIR Level 2 Weight 5]
|   |   |   |    Assigned:0          Offered:0
|   |   |   |    Consumed:0
|   |   |   |
|   |   |   |    [Above CIR Level 1 Weight 1]
|   |   |   |    Assigned:0          Offered:961000
|   |   |   |    Consumed:0
|   |   |   |
|   |   |   |    TotalConsumed:0
|   |   |   |    OperPIR:0
|   |   |   |
|   |   |   |    [As Parent]
|   |   |   |    Rate:0
|   |   |   |    ConsumedByChildren:0
|   |   |   |
|   |   |   |--(S) : AccessIngress:2->1/2/1:1->1
|   |   |   |   |    AdminPIR:max        AdminCIR:0(sum)
|   |   |   |   |
|   |   |   |   |    [Within CIR Level 0 Weight 1]
|   |   |   |   |    Assigned:0          Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    [Above CIR Level 1 Weight 1]
|   |   |   |   |    Assigned:0          Offered:961000
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    TotalConsumed:0
|   |   |   |   |    OperPIR:0
|   |   |   |   |
|   |   |   |   |    [As Parent]
|   |   |   |   |    OperPIR:0           OperCIR:0
|   |   |   |   |    ConsumedByChildren:0
|   |   |   |   |
|   |   |   |   |--(Q) : 2->1/2/1:1->1 5/1
|   |   |   |   |   |    AdminPIR:10000000   AdminCIR:0
```

```
|   |   |   |   |    CBS:0               MBS:0
|   |   |   |   |    Depth:0             HiPrio:0
|   |   |   |   |
|   |   |   |   |    [CIR]
|   |   |   |   |    Assigned:0          Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    [PIR]
|   |   |   |   |    Assigned:0          Offered:961000
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    OperPIR:0           OperCIR:0
|   |   |   |   |
|   |   |   |   |--(Q) : 2->1/2/1:1->1 1/2
|   |   |   |   |    AdminPIR:10000000   AdminCIR:0
|   |   |   |   |    CBS:0               MBS:0
|   |   |   |   |    Depth:0             HiPrio:0
|   |   |   |   |
|   |   |   |   |    [CIR]
|   |   |   |   |    Assigned:0          Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    [PIR]
|   |   |   |   |    Assigned:0          Offered:0
|   |   |   |   |    Consumed:0
|   |   |   |   |
|   |   |   |   |    OperPIR:0           OperCIR:0
===============================================================================
*A:Dut-R#


*A:Dut-R# show qos scheduler-hierarchy sap 5/1/1:1 egress detail
===============================================================================
Scheduler Hierarchy - Sap 5/1/1:1
===============================================================================
Legend :
(*) real-time dynamic value
(w) Wire rates
-------------------------------------------------------------------------------
Root (Egr)
| slot(5)
|--(S) : tplay
|   |    AdminPIR:960000     AdminCIR:19768(sum)
|   |
|   |    [Within CIR Level 0 Weight 0]
|   |    Assigned:0          Offered:0
|   |    Consumed:0
|   |
|   |    [Above CIR Level 0 Weight 0]
|   |    Assigned:0          Offered:0
|   |    Consumed:0
|   |
|   |    TotalConsumed:0
|   |    OperPIR:960000
|   |
|   |    [As Parent]
|   |    Rate:960000
|   |    ConsumedByChildren:19661
|   |
```

```
|   |
|   |--(S) : hsi
|   |   |    AdminPIR:max        AdminCIR:3000(sum)
|   |   |
|   |   |    [Within CIR Level 2 Weight 5]
|   |   |    Assigned:3000       Offered:3000
|   |   |    Consumed:3000
|   |   |
|   |   |    [Above CIR Level 1 Weight 1]
|   |   |    Assigned:946339     Offered:6000
|   |   |    Consumed:3000
|   |   |
|   |   |    TotalConsumed:6000
|   |   |    OperPIR:946339
|   |   |
|   |   |    [As Parent]
|   |   |    Rate:946339
|   |   |    ConsumedByChildren:6000
|   |   |
|   |   |--(Q) : 2->5/1/1:1->1
|   |   |   |    AdminPIR:6000       AdminCIR:3000
|   |   |   |    CBS:4               MBS:64
|   |   |   |    Depth:56            HiPrio:8
|   |   |   |
|   |   |   |    [Within CIR Level 0 Weight 1]
|   |   |   |    Assigned:3000       Offered:0
|   |   |   |    Consumed:0
|   |   |   |
|   |   |   |    [Above CIR Level 1 Weight 1]
|   |   |   |    Assigned:6000       Offered:6000
|   |   |   |    Consumed:6000
|   |   |   |
|   |   |   |    TotalConsumed:6000
|   |   |   |    OperPIR:6000        OperCIR:3000
|   |   |
|   |--(S) : vod
|   |   |    AdminPIR:max        AdminCIR:16000(sum)
|   |   |
|   |   |    [Within CIR Level 2 Weight 75]
|   |   |    Assigned:16000      Offered:13100
|   |   |    Consumed:13100
|   |   |
|   |   |    [Above CIR Level 2 Weight 75]
|   |   |    Assigned:956439     Offered:13100
|   |   |    Consumed:0
|   |   |
|   |   |    TotalConsumed:13100
|   |   |    OperPIR:956439
|   |   |
|   |   |    [As Parent]
|   |   |    Rate:956439
|   |   |    ConsumedByChildren:13100
|   |   |
|   |   |--(Q) : 2->5/1/1:1->2
|   |   |   |    AdminPIR:20000      AdminCIR:16000
|   |   |   |    CBS:20              MBS:64
|   |   |   |    Depth:0             HiPrio:8
|   |   |   |
|   |   |   |    [Within CIR Level 0 Weight 1]
```

```
|   |   |   |    Assigned:16000      Offered:0
|   |   |   |    Consumed:0
|   |   |   |
|   |   |   |    [Above CIR Level 1 Weight 1]
|   |   |   |    Assigned:20000      Offered:13100
|   |   |   |    Consumed:13100
|   |   |   |
|   |   |   |    TotalConsumed:13100
|   |   |   |    OperPIR:20000       OperCIR:16000
|   |
|   |--(S) : voice
|   |   |    AdminPIR:max        AdminCIR:768(sum)
|   |   |
|   |   |    [Within CIR Level 6 Weight 1]
|   |   |    Assigned:768        Offered:561
|   |   |    Consumed:561
|   |   |
|   |   |    [Above CIR Level 1 Weight 1]
|   |   |    Assigned:940900     Offered:561
|   |   |    Consumed:0
|   |   |
|   |   |    TotalConsumed:561
|   |   |    OperPIR:940900
|   |   |
|   |   |    [As Parent]
|   |   |    Rate:940900
|   |   |    ConsumedByChildren:561
|   |   |
|   |   |--(Q) : 2->5/1/1:1->3
|   |   |   |    AdminPIR:786        AdminCIR:768
|   |   |   |    CBS:8               MBS:64
|   |   |   |    Depth:0             HiPrio:8
|   |   |   |
|   |   |   |    [Within CIR Level 0 Weight 1]
|   |   |   |    Assigned:768        Offered:0
|   |   |   |    Consumed:0
|   |   |   |
|   |   |   |    [Above CIR Level 1 Weight 1]
|   |   |   |    Assigned:786        Offered:561
|   |   |   |    Consumed:561
|   |   |   |
|   |   |   |    TotalConsumed:561
|   |   |   |    OperPIR:784         OperCIR:768
===============================================================================
*A:Dut-R#
```

scheduler-hierarchy subscriber

Syntax **scheduler-hierarchy subscriber** *sub-ident-string* [**scheduler** *scheduler-name*] [**ingress** | **egress**] [**detail**]

Context show>qos

Description This command displays the scheduler hierarchy per subscriber.

Parameters **subscriber** ***sub-ident-string*** **—** Displays the subscriber identification policy name.

scheduler *scheduler-name* — Displays the scheduler name.

ingress — Displays ingress SAP subscriber scheduler stats.

egress — Displays egress SAP subscriber scheduler stats.

detail — Displays detailed information.

Output **Show QoS Scheduler-Hierarchy Subscriber Output —** The following table describes the QoS scheduler hierarchy subscriber fields.

Table 43: Show QoS Scheduler-Hierarchy Subscriber Output Fields

Label	Description
Legend	Admin CIR/PIR: Specifies the configured value of CIR/PIR. Assigned CIR/PIR: Specifies the PIR/CIR rate given to a member by that parent level. Offered CIR/PIR: Specifies the offered load on that member. Consumed CIR/PIR: Specifies the amount of scheduler bandwidth used by this member.
PIR	Specifies the PIR rate.
CIR	Specifies the CIR rate.
S	Displays the scheduler name.
Q	Displays the queue ID and information.

Sample Output

```
A:D# show qos scheduler-hierarchy subscriber RoutedCoHost1
===============================================================================
Scheduler Hierarchy - Subscriber RoutedCoHost1
===============================================================================
Root (Ing)
| slot(1)
|--(S) : grandpa
|   |
|   |--(S) : AccessIngress:Sub=1:1 200->1/2/5:1->8
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->8 1/2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->8 2/1
|   |   |
|   |
|   |--(S) : AccessIngress:Sub=1:1 200->1/2/5:1->7
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->7 1/2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->7 2/1
|   |   |
|   |
```

```
|   |--(S) : AccessIngress:Sub=1:1 200->1/2/5:1->6
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->6 1/2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->6 2/1
|   |   |
|   |
|   |--(S) : AccessIngress:Sub=1:1 200->1/2/5:1->5
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->5 1/2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->5 2/1
|   |   |
|   |
|   |--(S) : AccessIngress:Sub=1:1 200->1/2/5:1->4
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->4 1/2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->4 2/1
|   |   |
|   |
|   |--(S) : AccessIngress:Sub=1:1 200->1/2/5:1->3
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->3 1/2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->3 2/1
|   |   |
|   |
|   |--(S) : AccessIngress:Sub=1:1 200->1/2/5:1->2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->2 1/2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->2 2/1
|   |   |
|   |
|   |--(S) : AccessIngress:Sub=1:1 200->1/2/5:1->1
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->1 1/2
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->1 2/1
|   |   |


Root (Egr)
| slot(1)
|--(S) : gp
|   |
|   |--(S) : pb
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->1
|   |   |
|   |   |--(S) : pbs
|   |   |   |
|   |   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->2
|   |   |   |
|   |
|   |--(S) : mb
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->3
```

```
|   |   |
|   |   |--(S) : mbs
|   |   |   |
|   |   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->4
|   |   |   |
|
|--(S) : rb
|   |
|   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->5
|   |
|   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->7
|   |
|   |--(S) : rbs
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->6
|   |   |
|   |   |--(Q) : Sub=RoutedCoHost1:adsl-hsi 200->1/2/5:1->8
|   |   |
```

```
show qos scheduler-hierarchy subscriber x detail
...

|--(Q) : Sub=hpolSub43:hpolSlaProf1 2000->2/1/5:2000->2  (Port 2/1/5)
|   |    AdminPIR:100000     AdminCIR:0
|   |    AvgFrmOv:0.00
|   |    AdminPIR:100000(w)  AdminCIR:0(w)
|   |    CBS:0           B    MBS:125952     B
|   |    Depth:0           B  HiPrio:15360      B
|   |    MaxAggRate:22032821(w) CurAggRate:0(w)
|   |
|   |    [Within CIR Level 0 Weight 0]
|   |    Assigned:0(w)       Offered:0(w)
|   |    Consumed:0(w)
|   |
|   |    [Above CIR Level 1 Weight 60]
|   |    Assigned:1000(w)    Offered:0(w)
|   |    Consumed:0(w)
|   |
|   |    TotalConsumed:0
|   |    OperPIR:1000        OperCIR:0
...
```

scheduler-name

Syntax **scheduler-name** *scheduler-name*

Context show>qos

Description This command displays the scheduler policies using the specified scheduler.

Parameters *scheduler-name* — The name of a scheduler configured in the **config>qos>scheduler-policy>tier** context.

Sample Output

```
A:ALA-12# show qos scheduler-name NetworkControl
===============================================================
Scheduler : NetworkControl
===============================================================
Scheduler Policy   : SLA1
Scheduler Policy   : alpha
Scheduler Policy   : beta
===============================================================
A:ALA-12#
```

scheduler-stats customer

Syntax **scheduler-stats customer** *customer-id* **site** *customer-site-name* [**scheduler** *scheduler-name*] [**ingress | egress**]

Context show>qos

Description This command displays scheduler statistics information.

Parameters **customer** *customer-id* — Specifies the ID number associated with a particular customer.

Values 1 — 2147483647

site *customer-site-name* — The unique customer site name.

scheduler *scheduler-name* — The unique scheduler name created in the context of the scheduler policy

ingress — The keyword to display ingress SAP customer scheduler stats.

egress — The keyword to display egress SAP customer scheduler stats.

Output **Show QoS Scheduler-Stats Customer Output —** The following table describes the SAP scheduler-stats customer fields.

Table 44: Show QoS Scheduler-Stats Customer Output Fields

Label	Description
Scheduler	Displays the scheduler policy name.
Forwarded Packets	Displays the number of packets forwarded.
Forwarded Octets	Displays the number of octets forwarded.

Sample Output

```
A:ALA-12# show qos scheduler-stats customer 274 site west scheduler NetworkControl ingress
===============================================================================
Scheduler Stats
```

```
===============================================================================
Scheduler                          Forwarded Packets        Forwarded Octets
-------------------------------------------------------------------------------
NetworkControl                     0                        0
===============================================================================
A:ALA-12#
```

scheduler-stats sap

Syntax **scheduler-stats sap** *sap-id* [**scheduler** *scheduler-name*] [**ingress** | **egress**]

Context show>qos

Description Display the scheduler stats per SAP.

Parameters **sap** *sap-id* — The port number and encapsulation value used to identify the SAP.

Values: *sap-id*

null	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id* | *aps-id*]	
dot1q	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id* | *aps-id*]:*qtag1*	
qinq	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id*]:*qtag1.qtag2*	
atm	[*port-id* | *aps-id*][:*vpi/vci*|*vpi*| *vpi1.vpi2*]	
frame	[*port-id* | *aps-id*]:*dlci*	
cisco-hdlc	*slot/mda/port.channel*	
cem	*slot/mda/port.channel*	
ima-grp	[*bundle-id*[:vpi/vci|vpi|*vpi1.vpi2*]	
port-id	*slot/mda/port*[*.channel*]	
bundle-id	bundle-*type-slot/mda.bundle-num*	
	bundle	keyword
	type	ima, fr, ppp
	bundle-num	1 — 336
bpgrp-id	bpgrp-*type-bpgrp-num*	
	bpgrp	keyword
	type	ima, ppp
	bpgrp-num	1 — 2000
aps-id	aps-*group-id*[*.channel*]	
	aps	keyword
	group-id	1 — 64
ccag-id	ccag-*id.path-id*[*cc-type*]:*cc-id*	
	ccag	keyword
	id	1 — 8
	path-id	a, b
	cc-type	.sap-net, .net-sap
	cc-id	0 — 4094
eth-tunnel	eth-tunnel-*id*[:*eth-tun-sap*-id]	
	id:	1 — 1024
	eth-tun-sap-id	0 — 4094
lag-id	lag-id	
	lag	keyword
	id	1 — 200
qtag1	0 — 4094	

qtag2	*, 0 — 4094
vpi	NNI: 0 — 4095 UNI: 0 — 255
vci	1, 2, 5 — 65535
dlci	16 — 1022
ipsec-id	ipsec-*id*.[private | public]:*tag* ipsec keyword id 1 — 4 tag 0 — 4094

scheduler *scheduler-name* **—** The name of an existing scheduler policy.

ingress — Display only the policy displayed on the ingress SAP.

egress — Display only the policy displayed on the egress SAP.

Output **Show QoS Scheduler-Stats SAP Output —** The following table describes the scheduler-stats SAP fields.

Table 45: Show QoS Scheduler-Stats SAP Output Fields

Label	Description
Scheduler	Displays the scheduler policy name.
Forwarded Packets	Displays the number of packets forwarded.
Forwarded Octet	Displays the number of octets forwarded.
Ingress Schedulers	Displays the egress scheduler name(s).
Egress Schedulers	Displays the ingress scheduler name(s).

Sample Output

```
A:ALA-12# show qos scheduler-stats sap 1/1/4.1:0
===============================================================================
Scheduler Stats
===============================================================================
Scheduler                          Forwarded Packets        Forwarded Octets
-------------------------------------------------------------------------------
Ingress Schedulers
All_traffic                        0                        0
NetworkControl                     0                        0
Egress Schedulers
All_traffic                        0                        0
Internet_be                        0                        0
Internet_priority                  0                        0
Internet_voice                     0                        0
NetworkControl                     0                        0
NonVoice                           0                        0
VPN_be                             0                        0
VPN_nc                             0                        0
VPN_priority                       0                        0
VPN_reserved                       0                        0
```

```
VPN_video                          0                        0
VPN_voice                          0                        0
Voice                              0                        0
===============================================================================
A:ALA-12#


A:ALA-12# show qos scheduler-stats sap 1/1/5:0 scheduler 1
===============================================================================
Scheduler Stats
===============================================================================
Scheduler                          Forwarded Packets        Forwarded Octets
-------------------------------------------------------------------------------
Ingress Schedulers
No Matching Entries.
Egress Schedulers
No Matching Entries.
===============================================================================
A:ALA-12#


A:ALA-12# show qos scheduler-stats sap 1/1/4.1:0 scheduler All_traffic
===============================================================================
Scheduler Stats
===============================================================================
Scheduler                          Forwarded Packets        Forwarded Octets
-------------------------------------------------------------------------------Ingress
Schedulers
All_traffic                        0                        0
Egress Schedulers
All_traffic                        0                        0
===============================================================================
A:ALA-12#
```

scheduler-stats subscriber

Syntax **scheduler-stats subscriber** *sub-ident-string* [**scheduler** *scheduler-name*] [**ingress | egress**]

Context show>qos

Description This command displays scheduler statistics information.

Parameters **subscriber *sub-ident-string* —** Specifies an existing SLA profile string.

scheduler *scheduler-name* — Specifies an existing scheduler name.

ingress — Display only the policy displayed on ingress.

egress — Display only the policy displayed on egress.

Output **Show QoS Scheduler-Stats Subscriber Output —** The following table describes the QoS scheduler-stats subscriber fields.

Table 46: Show QoS Scheduler-Stats Subscriber Output Fields

Label	Description
Scheduler	Displays the scheduler policy name.
Forwarded Packets	Displays the number of packets forwarded.
Forwarded Octet	Displays the number of octets forwarded.

Sample Output

```
A:D# show qos scheduler-stats subscriber RoutedCoHost1
===============================================================================
Scheduler Stats
===============================================================================
Scheduler                          Forwarded Packets      Forwarded Octets
-------------------------------------------------------------------------------
Ingress Schedulers
gp                                 0                      0
Egress Schedulers
gp                                 0                      0
mb                                 0                      0
mbs                                0                      0
pb                                 0                      0
pbs                                0                      0
rb                                 0                      0
rbs                                0                      0
===============================================================================
*A:D#
```

agg-rate customer

Syntax **customer** *customer-id* **site** *customer-site-name* [**egress**] [**detail**]

Context show>qos

Description This command displays the HQoS aggregate rate limit per customer multi-service-site.

Parameters **customer** *customer-id* — Specifies the ID number associated with a particular customer.

Values 1 — 2147483647

site *customer-site-name* — The unique customer site name.

egress — Displays egress SAP customer scheduler stats.

detail — Displays detailed information.

agg-rate port

Syntax **port** *port-id* **queue-group** *queue-group-name* [**egress**] [**access|network**] [**instance** *instance-id*] [**detail**]
port *port-id* **vport** *name* [**detail**]

Context show>qos

Description This command displays the HQoS aggregate rate limit per port or vport.

Parameters *port-id* — Specifies the port ID in the slot/mda/port[.channel] format.

queue-group *queue-group-name* — Displays information about the specified queue group on the port.

egress — Displays egress queue group information.

access — Displays HQoS aggregate rate limit information on an access port.

network — Displays HQoS aggregate rate limit information on a network port.

instance *instance-id* — Specifies the identification of a specific instance of the queue-group.

Values 1 — 65535

vport *name* — Displays HQoS aggregate rate limit information for the specified vport.

detail — Displays detailed information.

agg-rate sap

Syntax **sap** *sap-id* [**egress**] [**detail**]
sap *sap-id* **encap-group** *group-name* [**member** *encap-id*] [**detail**]

Context show>qos

Description This command displays the HQoS aggregate rate limit per SAP or encap group.

Parameters **sap** *sap-id* — The port number and encapsulation value used to identify the SAP.

Values: *sap-id*

null	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id* | *aps-id*]	
dot1q	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id* | *aps-id*]:*qtag1*	
qinq	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id*]:*qtag1.qtag2*	
atm	[*port-id* | *aps-id*][:*vpi/vci*|*vpi*| *vpi1.vpi2*|*cp.conn-prof-id*]	
	cp	keyword
	conn-prof-id	[1—8000]
frame	[*port-id* | *aps-id*]:*dlci*	
cisco-hdlc	*slot/mda/port.channel*	
cem	*slot/mda/port.channel*	
ima-grp	[*bundle-id*[:vpi/vci|vpi|*vpi1.vpi2*|*cp.conn-prof-id*]	
	cp	keyword
	conn-prof-id	[1—8000]
port-id	*slot/mda/port*[.*channel*]	
bundle-id	bundle-*type-slot/mda.bundle-num*	
	bundle	keyword
	type	ima, fr, ppp
	bundle-num	1 — 336
bpgrp-id	bpgrp-*type-bpgrp-num*	
	bpgrp	keyword
	type	ima, ppp
	bpgrp-num	1 — 2000
aps-id	aps-*group-id*[.*channel*]	
	aps	keyword
	group-id	1 — 64
ccag-id	ccag-*id.path-id*[*cc-type*]:*cc-id*	
	ccag	keyword
	id	1 — 8
	path-id	a, b
	cc-type	.sap-net, .net-sap
	cc-id	0 — 4094
eth-tunnel	eth-tunnel-*id*[:*eth-tun-sap*-id]	
	id:	1 — 128
	eth-tun-sap-id	0 — 4094
lag-id	lag-id	
	lag	keyword
	id	1 — 200
pw-id	pw-*id*	
	pw	keyword
	id	1— 10239

qtag1	0 — 4094
qtag2	*, null, 0 — 4094
vpi	NNI: 0 — 4095
	UNI: 0 — 255
vci	1, 2, 5 — 65535
dlci	16 — 1022
tunnel-id	tunnel-*id*.[private | public]:*tag*
	tunnel keyword
	id 1 — 16
	tag 0 — 4094

egress — Displays egress SAP customer scheduler stats.

group-name — Specifies the name of the encap-group and can be up to 32 ASCII characters in length.

encap-id **—** Specifies the value of the single encap-id.

Values 1 — 16777215

detail — Displays detailed information.

agg-rate subscriber

Syntax **subscriber** *sub-indent-string* [**egress**] [**detail**]

Context show>qos

Description This command displays the HQoS aggregate rate limit per subscriber.

Parameters *sub-indent-string* **—** Specifies the subscriber identification string of the subscriber.

egress — Displays egress SAP customer scheduler stats.

detail — Displays detailed information.

port-scheduler-policy

Syntax **port-scheduler-policy** [*port-scheduler-policy-name*] [**association**]
port-scheduler-policy *port-scheduler-policy-name* **network-policy** *network-queue-policy-name*
port-scheduler-policy *port-scheduler-policy-name* **sap-egress** *policy-id*
port-scheduler-policy *port-scheduler-policy-name* **scheduler-policy** *scheduler-policy-name*
port-scheduler-policy *port-scheduler-policy-name* **scheduler-policy** *scheduler-policy-name* **sap-egress** *policy-id*

Context show>qos

Description This command displays port-scheduler policy information

Parameters *port-scheduler-policy-name* — Displays information for the specified existing port scheduler policy.

association — Displays associations related to the specified port scheduler policy.

network-policy *network-queue-policy-name* **—** Displays information for the specified existing network queue policy.

sap-egress *policy-id* **—** Displays information for the specified existing SAP egress policy.

scheduler-policy *scheduler-policy-name* **—** Displays information for the specified existing scheduler policy.

Output **Show QoS Port Scheduler Output —** The following table describes the QoS port scheduler policy fields.

Label	Description
Policy Name	Displays the port scheduler policy name.
Max Rate	Displays the explicit maximum frame-based bandwidth limit of this port scheduler.
Lvlx PIR	Displays the total bandwidth limit, PIR, for the specified priority level.
Lvlx CIR	Displays the within-cir bandwidth limit for the specified priority level.
Orphan Lvl	Displays above-cir port priority of orphaned queues and scheduler.
Orphan Weight	Displays the weight of orphaned queues and schedulers that are above-cir.
Orphan CIR-Lvl	Displays the port priority of orphaned queues and schedulers that are within-cir.
Orphan CIR-Weight	Displays the weight of orphaned queues and schedulers that are within-cir.

Label	Description (Continued)
Associations	Displays associations related to the specified port scheduler policy.
Mode	Displays the port scheduler policy mode (STRICT, RR, WRR, WDRR).
Accounting	Displays whether the accounting mode is frame-based or packet-based
Last Changed	Displays the last time the configuration changed.
Queue #	Displays the weight of the queue if configured.

Sample Output

```
*A:Dut-R# show qos port-scheduler-policy p1
===============================================================================
QoS Port Scheduler Policy
===============================================================================
Policy-Name       : p1
Max Rate          : max                Last changed      : 05/21/2007 10:39:15
Lvl1 PIR          : max                Lvl1 CIR          : max
Lvl2 PIR          : max                Lvl2 CIR          : max
Lvl3 PIR          : max                Lvl3 CIR          : max
Lvl4 PIR          : max                Lvl4 CIR          : max
Lvl5 PIR          : max                Lvl5 CIR          : max
Lvl6 PIR          : max                Lvl6 CIR          : max
Lvl7 PIR          : max                Lvl7 CIR          : max
Lvl8 PIR          : max                Lvl8 CIR          : max
Orphan Lvl        : default            Orphan Weight     : default
Orphan CIR-Lvl    : default            Orphan CIR-Weight : default
===============================================================================
QoS Port Scheduler Policy
===============================================================================
Policy-Name       : p1
-------------------------------------------------------------------------------
Associations
-------------------------------------------------------------------------------
 - Port : 5/1/1
===============================================================================
*A:Dut-R#
```

Sample Output

The following configuration displays **dist-lag-rate-shared** and **percent-rate** for level, **group** and **max-rate** in a port-scheduler-policy

```
*B:vineshDut-A>config>qos>port-sched-plcy# info
----------------------------------------------
 dist-lag-rate-shared
  max-rate percent 30.00
```

```
 group "test" create
               percent-rate 20.00 cir 20.00
  exit
  level 1 percent-rate 10.00 percent-cir 10.00
  level 2 percent-rate 20.00 percent-cir 20.00
  level 3 percent-rate 30.00 percent-cir 30.00
  level 4 percent-rate 40.00 percent-cir 40.00
  level 5 percent-rate 50.00 percent-cir 50.00
  level 6 percent-rate 60.00 percent-cir 60.00
  level 7 percent-rate 70.00 percent-cir 70.00
  level 8 percent-rate 80.00 percent-cir 80.00
```

Overrides

```
*B:vineshDut-A>config>port# info
----------------------------------------------
        ethernet
            mode access
            egress-scheduler-policy "psp2"
            egress-scheduler-override create
                max-rate percent 50.00
                level 1 percent-rate 10.00 percent-cir 10.00
                level 2 percent-rate 20.00 percent-cir 20.00
                level 3 percent-rate 30.00 percent-cir 30.00
                level 4 percent-rate 40.00 percent-cir 40.00
                level 5 percent-rate 50.00 percent-cir 50.00
                level 6 percent-rate 60.00 percent-cir 60.00
                level 7 percent-rate 70.00 percent-cir 70.00
                level 8 percent-rate 80.00 percent-cir 80.00
            exit
            autonegotiate limited
        exit
        no shutdown
----------------------------------------------
```

The following output shows a **port-scheduler-policy** showing Dist Lag Rate and percent parameters

```
*B:vineshDut-A>config>port# /show qos port-scheduler-policy "psp2"
===============================================================================
QoS Port Scheduler Policy
===============================================================================
Policy-Name       : psp2
Description       : (Not Specified)
Max Rate          : max                Max Rate Percent  : 30.00
Dist LAG Rate     : True               Last changed      : 07/16/2014 21:31:51
Group             : test
Group PIR         : max                Group CIR         : max
Group PIR Percent : 20.00              Group CIR Percent : 20.00

Lvl1 PIR          : max                Lvl1 CIR          : max
Lvl1 PIR Percent  : 10.00              Lvl1 CIR Percent  : 10.00
Lvl2 PIR          : max                Lvl2 CIR          : max
Lvl2 PIR Percent  : 20.00              Lvl2 CIR Percent  : 20.00
Lvl3 PIR          : max                Lvl3 CIR          : max
Lvl3 PIR Percent  : 30.00              Lvl3 CIR Percent  : 30.00
Lvl4 PIR          : max                Lvl4 CIR          : max
Lvl4 PIR Percent  : 40.00              Lvl4 CIR Percent  : 40.00
```

```
Lvl5 PIR          : max                Lvl5 CIR          : max
Lvl5 PIR Percent  : 50.00              Lvl5 CIR Percent  : 50.00
Lvl6 PIR          : max                Lvl6 CIR          : max
Lvl6 PIR Percent  : 60.00              Lvl6 CIR Percent  : 60.00
Lvl7 PIR          : max                Lvl7 CIR          : max
Lvl7 PIR Percent  : 70.00              Lvl7 CIR Percent  : 70.00
Lvl8 PIR          : max                Lvl8 CIR          : max
Lvl8 PIR Percent  : 80.00              Lvl8 CIR Percent  : 80.00
Orphan Lvl        : default            Orphan Weight     : default
Orphan CIR-Lvl    : default            Orphan CIR-Weight : default
===============================================================================
Part of show port  Output
-------------------------------------------------------------------------------
Egr Port Sched Override
-------------------------------------------------------------------------------
Max Rate           : max*                     Max Rate Percent : 50.00
Lvl1 PIR           : max*                     Lvl1 CIR         : max*
Lvl1 PIR Percent   : 10.00                    Lvl1 CIR Percent : 10.00
Lvl2 PIR           : max*                     Lvl2 CIR         : max*
Lvl2 PIR Percent   : 20.00                    Lvl2 CIR Percent : 20.00
Lvl3 PIR           : max*                     Lvl3 CIR         : max*
Lvl3 PIR Percent   : 30.00                    Lvl3 CIR Percent : 30.00
Lvl4 PIR           : max*                     Lvl4 CIR         : max*
Lvl4 PIR Percent   : 40.00                    Lvl4 CIR Percent : 40.00
Lvl5 PIR           : max*                     Lvl5 CIR         : max*
Lvl5 PIR Percent   : 50.00                    Lvl5 CIR Percent : 50.00
Lvl6 PIR           : max*                     Lvl6 CIR         : max*
Lvl6 PIR Percent   : 60.00                    Lvl6 CIR Percent : 60.00
Lvl7 PIR           : max*                     Lvl7 CIR         : max*
Lvl7 PIR Percent   : 70.00                    Lvl7 CIR Percent : 70.00
Lvl8 PIR           : max*                     Lvl8 CIR         : max*
Lvl8 PIR Percent   : 80.00                    Lvl8 CIR Percent : 80.00
* means the value is inherited
-------------------------------------------------------------------------------
```

Clear Commands

sap

Syntax **sap** *sap-id* [**scheduler** *scheduler-name*] [**ingress** | **egress**]

Context clear>qos>scheduler-stats

Description This command clears scheduler statistics.

Parameters *sap-id* — Specifies the SAP assigned to the service.

Values: *sap-id*

null	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id* | *aps-id*]	
dot1q	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id* | *aps-id*]:*qtag1*	
qinq	[*port-id* | *bundle-id* | *bpgrp-id* | *lag-id*]:*qtag1.qtag2*	
atm	[*port-id* | *aps-id*][:*vpi/vci*|*vpi*| *vpi1.vpi2*]	
frame	[*port-id* | *aps-id*]:*dlci*	
cisco-hdlc	*slot/mda/port.channel*	
cem	*slot/mda/port.channel*	
ima-grp	[*bundle-id*[:vpi/vci|vpi|*vpi1.vpi2*]	
port-id	*slot/mda/port*[*.channel*]	
bundle-id	bundle-*type-slot/mda.bundle-num*	
	bundle	keyword
	type	ima, fr, ppp
	bundle-num	1 — 336
bpgrp-id	bpgrp-*type-bpgrp-num*	
	bpgrp	keyword
	type	ima, ppp
	bpgrp-num	1 — 2000
aps-id	aps-*group-id*[*.channel*]	
	aps	keyword
	group-id	1 — 64
ccag-id	ccag-*id.path-id*[*cc-type*]:*cc-id*	
	ccag	keyword
	id	1 — 8
	path-id	a, b
	cc-type	.sap-net, .net-sap
	cc-id	0 — 4094
lag-id	lag-id	
	lag	keyword
	id	1 — 200
qtag1	0 — 4094	
qtag2	*, 0 — 4094	
vpi	NNI: 0 — 4095	
	UNI: 0 — 255	
vci	1, 2, 5 — 65535	
dlci	16 — 1022	

ipsec-id	ipsec-*id*.[private | public]:*tag*	
	ipsec	keyword
	id	1 — 4
	tag	0 — 4094

scheduler-name — The name of the scheduler.

Values Valid names consist of any string up to 32 characters long composed of printable, 7-bit ASCII characters. If the string contains special characters (#, $, spaces, etc.), the entire string must be enclosed within double quotes.

ingress — Display only the policy displayed on the ingress SAP.

egress — Display only the policy displayed on the egress SAP.