Inline TCP Optimization

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Feature Summary and Revision History

Summary Data

Applicable Product(s) or Functional Area	P-GW
Applicable Platform(s)	• ASR 5500 • VPC - DI • VPC - SI
Feature Default	Disabled - Configuration Required
Related Changes in This Release	Not Applicable
Related Documentation	• *Command Line Interface Reference* • *P-GW Administration Guide* • *Statistics and Counters Reference*

Revision History

Revision Details	Release
In this release, the throughput gain has been increased. KPIs - separate counters for IP versions (IPv4/IPv6) and application protocols (HTTP/HTTPs), are added.	21.10

Revision Details	Release
In this release, two new commands - **accl-flags** and **cwnd-gain**, are added to the TCP Acceleration Profile Parameters configuration. Configuring these commands increases throughput gain and optimized mid-flow proxy engagement procedures for TCP accelerated flows. Also, the output for the **show tcp-acceleration-profile** command has been updated.	21.9.1
Inline TCP Optimization engine is enhanced to dynamically engage the TCP acceleration module at mid-flow.	21.9
First introduced.	21.8

Feature Description

Inline TCP Optimization is an integrated solution to service providers to increase the TCP flow throughput for TCP connections. This solution enables faster transmission of data for a better user experience.

The Inline TCP Optimization solution ensures accelerated TCP flows using a proprietary algorithm that provides efficient and optimal throughput at a given time. A TCP proxy has been integrated with this solution to monitor and control the TCP congestion window for optimal throughput.

The Inline TCP Optimization solution also supports split TCP sessions to accommodate wireless requirements and provides feature parity with other existing inline services.

Note Optimization only applies to the downlink data on the Gn interface.

The Inline TCP Optimization feature is license controlled. Contact your Cisco account representative for detailed information on specific licensing requirements. For information on installing and verifying licenses, refer to the *Managing License Keys* section of the *Software Management Operations* chapter in the *System Administration Guide*.

How It Works

The TCP Optimization feature includes the following functionalities:

- TCP Connection Splicing: The TCP connections are split into two connections; one connection towards Gn and the other connection towards Gi, inside P-GW. The connections are split in a transparent manner in the P-GW so that the UE and the Gi servers are transparent to the connection being split.
- TCP Proxy ensures seamless movement of data across these two TCP split connections.
- TCP Optimization is deployed on the Gn interface (towards the UE) of the TCP stack. A user-space TCP stack in P-GW is used.
- Cisco library for TCP optimization:
  - Provides algorithms that are designed to increase the TCP throughput.

- Interfaces with the User-space TCP stack (Gn interface) and notifies appropriate events that occur in the TCP connection and takes actions accordingly.
- Provides APIs to integrate the Cisco Library (for TCP optimization) and StarOS.

Note TCP Acceleration is enabled during the start of the TCP flow (when SYN packet is received). It cannot be disabled later during the flow.

Accelerating Selected TCP Flows

The Inline TCP Optimization solution is designed to optimize most-eligible TCP flows.

The following are a few criteria to select TCP flows for acceleration:

- Based on the amount of data seen on the flow: Flows that have data more than that of the threshold value are accelerated.
- TCP acceleration is avoided in certain scenarios for throttled TCP flows. For example:
  - ADC flows that configured to be throttled.
  - TCP flows throttled due to breaching data limit triggered by OCS/PCRF.
  - Tethered flows that are throttled.
- Based on GBR/non-GBR: Only TCP flows on default bearers is applicable for TCP acceleration.

Note TCP acceleration is only supported for LTE RAT-Type.

Configuring Inline TCP Optimization

Enabling TCP Acceleration under Active Charging Service

Use the following configuration to enable TCP acceleration:

```
configure
  require active-charging
  active-charging service service_name
    tcp-acceleration
    end
```

NOTES:

- **tcp-acceleration**: Enables TCP acceleration under the ACS Configuration mode.

Enabling TCP Acceleration under Trigger Action

Use the following configuration to enable TCP acceleration:

```
configure
   require active-charging
   active-charging service service_name
      trigger-action trigger_action_name
         tcp-acceleration profile profile_name
         end
```

NOTES:

- **tcp-acceleration**: Enables TCP acceleration under the ACS Trigger Action Configuration mode.
- **profile**: Identifies the TCP acceleration profile. The *profile_name* is a string ranging from 1 to 63 characters.

Configuring a TCP Acceleration Profile

Use the following configuration to configure a TCP Acceleration Profile:

```
configure
   require active-charging
   active-charging service service_name
      [ no ] tcp-acceleration-profile profile_name
      end
```

NOTES:

- **tcp-acceleration-profile**: Configures the TCP Acceleration feature profile for inline TCP optimization.
- **no**: Disables the TCP Acceleration profile.

Configuring TCP Acceleration Profile Parameters

Use the following commands to configure the TCP acceleration profile parameters:

```
configure
   require active-charging
   active-charging service service_name
      [ no ] tcp-acceleration-profile profile_name
         accl-flags flag_value
         default accl-flags
        buffer-size { [ downlink [ 128KB | 256KB | 512KB | 1024KB | 1536KB
 | 2048KB | 2560KB | 3072KB | 3584KB | 4096KB ] [ uplink [ 128KB | 256KB
 | 512KB | 1024KB | 1536KB | 2048KB | 2560KB | 3072KB | 3584KB | 4096KB
] ] ] | [ uplink [ 128KB | 256KB | 512KB | 1024KB | 1536KB | 2048KB |
2560KB | 3072KB | 3584KB | 4096KB ] [ downlink [ 128KB | 256KB | 512KB |
 1024KB | 1536KB | 2048KB | 2560KB | 3072KB | 3584KB | 4096KB ] ] ] }
         cwnd-gain { dynamic { off | on } [ factor factor_value ] | factor
factor_value [ dynamic { off | on } ] }
         default cwnd-gain
```

```
default buffer-size [ downlink | uplink ]
initial-cwnd-size window_size
default initial-cwnd-size
max-rtt max_rtt_value
default max-rtt
mss mss_value
default mss
end
```

NOTES:

- **default**: Assigns or restores default values to its following commands.
- **accl-flags**: Configures TCP acceleration related optimization flags. The flag_value is an integer ranging from 0 to 65535.
- **buffer-size**: Configures the TCP Proxy buffer size for downlink and uplink data in Kilobytes.

  Note This command is supported from 21.9.1 and later releases

- **cwnd-gain**: Configures the TCP congestion window gain. This command is used by the TCP optimization engine to continuously calculate the actual congestion window size. Scaling the window size allows the TCP optimization engine to manage the in-flight of data in the engine.
  - The **dynamic** option in this command automatically scales-up the congestion window gain to ensure that it is sized correctly to allow for RTT variation during the flow.
  - The **factor** option configures the TCP congestion window gain factor. The *factor_value* is an integer ranging from 1 to 16378.

  Note This command is supported from 21.9.1 and later releases

- **initial-cwnd-size**: Configures the initial congestion window size in segments. The *window_size* is an integer ranging from 1 to 65535.
- **max-rtt**: Configures the maximum RTT value in milliseconds. The *max_rtt_value* is an integer ranging from 1 to 10000.
- **mss**: Configures the maximum segment size for TCP in Bytes. The *mss_value* is an integer ranging from 496 to 65535.

Configuring Post-Processing Rule Name under Trigger Condition

Use the following commands to configure the post-processing rule names:

```
configure
  require active-charging
  active-charging service service_name
    trigger-condition trigger_condition_name
      post-processing-rule-name { = | contains | ends-with | starts-with
```

```
} rule_name
      [ no ] post-processing-rule-name rule_name
      end
```

NOTES:

- **post-processing-rule-name**: Sets condition for a particular post-processing rule. The following operators specify how the rules are matched:
  - **=**: Equals
  - **!=**: Not Equals
  - **contains**: Contains
  - **ends-with**: Ends with.
  - **starts-with**: Starts with
- *name*: Specifies the name of the post-processing rule.

Configuring TCP Acceleration Related EDR Attributes

Use the following configuration to configure the EDR attributes:

```
configure
  require active-charging
  active-charging service service_name
    edr-format edr_format_name
      rule-variable tcp [ sn-tcp-accl | sn-tcp-accl-reject-reason |
sn-tcp-min-rtt | sn-tcp-rtt ] priority priority_value
      end
```

NOTES:

- **rule variable**: Assigns a rule variable attributes for EDR or UDR.
- **tcp**: Specifies Transmission Control Protocol (TCP) related fields.
  - **sn-tcp-accl**: Specifies the TCP Acceleration status for the TCP flow.
    - **0**: TCP Acceleration is not enabled on the flow.
    - **1**: TCP Acceleration is enabled on the flow.
    - **2**: Flow is eligible and attempted, but not TCP Accelerated.
    - **3**: Flow is eligible, but not attempted for TCP Acceleration
  - **sn-tcp-accl-reject-reason**: Specifies reason for not accelerating the TCP flow.
  - **sn-tcp-min-rtt**: Specifies min RTT observed for accelerated TCP flow.
  - **sn-tcp-rtt**: Specifies smoothed RTT for accelerated TCP flow.
- **priority**: Specifies the CSV position of the field (protocol rule) in the EDR. Priority must be an integer from 1 through 65535.

Configuring Flow Length Threshold for a TCP Flow under Trigger Action

The flow length threshold of a TCP flow is configured using Trigger Action under the service-scheme framework. The threshold value of the flow length is used to engage the TCP Acceleration module dynamically.

Use the following configuration to engage TCP acceleration module during mid-flow:

```
configure
  require active-charging
  active-charging service service_name
    trigger-action trigger_action_name
      tcp-acceleration flow-length threshold threshold_value
      no tcp-acceleration flow-length threshold
      end
```

NOTES:

- **no**: Disables flow recovery for a trigger-action.
- **flow-length**: Specifies the flow length action for a TCP flow.
- **threshold**: Specifies the threshold value of the flow length in bytes, for a TCP flow. The threshold value is an integer ranging from 1 to 10000 bytes.

Configuring a Flow Length Threshold Exceeded for a TCP Flow under Trigger Condition

The flow length condition **exceed** for a TCP flow is configured using Trigger Condition under the service-scheme framework.

Use the following configuration to configure a condition for a TCP flow length:

```
configure
  require active-charging
  active-charging service service_name
    trigger-condition trigger_condition_name
      flow-length threshold exceed
      end
```

NOTES:

- **flow-length**: Specifies the flow length condition for a TCP flow.
- **threshold**: Specifies the threshold value configured in the trigger-action configuration.
- **exceed**: Invokes the exceed condition when the flow length is exceeded.

Monitoring and Troubleshooting

This section provides information regarding monitoring and troubleshooting the feature.

Show Command(s) and/or Outputs

This section provides information regarding show commands and/or their outputs in support of this feature.

show configuration

The output of this command displays the following fields for this feature::

- tcp-acceleration
- tcp-accelration profile tap
- buffer-size downlink *size* uplink *size*
- initial-cwnd-size
- max-rtt
- mss

show tcp-acceleration-profile { [all] | [name *profile-name*] }

The output of this command displays the following fields for this feature:

- TCP Acceleration Profile Name
  - Initial Congestion Window
  - Max RTT
  - MSS
  - Buffer Size (Downlink)
  - Buffer Size (Uplink)
  - Cwnd Gain Factor
  - Cwnd Gain Dynamic
  - Accl Flags
- Total tcp-acceleration-profile found

show active-charging tcp-acceleration info

The output of this command displays the following fields for this feature:

- TCP Acceleration Library Information
  - Version

show active-charging tcp-acceleration statistics sessmgr all

The output of this command displays the following fields for this feature:

- TCP acceleration Statistics

- Total Accelerated Flows
- Current Accelerated Flows
- Released Accelerated Flows
- Rejected Accelerated Flows
  - Feature Not Supported
  - RAT Type Not Supported
  - Bearer Not Supported
  - Resource Not Available (Memory)
  - Others
- Subscriber Level Statistics
  - Total Accelerated Subscribers
  - Current Accelerated Subscribers
- Protocol Level Statistics
  - Total Flows (IPv4 and IPv6)
    - TCP
    - HTTP
    - HTTPS
  - Active Flows (IPv4 and IPv6)
    - TCP
    - HTTP
    - HTTPS
  - Current Idle Flows (IPv4 and IPv6)
    - TCP
    - HTTP
    - HTTPS
  - Clearer by Idle Timer (IPv4 and IPv6)
    - TCP
    - HTTP
    - HTTPS

- Control Statistics
  - IPv4 (User-Side and Inet-Side)
    - TCP Terminations Rx
    - TCP Terminations Tx
  - IPv6 (User-Side and Inet-Side)
    - TCP Terminations Rx
    - TCP Terminations Tx
- Data Statistics
  - IPv4 (User-Side and Inet-Side)
    - Total Pkts Rx
    - Total Bytes Rx
    - Total Pkts Tx
    - Total Bytes Tx
    - HTTP (User-Side and Inet-Side)
      - Total Pkts Rx
      - Total Bytes Rx
      - Total Pkts Tx
      - Total Bytes Tx
      - Retrans Pkts Rx
      - Retrans Bytes Rx
      - Retrans Pkts Tx
      - Retrans Bytes Tx
    - HTTPS (User-Side and Inet-Side)
      - Total Pkts Rx
      - Total Bytes Rx
      - Total Pkts Tx
      - Total Bytes Tx
      - Retrans Pkts Rx
      - Retrans Bytes Rx
      - Retrans Pkts Tx
      - Retrans Bytes Tx

- IPv6 (User-Side and Inet-Side)
  - Total Pkts Rx
  - Total Bytes Rx
  - Total Pkts Tx
  - Total Bytes Tx
  - HTTP (User-Side and Inet-Side)
    - Total Pkts Rx
    - Total Bytes Rx
    - Total Pkts Tx
    - Total Bytes Tx
    - Retrans Pkts Rx
    - Retrans Bytes Rx
    - Retrans Pkts Tx
    - Retrans Bytes Tx
  - HTTPS (User-Side and Inet-Side)
    - Total Pkts Rx
    - Total Bytes Rx
    - Total Pkts Tx
    - Total Bytes Tx
    - Retrans Pkts Rx
    - Retrans Bytes Rx
    - Retrans Pkts Tx
    - Retrans Bytes Tx

show active-charging flows full all

The output of this command displays the following fields for this feature::

- TCP Acceleration

show active-charging trigger-action name *trigger_action_name*

On executing the above command, the following new field(s) are displayed for this feature:

- TCP Acceleration

- TCP Acceleration Treshold

show active-charging trigger-condition name *name*

The output of this command displays the following fields for this feature:

- Post-Processing Rule-name/GOR
- Flow-Length Threshold exceed

Bulk Statistics

The following bulk statistics are added in the **CUSP** schema in support of the Inline TCP Optimization (Phase 2) feature.

Bulk Statistics	Description
tcpaccl-totflows	Indicates the total number of TCP accelerated flows.
tcpaccl-currflows	Indicates the number of current TCP accelerated flows.
tcpaccl-usr-ipv4totpkts-rx	Indicates the total number of IPv4 TCP accelerated packets received from the UE.
tcpaccl-usr-ipv4totbytes-rx	Indicates the total number of IPv4 TCP accelerated bytes received from the UE.
tcpaccl-usr-ipv4totpkts-tx	Indicates the total number of IPv4 TCP accelerated packets sent towards the UE.
tcpaccl-usr-ipv4totbytes-tx	Indicates the total number of IPv4 TCP accelerated bytes sent towards the UE.
tcpaccl-inet-ipv4totpkts-rx	Indicates the total number of IPv4 TCP accelerated packets received from the internet.
tcpaccl-inet-ipv4totbytes-rx	Indicates the total number of IPv4 TCP accelerated bytes received from the internet.
tcpaccl-inet-ipv4totpkts-tx	Indicates the total number of IPv4 TCP accelerated packets sent towards the internet.
tcpaccl-inet-ipv4totbytes-tx	Indicates the total number of IPv4 TCP accelerated bytes sent towards the internet.
tcpaccl-usr-ipv6totpkts-rx	Indicates the total number of IPv6 TCP accelerated packets received from the UE.
tcpaccl-usr-ipv6totbytes-rx	Indicates the total number of IPv6 TCP accelerated bytes received from the UE.
tcpaccl-usr-ipv6totpkts-tx	Indicates the total number of IPv6 TCP accelerated packets sent towards the UE.

Bulk Statistics	Description
tcpaccl-usr-ipv6totbytes-tx	Indicates the total number of IPv6 TCP accelerated bytes sent towards the UE.
tcpaccl-inet-ipv6totpkts-rx	Indicates the total number of IPv6 TCP accelerated packets received from the internet.
tcpaccl-inet-ipv6totbytes-rx	Indicates the total number of IPv6 TCP accelerated bytes received from the internet.
tcpaccl-inet-ipv6totpkts-tx	Indicates the total number of IPv6 TCP accelerated packets sent towards the internet.
tcpaccl-inet-ipv6totbytes-tx	Indicates the total number of IPv6 TCP accelerated bytes sent towards the internet.

The following bulk statistics are added in the **CUSP** schema in support of the Inline TCP Optimization (Phase 3) feature.

Bulk Statistics	Descriptions
tcpaccl-tot-subs	Indicates the total number of subscribers with atleast one TCP accelerated flow.
tcpaccl-curr-subs	Indicates the current number of active subscribers with atleast one TCP accelerated flow.
tcpaccl-ipv4-tot-tcp-flows	Indicates the total number of TCP accelerated IPv4 flows.
tcpaccl-ipv6-tot-tcp-flows	Indicates the total number of TCP accelerated IPv6 flows.
tcpaccl-ipv4-tot-http-flows	Indicates the total number of TCP accelerated IPv4 HTTP flows.
tcpaccl-ipv6-tot-http-flows	Indicates the total number of TCP accelerated IPv6 HTTP flows.
tcpaccl-ipv4-tot-https-flows	Indicates the total number of TCP accelerated IPv4 HTTPS flows.
tcpaccl-ipv6-tot-https-flows	Indicates the total number of TCP accelerated IPv6 HTTPS flows.
tcpaccl-ipv4-curr-tcp-flows	Indicates the current number of active TCP accelerated IPv4 flows.
tcpaccl-ipv6-curr-tcp-flows	Indicates the current number of active TCP accelerated IPv6 flows.
tcpaccl-ipv4-curr-http-flows	Indicates the current number of active TCP accelerated IPv4 HTTP flows.

Bulk Statistics	Descriptions
tcpaccl-ipv6-curr-http-flows	Indicates the current number of active TCP accelerated IPv6 HTTP flows.
tcpaccl-ipv4-curr-https-flows	Indicates the current number of active TCP accelerated IPv4 HTTPS flows.
tcpaccl-ipv6-curr-https-flows	Indicates the current number of active TCP accelerated IPv6 HTTPS flows.
tcpaccl-ipv4-curr-tcp-idleflows	Indicates the current number of idle TCP accelerated IPv4 flows.
tcpaccl-ipv6-curr-tcp-idleflows	Indicates the current number of idle TCP accelerated IPv6 flows.
tcpaccl-ipv4-curr-http-idleflows	Indicates the current number of idle TCP accelerated IPV4 HTTP flows.
tcpaccl-ipv6-curr-http-idleflows	Indicates the current number of idle TCP accelerated IPV6 HTTP flows.
tcpaccl-ipv4-curr-https-idleflows	Indicates the current number of idle TCP accelerated IPV4 HTTPS flows.
tcpaccl-ipv6-curr-https-idleflows	Indicates the current number of idle TCP accelerated IPV6 HTTPS flows.
tcpaccl-ipv4-tcp-flows-idle-timeout	Indicates the total number of TCP accelerated IPv4 flows that are cleared due to idle timeout.
tcpaccl-ipv6-tcp-flows-idle-timeout	Indicates the total number of TCP accelerated IPv6 flows that are cleared due to idle timeout.
tcpaccl-ipv4-http-flows-idle-timeout	Indicates the total number of TCP accelerated IPv4 HTTP flows that are cleared due to idle timeout.
tcpaccl-ipv6-http-flows-idle-timeout	Indicates the total number of TCP accelerated IPv6 HTTP flows that are cleared due to idle timeout.
tcpaccl-ipv4-https-flows-idle-timeout	Indicates the total number of TCP accelerated IPv4 HTTPS flows that are cleared due to idle timeout.
tcpaccl-ipv6-https-flows-idle-timeout	Indicates the total number of TCP accelerated IPv6 HTTPS flows that are cleared due to idle timeout.
tcpaccl-usr-ipv4-tcpterm-rx	Indicates the total number of TCP Reset termination request received from UE for TCP accelerated IPV4 flows.
tcpaccl-usr-ipv6-tcpterm-rx	Indicates the total number of TCP Reset termination request received from UE for TCP accelerated IPV6 flows.

Bulk Statistics	Descriptions
tcpaccl-usr-ipv4-tcpterm-tx	Indicates the total number of TCP Reset termination request sends towards UE for TCP accelerated IPV4 flows.
tcpaccl-usr-ipv6-tcpterm-tx	Indicates the total number of TCP Reset termination request sends towards UE for TCP accelerated IPV6 flows.
tcpaccl-inet-ipv4-tcpterm-rx	Indicates the total number of TCP Reset termination request received from server for TCP accelerated IPV4 flows.
tcpaccl-inet-ipv6-tcpterm-rx	Indicates the total number of TCP Reset termination request received from server for TCP accelerated IPV6 flows.
tcpaccl-inet-ipv4-tcpterm-tx	Indicates the total number of TCP Reset termination request sends towards server for TCP accelerated IPV4 flows.
tcpaccl-inet-ipv6-tcpterm-tx	Indicates the total number of TCP Reset termination request sends towards server for TCP accelerated IPV6 flows.
tcpaccl-usr-ipv4-http-totpkts-rx	Indicates the total number of IPv4 HTTP TCP accelerated packets received from the UE.
tcpaccl-usr-ipv4-http-totbytes-rx	Indicates the total number of IPv4 HTTP TCP accelerated bytes received from the UE.
tcpaccl-usr-ipv4-http-totpkts-tx	Indicates the total number of IPv4 HTTP TCP accelerated packets sent towards the UE.
tcpaccl-usr-ipv4-http-totbytes-tx	Indicates the total number of IPv4 HTTP TCP accelerated bytes sent towards the UE.
tcpaccl-inet-ipv4-http-totpkts-rx	Indicates the total number of IPv4 HTTP TCP accelerated packets received from the internet.
tcpaccl-inet-ipv4-http-totbytes-rx	Indicates the total number of IPv4 HTTP TCP accelerated bytes received from the internet.
tcpaccl-inet-ipv4-http-totpkts-tx	Indicates the total number of IPv4 HTTP TCP accelerated packets sent towards the internet.
tcpaccl-inet-ipv4-http-totbytes-tx	Indicates the total number of IPv4 HTTP TCP accelerated bytes sent towards the internet.
tcpaccl-usr-ipv6-http-totpkts-rx	Indicates the total number of IPv6 HTTP TCP accelerated packets received from the UE.

Bulk Statistics	Descriptions
tcpaccl-usr-ipv6-http-totbytes-rx	Indicates the total number of IPv6 HTTP TCP accelerated bytes received from the UE.
tcpaccl-usr-ipv6-http-totpkts-tx	Indicates the total number of IPv6 HTTP TCP accelerated packets sent towards the UE.
tcpaccl-usr-ipv6-http-totbytes-tx	Indicates the total number of IPv6 HTTP TCP accelerated bytes sent towards the UE.
tcpaccl-inet-ipv6-http-totpkts-rx	Indicates the total number of IPv6 HTTP TCP accelerated packets received from the internet.
tcpaccl-inet-ipv6-http-totbytes-rx	Indicates the total number of IPv6 HTTP TCP accelerated bytes received from the internet.
tcpaccl-inet-ipv6-http-totpkts-tx	Indicates the total number of IPv6 HTTP TCP accelerated packets sent towards the internet.
tcpaccl-inet-ipv6-http-totbytes-tx	Indicates the total number of IPv6 HTTP TCP accelerated bytes sent towards the internet.
tcpaccl-usr-ipv4-https-totpkts-rx	Indicates the total number of IPv4 HTTPS TCP accelerated packets received from the UE.
tcpaccl-usr-ipv4-https-totbytes-rx	Indicates the total number of IPv4 HTTPS TCP accelerated bytes received from the UE.
tcpaccl-usr-ipv4-https-totpkts-tx	Indicates the total number of IPv4 HTTPS TCP accelerated packets sent towards the UE.
tcpaccl-usr-ipv4-https-totbytes-tx	Indicates the total number of IPv4 HTTPS TCP accelerated bytes sent towards the UE.
tcpaccl-inet-ipv4-https-totpkts-rx	Indicates the total number of IPv4 HTTPS TCP accelerated packets received from the internet.
tcpaccl-inet-ipv4-https-totbytes-rx	Indicates the total number of IPv4 HTTPS TCP accelerated bytes received from the internet.
tcpaccl-inet-ipv4-https-totpkts-tx	Indicates the total number of IPv4 HTTPS TCP accelerated packets sent towards the internet.
tcpaccl-inet-ipv4-https-totbytes-tx	Indicates the total number of IPv4 HTTPS TCP accelerated bytes sent towards the internet.
tcpaccl-usr-ipv6-https-totpkts-rx	Indicates the total number of IPv6 HTTPS TCP accelerated packets received from the UE.
tcpaccl-usr-ipv6-https-totbytes-rx	Indicates the total number of IPv6 HTTPS TCP accelerated bytes received from the UE.
tcpaccl-usr-ipv6-https-totpkts-tx	Indicates the total number of IPv6 HTTPS TCP accelerated packets sent towards the UE.

Bulk Statistics	Descriptions
tcpaccl-usr-ipv6-https-totbytes-tx	Indicates the total number of IPv6 HTTPS TCP accelerated bytes sent towards the UE.
tcpaccl-inet-ipv6-https-totpkts-rx	Indicates the total number of IPv6 HTTPS TCP accelerated packets received from the internet.
tcpaccl-inet-ipv6-https-totbytes-rx	Indicates the total number of IPv6 HTTPS TCP accelerated bytes received from the internet.
tcpaccl-inet-ipv6-https-totpkts-tx	Indicates the total number of IPv6 HTTPS TCP accelerated packets sent towards the internet.
tcpaccl-inet-ipv6-https-totbytes-tx	Indicates the total number of IPv6 HTTPS TCP accelerated bytes sent towards the internet.
tcpaccl-usr-ipv4-http-pktsretrans-tx	Indicates the total number of packets retransmitted towards the UE for TCP accelerated IPV4 HTTP flows.
tcpaccl-usr-ipv4-http-pktsretrans-rx	Indicates the total number of retransmitted packets received from the UE for TCP accelerated IPV4 HTTP flows.
tcpaccl-usr-ipv4-http-bytesretrans-tx	Indicates the total number of bytes retransmitted towards the UE for TCP accelerated IPV4 HTTP flows.
tcpaccl-usr-ipv4-http-bytesretrans-rx	Indicates the total number of retransmitted bytes received from the UE for TCP accelerated IPV4 HTTP flows.
tcpaccl-inet-ipv4-http-pktsretrans-tx	Indicates the total number of packets retransmitted towards the server for TCP accelerated IPV4 HTTP flows.
tcpaccl-inet-ipv4-http-pktsretrans-rx	Indicates the total number of retransmitted packets received from the server for TCP accelerated IPV4 HTTP flows.
tcpaccl-inet-ipv4-http-bytesretrans-tx	Indicates the total number of bytes retransmitted towards the server for TCP accelerated IPV4 HTTP flows.
tcpaccl-inet-ipv4-http-bytesretrans-rx	Indicates the total number of retransmitted bytes received from the server for TCP accelerated IPV4 HTTP flows.
tcpaccl-usr-ipv6-http-pktsretrans-tx	Indicates the total number of packets retransmitted towards the UE for TCP accelerated IPV6 HTTP flows.

Bulk Statistics	Descriptions
tcpaccl-usr-ipv6-http-pktsretrans-rx	Indicates the total number of retransmitted packets received from the UE for TCP accelerated IPV6 HTTP flows.
tcpaccl-usr-ipv6-http-bytesretrans-tx	Indicates the total number of bytes retransmitted towards the UE for TCP accelerated IPV6 HTTP flows.
tcpaccl-usr-ipv6-http-bytesretrans-rx	Indicates the total number of retransmitted bytes received from the UE for TCP accelerated IPV6 HTTP flows.
tcpaccl-inet-ipv6-http-pktsretrans-tx	Indicates the total number of packets retransmitted towards the server for TCP accelerated IPV6 HTTP flows.
tcpaccl-inet-ipv6-http-pktsretrans-rx	Indicates the total number of retransmitted packets received from the server for TCP accelerated IPV6 HTTP flows.
tcpaccl-inet-ipv6-http-bytesretrans-rx	Indicates the total number of retransmitted bytes received from the server for TCP accelerated IPV6 HTTP flows.
tcpaccl-usr-ipv4-https-pktsretrans-tx	Indicates the total number of packets retransmitted towards the UE for TCP accelerated IPV4 HTTPS flows.
tcpaccl-usr-ipv4-https-pktsretrans-rx	Indicates the total number of retransmitted packet received from the UE for TCP accelerated IPV4 HTTPS flows.
tcpaccl-usr-ipv4-https-bytesretrans-tx	Indicates the total number of bytes retransmitted towards the UE for TCP accelerated IPV4 HTTPS flows.
tcpaccl-usr-ipv4-https-bytesretrans-rx	Indicates the total number of retransmitted bytes received from the UE for TCP accelerated IPV4 HTTPS flows.
tcpaccl-inet-ipv4-https-pktsretrans-tx	Indicates the total number of packets retransmitted towards the server for TCP accelerated IPV4 HTTPS flows.
tcpaccl-inet-ipv4-https-pktsretrans-rx	Indicates the total number of retransmitted packet received from the server for TCP accelerated IPV4 HTTPS flows.
tcpaccl-inet-ipv4-https-bytesretrans-tx	Indicates the total number of bytes retransmitted towards the server for TCP accelerated IPV4 HTTPS flows.

Bulk Statistics	Descriptions
tcpaccl-inet-ipv4-https-bytesretrans-rx	Indicates the total number of retransmitted bytes received from the server for TCP accelerated IPV4 HTTPS flows.
tcpaccl-usr-ipv6-https-pktsretrans-tx	Indicates the total number of retransmitted bytes received from the server for TCP accelerated IPV4 HTTPS flows.
tcpaccl-usr-ipv6-https-pktsretrans-tx	Indicates the total number of packets retransmitted towards the UE for TCP accelerated IPV6 HTTPS flows.
tcpaccl-usr-ipv6-https-pktsretrans-rx	Indicates the total number of retransmitted packets received from the UE for TCP accelerated IPV6 HTTPS flows.
tcpaccl-usr-ipv6-https-bytesretrans-tx	Indicates the total number of bytes retransmitted towards the UE for TCP accelerated IPV6 HTTPS flows.
tcpaccl-usr-ipv6-https-bytesretrans-rx	Indicates the total number of retransmitted bytes received from the UE for TCP accelerated IPV6 HTTPS flows.
tcpaccl-inet-ipv6-https-pktsretrans-tx	Indicates the total number of packets retransmitted towards the server for TCP accelerated IPV6 HTTPS flows.
tcpaccl-inet-ipv6-https-pktsretrans-rx	Indicates the total number of retransmitted packets received from the server for TCP accelerated IPV6 HTTPS flows.
tcpaccl-inet-ipv6-https-bytesretrans-tx	Indicates the total number of bytes retransmitted towards the server for TCP accelerated IPV6 HTTPS flows.
tcpaccl-inet-ipv6-https-bytesretrans-rx	Indicates the total number of retransmitted bytes received from the server for TCP accelerated IPV6 HTTPS flows.