

Crowd Sourcing 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 - License Required
Related Changes in this Release	Not Applicable
Related Documentation	• *P-GW Administration Guide* • *Command Line Interface Reference* • *Statistics and Counters Reference*

Revision History

Revision Details	Release
First Introduced.	21.23

Feature Description

The Crowd Sourcing Optimization feature uses historical data sessions to provide an increase in recovered capacity from active elephants through seeding profiles and more rapid learning of cell conditions and capabilities.

Crowd Sourcing Optimization feature allows

- Reporting of real-time and historical cell characteristics that capture performances of traffic flows.
- Handling of traffic from the same subscriber by the same session manager.
- Location update enablement.
- Reporting to Cisco Ultra Traffic Optimization library based on the ECGI change instead of ULI change.
- Crowd Sourcing information on each VPP instance.



Note The Crowd Sourcing Optimization feature works only if P-GW learns about user location (for example, from MME). Hence, you should enable the User Location Information update.

Relationship to Other Feature

The Crowd Sourcing Optimization feature is related to Cisco Ultra Traffic Optimization functionality. For details, see the *Cisco Ultra Traffic Optimation* chapter in the *P-GW Administration Guide*.

Licensing

The Crowd Sourcing Optimization feature requires Feature Pack1 license. 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 Crowd sourcing optimization procedure describes:

- Handling ECGI Information
- Enhanced elephant detection mechanism
- Trial Mode mechanism

Handling ECGI Information

Following is the workflow for processing ECGI data:

- When P-GW records the ULI information it receives the session creation request.
- P-GW experiences the traffic, recorded ULI information is reported to CUTO during flow creation.
- During the location update, new ULI information is received in bearer modification request during mid flows. All the flows of respective subscribers gets onloaded and new ULI information is reported through CUTO stream modification and streams get offloaded again once rule is matched.

  Under the “CUTO Upgrade Pack 1” license:

  - Reporting of the ULI information is generated based on CUTO algorithm.
  - ULI type and ECGI information gets captured in TODR after the end of flow in multiple phases. It helps for analysis of flows in scale scenario.

Enhanced Elephant Detection Mechanism

Detection of elephant logic, which is based on byte-based, time-based, or bytes-and-time-based thresholds, are added in the configuration CLI as follows.

- Detection mechanism is grouped under the following two modes:
  - **Base Mode**: In Base mode, threshold bytes parameter value is considered.
  - **Enhanced Mode**: In Enhanced mode, combinations of threshold bytes and seed-time values are considered.

  Flows become elephant when either of them crosses first.

  Note Seed time is applicable in enhanced mode of detection. Ensure to activate Seed Time and Detection Mode CLI options under the CUTO Upgrade Pack1 license to view all parameters in the CLI.

- Detections of the elephant flows are based on the cuto base policy configuration parameters (seed-time, detection-mode) and CUTO does not consider extended based policy parameters in detection algorithm. CLI throws warning as:

```
Seed-time configured will not take effect for detection. Please configure
under heavy-session” when it’s getting configured.
```

- Detection-cause (time or bytes) and cuto mode (Active/Passive) are recorded in TODR, which helps in the analysis of flows in scale. Detection-cause is recorded under “CUTO Upgrade Pack 1” license and cuto-mode is recorded without any license and applicable for the base CUTO license as well.

Trial Mode

Trail Mode allows the feature to schedule a A/B test campaign from within the P-GW that alternates active and passive modes at regular intervals to demonstrate CUTO’s network efficacy.The Trial Mode operates under the traffic-optimization license or Cisco Ultra Traffic Optimization suppression license, but does not

need the“CUTO feature pack 1” license to turn it on. Service Request (SR) is supported as Trial Mode is applicable only on the Active chassis, however, ICSR is not supported.



Important Make sure to disable Trial Mode before making any changes in the **cuto-profile** because no changes are allowed in the **cuto-profile** during Trial Mode.

Configuring Detection Mode for Elephant Detection Mechanism

Detection of elephant logic that is based on byte-based, time-based or bytes-and-time-based thresholds are added in the configuration CLI as follows.

```
configure
   active-charging service service_name
      [ no ] traffic-optimization-policy policy_name[extended]
         default detection-mode
         detection-mode
        [ no ] heavy-session { standard-flow-timeout  standard_flow-timeout_value
  threshold threshold_value  seed-time seed_time_value }
         end
```

NOTES:

- **default**: Default configuration for detection-mode.
- **detection-mode**: Configures heavy-session detection mode. The default value for detection mode is "enhanced".
- **heavy-session**: Configures heavy-session detection related parameters.
- **seed-time**: Configures time in ms for detection of elephant flow. Use this parameter in the enhanced detection mode.

Configuring Crowd Source Optimization in trial-mode

Use the following CLI commands to enable the Crowd Sourcing Optimization feature in trial-mode.

```
configure
   require active-charging
   active-charging service service_name
      traffic-optimization-profile
         trial-mode  start-time YYYYMMDDHHMM end-time YYYYMMDDHHMM
mode-toggle-interval mode_toggle_interval initial-mode initial_active |
initial_passive
         end
```

NOTES:

- **trial-mode**: Enables the Crowd Sourcing Optimation feature in the Trial Mode.
- **start-time** : Local time begins trial in YYYY:MM:DD:HH:MM.

- **end-time** : Local time ends trial in YYYY:MM:DD:HH:MM.
- **toggle-mode-interval** : Provides interval in minutes to toggle the CUTO mode toggling between Active and Passive at interval. Interval can be at 15, 30, 60 minutes. Starting interval is at 15 minutes.
- **initial-mode** : Set the initial mode with Active or Passive when trial starts.
  - active: Start the trial mode with CUTO mode as active.
  - passive: Start the trial mode with CUTO mode as passive

Monitoring and Troubleshooting

This section provides information regarding commands available to monitor and troubleshoot the Crowd Sourcing Optimization solution on the P-GW.

Show Commands and Outputs

This section provides information about show commands and the fields that are introduced in support Crowd Sourcing Optimization solution.

show active-charging traffic-optimization policy all

Shows configured values of heavy-sessions, extended-heavy-session at active charging service level and traffic optimization policy.

Table 1:

Field	Description
Heavy-Session: Shows heavy-session detection related parameters.	
Seed-Time	Displays time in milliseconds for detection of elephant flow.
Detection-Mode: Shows heavy-session detection mode (Default: enhanced).	
Extended Heavy-Session: Shows heavy-session detection related parameters for extended policy	
Seed-Time	Displays time in milliseconds for detection of elephant flow.