

Using Exinda with the IP ToS/DiffServ Field

Award Winning Application Traffic Management Solutions ::
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Introduction

The ToS (type of service) or DiffServ (differentiated services) field in the IP header is used to classify IP packets so that routers can make QoS (quality of service) decisions about what path packets should traverse across the network. For example, users may want ensure that VoIP utilizes high quality, low-latency (and expensive) links, or, they might want to ensure email or recreational traffic uses cheaper (but less reliable) links.

Previously, there were 5 different categories that users could classify their traffic with using the IP ToS field (see [RFC 791](#)).

- Normal Service
- Minimize Cost
- Maximize Reliability
- Maximize Throughput
- Minimize Delay

These have since been replaced by a new set of values called DSCP (DiffServ Code Points, see [RFC 2474](#)). A DSCP is a 6-bit number; therefore, there are 64 possible DSCP combinations, of which, only a portion have been standardized and are listed below.

DSCP Class (name)	Binary Value	Decimal Value
BE (best effort, default)	000000	0
AF11 (assured forwarding, see RFC 2597)	001010	10
AF12	001100	12
AF13	001110	14
AF21	010010	18
AF22	010100	20
AF23	010110	22
AF31	011010	26
AF32	011100	28
AF33	011110	30
AF41	100010	34
AF42	100100	36
AF43	100110	38
CS1 (class selector)	001000	8
CS2	010000	16
CS3	011000	24
CS4	100000	32
CS5	101000	40
CS6	110000	48
CS7	111000	56
EF (expedited forwarding, see RFC 2598)	101110	46

How Exinda uses these fields?

All Exinda products can read and write the ToS/DiffServ field allowing users to:

- **Match** packets with a ToS/DSCP value and apply optimizer policies to this traffic.
- **Mark** the packets with a ToS/DSCP value based on source/destination host/subnet, source/destination port, layer 7 application, time of day, vlan id, etc.

Matching Packets

When defining policies on the Exinda appliance, there is a ToS/DSCP dropdown that allows users to match only those packets with the specified ToS/DSCP value.

Add New VC Policy

Policy Name:

VC Policy Number:

Schedule:

Action:

Policy Enabled:

Guaranteed Bandwidth: %
 Burst (Max) Bandwidth: %
 Burst Priority:
 Acceleration:
 ToS/DSCP Mark:

VLAN	Host	Direction	Host	ToS/DSCP	Application
<input type="text"/>	<input type="text"/>	<input type="text" value="< - >"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="< - >"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="< - >"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="< - >"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Users can select the appropriate DSCP/ToS value from this dropdown field and any packets that match this ToS/DSCP value will be applied to this policy.

Example:

VoIP equipment in a user's network may be configured to mark all outgoing packets as DSCP EF (decimal 46). VoIP is a real-time application and the user wishes to prioritize this with a high priority policy that guarantees VoIP a certain amount of WAN bandwidth. To achieve this, the user selects 'DSCP 46' from the ToS/DSCP dropdown and configures the appropriate bandwidth allocation in this policy.

Marking Packets

Users may want to mark certain packets with a ToS/DSCP value so that external routers can treat the traffic appropriately. The same policy configuration screen above allows users to configure such an action.

When the policy action is set to 'Optimize', several options are available on the right-hand side, one of which is the 'ToS/DSCP Mark'. Users will need to enable this feature by checking the box and selecting the appropriate ToS/DSCP mark from the dropdown.

Any traffic that matches the corresponding filter rules will then be marked with the specified value and should be treated appropriately by routing equipment down the line.

Example:

Service Providers may provide users with a table similar to the one below (example only). Each class has different guaranteed service and pricing levels. This information should be used in conjunction with optimizer policies to implement and ensure quality of service.

Traffic Priority Class	IETF DiffServ Traffic Priority Class	DSCP Setting
Real Time (Gold)	Expedited Forwarding	EF
Mission Critical (Silver High)	Assured Forwarding	AF31
Business Critical (Silver Low)	Assured Forwarding	AF32/33
General Business (Bronze)	Best Effort	BE

Summary

Exinda appliances can read and write ToS/DSCP marks in packets allowing users fine-grained control of classification of applications that are marked with Tos/DSCP values as well as applying marking policies to ensure traffic is treated appropriately by onward network equipment.

Used in conjunction with Exinda's superior classification techniques, including advanced layer 7 detection, users have complete control of how traffic is marked and subsequently treated in the WAN cloud.

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About Exinda Networks

Exinda Networks is a global supplier of Unified Performance Management that integrates WAN optimisation, application acceleration, application visibility and application response time measurements for enterprise, government and service provider clients. Founded in 2002, Exinda's mission is to ensure optimal and consistent application performance over the WAN and reduce network operating costs. Exinda has more than 1,000 customers in more than 35 countries around the world. Exinda's 4700 appliance received ZDnet's Technology & Business magazine's 2005 Editor's Choice Award for ease of use and excellence in traffic

monitoring and reporting. Exinda's award winning technology is available by contacting leading resellers or Exinda directly.

Exinda's research and development offices are located in Melbourne, Australia. Exinda's U.S. headquarters is located in Boston, Massachusetts. Additional corporate offices are located in Frankfurt, London and Kuala Lumpur. For more information, visit www.exinda.com