Standard Configuration of DiffServ Service Classes
at IETF83

draft-polk-tsvwg-new-dscp-assignments-00.txt

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Purpose of the drafts

- To specify DiffServ service class traffic characteristics, with associated DSCP name and value

- First draft proposes to obsolete RFC 4594

- Also proposed currently as standards track

- Second draft merely creates the new DiffServ values needed by the update draft

- NOTE: RFC 5127 is for Aggregating DiffServ Classes

Particulars within RFC 4594 update

- Built on text from RFC 4594 (from this WG)
- Updates to included Voice-Admit from RFC 5865
- Adds several more Capacity Admitted Service classes for
  - (newly modified) Realtime-Interactive
  - Broadcast
  - (new) Hi-Res service class
  - (newly modified) Multimedia-Conferencing
- Also adds non-capacity-admitted service classes:
  - (newly modified) Multimedia-Conferencing
  - (newly modified) Conversational Signaling

Particulars within RFC 4594 update

- Differences between traffic characteristics between service classes requires too much time for this preso…

  … but I'll try

  – Please read the draft for these details
  – If you don't fall asleep, send mail to the list if you have comments.

List of Service Classes Unchanged

- Multimedia-Streaming
  - Remains the same
- High-Throughput Data
  - Remains the same
- Low-Priority Data
  - Remains the same
- Default Forwarding
  - Remains the same
- Network Routing
  - Remains the same
- OAM
  - Remains the same

List of Service Classes Modified or New

Now "Conversational" traffic types

- Realtime-Interactive
  - Moved to (near) realtime TCP apps
- Audio
  - Same as Telephony (which is gone), adds Voice-Admit for capacity-admitted traffic
- Video
  - NEW for video and audio/video conferencing, was Multimedia-Conferencing
- Hi-Res
  - NEW for video and audio/video conferencing
- Multimedia-Conferencing
  - Now without audio or human video
- Broadcast
  - Remains the same, added CS3 for capacity-admitted
- Low-Latency Data
  - Remains the same, adds IM & Presence explicitly
- Conversational Signaling
  - Was 'Signaling'

New Figure 1. User/Subscriber Service Classes Grouping

Application Categories	Service Class	Signaled	Flow Behavior	G.1010 Rating
Application Control	A/V Sig	Not applicable	Inelastic	Responsive
Media-Oriented	Real-Time Interactive	Yes	Inelastic	Interactive
	Audio	Yes	Inelastic	Interactive
	Video	Yes	Inelastic	Interactive
	Hi-Res	Yes	Inelastic	Interactive
	Multimedia Conferencing	Yes	Rate Adaptive	Moderately Interactive
	Broadcast	Yes	Inelastic	Responsive
	Multimedia Streaming	Yes	Elastic	Timely
Data	Low-Latency Data	No	Elastic	Responsive
	High-Throughput Data	No	Elastic	Timely
	Low-Priority Data	No	Elastic	Non-critical
Best Effort	Standard	Not Specified		Non-critical

New Figure 2. Service Class Characteristics (1/2)

```
+-----------------------------------------------------------------+
|Service Class  |                           |   Tolerance to      |
|    Name       |  Traffic Characteristics  | Loss |Delay |Jitter|
|===============+===========================+======+======+======|
|   Network     |Variable size packets, mostly |      |      |      |
|   Control     |inelastic short messages, but | Low  | Low  | Yes  |
|               |traffic can also burst (BGP)  |      |      |      |
|---------------+---------------------------+------+------+------|
|   Real-Time   | Inelastic, mostly variable | Low  | Very | Low  |
|   Interactive | rate                       |      | Low  |      |
+---------------+---------------------------+------+------+------+
|               | Fixed-size small packets,  | Very | Very | Very |
|   Audio       | inelastic                  | Low  | Low  | Low  |
|               |                            |      |      |      |
+---------------+---------------------------+------+------+------+
|               | Fixed-size small-large     | Very | Very | Very |
|   Video       | packets, inelastic         | Low  | Low  | Low  |
|               |                            |      |      |      |
+---------------+---------------------------+------+------+------+
|               | Fixed-size small-large     | Very | Very | Very |
|   Hi-Res A/V  | packets, inelastic         | Low  | Low  | Low  |
|               |                            |      |      |      |
+---------------+---------------------------+------+------+------+
```

New Figure 2. Service Class Characteristics (2/2)

```
+----------------------------------------------------------------------+
|Service Class |                                | Tolerance to        |
|    Name      | Traffic Characteristics        | Loss |Delay |Jitter|
|==============+================================+======+======+======|
|  Multimedia  | Variable size packets,         | Low  | Low  | Low  |
|  Conferencing| constant transmit interval,    |  -   |  -   |  -   |
|              | rate adaptive, reacts to loss  |Medium|Medium|Medium|
+--------------+--------------------------------+------+------+------+
|  Multimedia  | Variable size packets,         |Low - |Medium| High |
|  Streaming   | elastic with variable rate     |Medium|      |      |
+--------------+--------------------------------+------+------+------+
|  Broadcast   | Constant and variable rate,    | Very |Medium|  Low |
|              | inelastic, non-bursty flows    | Low  |      |      |
+--------------+--------------------------------+------+------+------+
|  Low-Latency | Variable rate, bursty short-   | Low  |Low - |  Yes |
|     Data     |  lived elastic flows           |      |Medium|      |
|--------------+--------------------------------+------+------+------+
|Conversational| Variable size packets, some    | Low  | Low  |  Yes |
|   Signaling  | what bursty short-lived flows  |      |      |      |
|--------------+--------------------------------+------+------+------+
|   OAM        |   Variable size packets,       | Low  |Medium|  Yes |
|              |   elastic & inelastic flows    |      |      |      |
|--------------+--------------------------------+------+------+------+
|   High-      | Variable rate, bursty long-    | Low  |Medium|  Yes |
|Throughput Data|   lived elastic flows         |      |- High|      |
|--------------+--------------------------------+------+------+------+
|  Standard    | A bit of everything            |   Not Specified    |
|--------------+--------------------------------+------+------+------+
|  Low-Priority| Non-real-time and elastic      | High | High |  Yes |
|     Data     |                                |      |      |      |
+----------------------------------------------------------------------+
```

New Figure 3. DSCP to Service Class Mapping (1/2)

```
+----------------------------------------------------------------------+
|    Service      |  DSCP   |    DSCP     |        Application          |
|  Class Name     |  Name   |   Value     |         Examples            |
|================+=========+=============+============================|
|Network Control| CS6&CS7 |    11xxxx    | Network routing             |
|---------------+---------+-------------+----------------------------|
|   Real-Time     | CS5,    |   101000,    | Remote/Virtual Desktop      |
|   Interactive   |CS5-Admit|   101001     | and Interactive gaming      |
|---------------+---------+-------------+----------------------------|
|   Audio         |   EF    |   101110     | Voice bearer                |
|                 |Voice-Admit| 101100    |                             |
|---------------+---------+-------------+----------------------------|
|   Hi-Res A/V    | CS4,    |   100000,    | Conversational Hi-Res       |
|                 |CS4-Admit|   100001     | Audio/Video bearer          |
|---------------+---------+-------------+----------------------------|
|   Video         |AF41,AF42|100010,100100| Audio/Video conferencing    |
|                 |  AF43   |   100110     | bearer                      |
|---------------+---------+-------------+----------------------------|
|   Multimedia    |  MC,    |   011101,    | Presentation Data and       |
|   Conferencing  | MC-Admit|   100101     | App Sharing/Whiteboarding   |
|---------------+---------+-------------+----------------------------|
```

New Figure 3. DSCP to Service Class Mapping (2/2)

```
+---------------------------------------------------------------------+
|   Service     | DSCP    |   DSCP     |      Application            |
| Class Name    | Name    |   Value    |      Examples               |
|===============+=========+============+=============================|
|  Multimedia   |AF31,AF32|011010,011100| Streaming video and        |
|  Streaming    |  AF33   |   011110   | audio on demand             |
|---------------+---------+------------+-----------------------------|
|  Broadcast    | CS3,    |   011000,  | Broadcast TV, live events|
|               |CS3-Admit|   011001   | & video surveillance       |
|---------------+---------+------------+-----------------------------|
|  Low-Latency  |AF21,AF22|010010,010100|Client/server trans., Web-|
|  Data         |  AF23   |   010110   |based ordering, IM/Pres     |
|---------------+---------+------------+-----------------------------|
|Conversational | A/V-Sig |   010001   | Conversational signaling |
|  Signaling    |         |            |                             |
|---------------+---------+------------+-----------------------------|
|  OAM          | CS2     |   010000   | OAM&P                       |
|---------------+---------+------------+-----------------------------|
|High-Throughput|AF11,AF12|001010,001100| Store and forward          |
|  Data         |  AF13   |   001110   | applications                |
|---------------+---------+------------+-----------------------------|
|  Low-Priority | CS1     |   001000   | Any flow that has no BW   |
|  Data         |         |            | assurance                   |
|---------------+---------+------------+-----------------------------|
|  Best Effort  | CS0     |   000000   | Undifferentiated           |
|               |         |            | applications                |
+---------------------------------------------------------------------+
```

New Figure 4. Summary of CoS Mechanisms Used for Each Service Class (1/2)

```
+-----------------------------------------------------------------+
|  Service     |  DSCP | Conditioning at    |  PHB  | Queuing| AQM|
|  Class       |       |    DS Edge         | Used  |        |    |
|==============+=======+====================+=======+========+====|
|Network Control|CS6/CS7| See Section 3.1   |RFC2474|  Rate  | Yes|
|--------------+-------+------------------+-------+--------+----|
| Real-Time    | CS5,  |Police using sr+bs |RFC2474|  Rate  | No |
| Interactive  | CS5-  |                   |       |        |    |
|              | Admit*|               |[ID-DSCP]|        |    |
|--------------+-------+------------------+-------+--------+----|
|              |  EF,  |Police using sr+bs |RFC3246|Priority| No |
|   Audio      |Voice- |                   |       |        |    |
|              | Admit*|               |RFC5865|        |    |
|--------------+-------+------------------+-------+--------+----|
|              | CS4,  |Police using sr+bs |RFC2474|Priority| No |
|  Hi-Res A/V  | CS4-  |                   |       |        |    |
|              | Admit*|               |[ID-DSCP]|        |    |
|--------------+-------+------------------+-------+--------+----|
|              | AF41*,|  Using two-rate,  |       |        | Yes|
|   Video      |  AF42 |three-color marker |RFC2597|  Rate  | per|
|              |  AF43 | (such as RFC 2698)|       |        |DSCP|
|--------------+-------+------------------+-------+--------+----|
| Multimedia   | MC,   |Police using sr+bs|[ID-DSCP]|  Rate  | No |
| Conferencing | MC-   |                   |       |        |    |
|              | Admit*|               |[ID-DSCP]|        |    |
|--------------+-------+------------------+-------+--------+----|
```

New Figure 4. Summary of CoS Mechanisms Used for Each Service Class (2/2)

```
+--------------------------------------------------------------------+
|   Service     |  DSCP  | Conditioning at   |  PHB   | Queuing| AQM|
|   Class       |        |   DS Edge         |  Used  |        |    |
|===============+========+===================+========+========+====|
|  Multimedia   | AF31*, |   Using two-rate, |        |        |Yes |
|  Streaming    |  AF32  |three-color marker |RFC2597 |  Rate  |per |
|               |  AF33  | (such as RFC 2698)|        |        |DSCP|
|---------------+--------+-------------------+--------+--------+----|
|  Broadcast    | CS3,   |Police using sr+bs |RFC2474 |  Rate  | No |
|               | CS3-   |                   |        |        |    |
|               | Admit* |                  |[ID-DSCP]|        |    |
|---------------+--------+-------------------+--------+--------+----|
|    Low-       | AF21   | Using single-rate,|        |        |Yes |
|    Latency    | AF22   |three-color marker |RFC2597 |  Rate  |per |
|    Data       | AF23   | (such as RFC 2697)|        |        |DSCP|
|---------------+--------+-------------------+--------+--------+----|
|Conversational |AV-Sig  |Police using sr+bs |[ID-DSCP]|  Rate | No |
|  Signaling    |        |                   |        |        |    |
|---------------+--------+-------------------+--------+--------+----|
|    OAM        | CS2    |Police using sr+bs |RFC2474 |  Rate  |Yes |
|---------------+--------+-------------------+--------+--------+----|
|    High-      | AF11   |   Using two-rate, |        |        |Yes |
|  Throughput   | AF12   |three-color marker |RFC2597 |  Rate  |per |
|    Data       | AF13   | (such as RFC 2698)|        |        |DSCP|
|---------------+--------+-------------------+--------+--------+----|
|   Standard    | DF     | Not applicable    |RFC2474 |  Rate  |Yes |
|---------------+--------+-------------------+--------+--------+----|
| Low-Priority  | CS1    | Not applicable    |RFC3662 |  Rate  |Yes |
|    Data       |        |                   |        |        |    |
|---------------+--------+-------------------+--------+--------+----|
```

What's Next?

- Need reviewers and comments