



Channel Access



Quality of Service Enhancements



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■ Internet Protocol TOS Octet

- All version 4 internet frames include a Type of Service (TOS) field in the IP header
 - IPV6 has similar Traffic Class (TC) field
- Internet kernels and internet routers and can prioritize packet flow based on this field
 - Not universally supported
 - Not universally policed on input

Traditional TOS Octet Interpretation

■ Precedence 3 Bit Field

- Routine
- Priority
- Immediate
- Flash
- Flash Override
- Critical Functions
- Internet Work Control
- Network Control

■ Service 3 Bit Field

- Normal best effort
- Minimize metered cost
- Maximize reliability
- Maximize throughput
- Minimize Delay

DiffServ Code Point (DSCP) TOS Octet Interpretation

- Precedence 3 Bit Field
 - Best Effort
 - Class 1
 - Class 2
 - Class 3
 - Class 4
 - Express Forwarding
 - Internet Work Control
 - Network Control
- Service 3 Bit Field
 - Used for finer granularity

CA Channel Priority

- Specified in client application when creating a channel
 - Ranging 0 (lowest) through 99 (highest)
 - R3.14 CA Client Library required
- Priority level for dispatch within the client, server, or network
 - Currently implemented only in the server
 - New virtual circuit created for each unique priority level specified

CA Channel Priorities — Intentionally Abstract

- CA Channel Priorities are intentionally abstract so as to allow mapping to a range of different underlying priority systems
 - Thread (operating system)
 - Transport Protocol (Internet Protocol)
 - Link (hardware)

Mapping Channel Priority to Internet Quality of Service

- Router and IP Kernel Interpretation of TOS will vary
 - Site specific configuration important
- Predictable behavior
 - Use of increasing CA channel priority should result in some appropriate changes in behavior
 - Multiple divergent mappings based on per-user whim could be sub-optimal

Mapping Channel Priority to Internet Quality of Service

- Desirable to limit configuration complexity and avoid nonsensical mappings
- Can we identify a limited set of TOS field interpretations?
 - If so, we could hardwire mappings for this limited set
 - EPICS environment variables would choose between them
- Otherwise, all mapping details could be included in an environment variable
 - Complex environment variable syntax
 - Potential for unpredictable site wide behavior

■ ■ Implementation Details

- IP_TOS socket option to set TOS octet
 - Hopefully uniform portable behavior on a range of OS without OS dependent stub based implementation
- Should access security in the server limit the priority ranges allowed to connect?
 - Limited based on the client's user and host name

■ Possible Mapping

- CA Priorities 0 – 99 map to DSCP class0 through class1 in the precedence 3 bit field
- Service 3 bit field set to Normal Best Effort
 - We might also consider finer priority mapping granularity offered by certain DSCP implementations, but this would probably require an environment variable for site specific configuration