Channel Access Multicast Upgrades

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Multicasting Functional Benefits

- On Ethernet this implies improved hardware filtering compared to Ethernet broadcasts
- On the internet this implies improved routing of one to many traffic

IP Multicast Fundamentals

- Special IP address range for multicasts
- Clients send UDP datagrams to one of these addresses
- Server joins multiple multicast groups
  - listens to multicasts sent to these groups

IP Multicast — Benefits for EPICS

- Set up EPICS tightly coupled domains
  - Domains need not be constrained by IP subnet topology
  - Simplify configuration when segmenting EPICS system into multiple domains

IP Multicast Benefits

- If EPICS system were purely multicast based
  - This is a design decision to *not* use ordinary broadcasts and unicasts for search messages and beacon messages
    - Eliminate quirks associated with multiple servers listening on the same port
    - Phase out CA repeater
  - CA Repeater source code may still need to exist for backwards compatibility at sites that continue to use unicasts
    - Needs further consideration

IP Multicast Benefits

- Possibly less load on Ethernet attached micro-controllers
  - Hardware filtering of Ethernet multicasts
  - Software filtering of IP broadcasts

Administratively Scoped IP Multicast Addressing

- Internet global multicast group identifiers assigned by IANA
  - Scarce in IPv4
- Administratively scoped IP multicast addressing – RFC 2365
  - Router configuration limits scope of multicasts on defined routing boundaries
  - Allows site assignment of multicast group identifiers
  - Somewhat like the NAT approach to IP address assignment

EPICS Architecture Implications

- Servers and clients will be configured to be a member of a tightly coupled domain
  - Linac, booster, ring …
  - Will servers and clients be permitted to be members of more than one domain

Configuration

- Need to decide at what level configuration will be done
  - IP address level
  - Multicast group ID
  - Mnemonic level
    - Define LINAC CA group and assign it a multicast address
    - Clients and servers are configured to be a member of the LINAC group