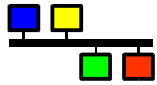
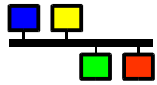


**EPICS**



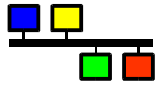
# *Channel Access Configuration*

Bob Dalesio  
LANL



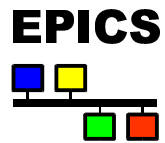
## *Configuration method*

- ◆ CA clients and servers can be configured by setting environment variables
- ◆ On Unix:
  - ◆ `csh, tcsh` – `setenv VARNAME value`
  - ◆ `sh, ksh` – `VARNAME=value; export VARNAME`
  - ◆ `printenv` displays all variables from any shell
- ◆ On vxWorks:
  - ◆ `putenv "VARNAME=value"`
  - ◆ `envShow` displays all variable values
- ◆ Environment variables are inherited when you start a new program, not afterwards
  - ◆ Unix: Set the variables, then start the client
  - ◆ vxWorks: Set variables in the startup script
- ◆ Default values for a site are set at build-time in `<epics>/base/config/CONFIG_ENV` and `<epics>/base/config/CONFIG_SITE_ENV`



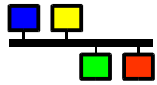
## *CA name resolution*

- ◆ Search requests for CA channel names are broadcast to all CA servers on the client's local TCP/IP subnet
- ◆ Only a server which recognizes the name will respond to the client
  - ◆ If identical record names exist in two IOCs, the first to reply "wins" the connection
- ◆ The client library then opens a connection with that server to access that channel
- ◆ Potential problems:
  - ◆ Not all LANs support broadcasting
    - ◆ Ethernet does, Token Ring doesn't
  - ◆ Some sites don't allow broadcasting
    - ◆ Bridges/hubs will not forward packets
  - ◆ Broadcasts are local to the machine's subnet
    - ◆ Sites can span more than a single subnet



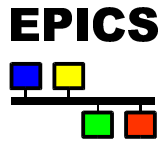
# Configuring name resolution

- ◆ How to disable all broadcasts?
  - ◆ `EPICS_CA_AUTO_ADDR_LIST = NO`
  - ◆ Default value = YES
  - ◆ IOCs are also clients, so generate broadcasts
- ◆ How to find channels without broadcast?
  - ◆ `EPICS_CA_ADDR_LIST`
  - ◆ List of IP addresses, separated by spaces
    - `setenv EPICS_CA_ADDR_LIST "164.54.8.145"`
  - ◆ This list is used in addition to broadcasts if these are enabled
- ◆ How to search other subnets as well?
  - ◆ Use a broadcast address in `EPICS_CA_ADDR_LIST`
    - `setenv EPICS_CA_ADDR_LIST "131.111.69.255"`
  - ◆ Some routers will not pass broadcast addresses



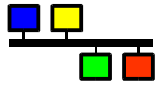
## *Connection health*

- ◆ CA servers send out an “I’m still here” beacon ever 15 seconds
  - ◆ Usually broadcast, configurable as before
- ◆ If a server is quiet for 30 seconds, any connected clients will
  - ◆ send it an “echo” packet (not broadcast)
  - ◆ allow 5 seconds for it to reply
  - ◆ mark all channels to this server disconnected
- ◆ Potential problems:
  - ◆ Slow or busy links might introduce random delays, some longer than 15 seconds
  - ◆ Busy sites may want to reduce broadcast rates
  - ◆ Clients take 35 seconds to recognize when a server has died



# Configuring connection health

- ◆ How to change the server beacon period?
  - ◆ `putenv "EPICS_CA_BEACON_PERIOD=30.0"`
  - ◆ Default value is 15.0 seconds
- ◆ How to change the client timeout delay?
  - ◆ `setenv EPICS_CA_CONN_TMO 60.0`
  - ◆ Default value is 30.0 seconds
  - ◆ This value determines how long a client takes to notice that a server has died (+5 seconds)
- ◆ The connection timeout must be longer than the beacon period, preferably twice
  - ◆ Breaking the 'preferred' condition could increase network traffic
  - ◆ Breaking the 'must be' condition can also cause random client disconnections



## *Port numbers*

- ◆ Channel Access uses two IP port numbers for its communication (UDP and TCP)
  - ◆ EPICS\_CA\_SERVER\_PORT
    - ◆ Default is 5064
  - ◆ EPICS\_CA\_REPEATER\_PORT
    - ◆ Default is 5065
  - ◆ Both should be > 5000, check with sysadmins
- ◆ The settings for a server and all its clients must be the same
- ◆ Using different port numbers can allow independent projects to share a subnet without any danger of CA name clashes
  - ◆ Can also be used for application testing
  - ◆ No interaction is possible between projects