PAUL SCHERRER INSTITUT

PSI

SLS

Channel Access Gateway Update

Fixed problems

Background

- SLS used to have 1 machine network and 1 beamline network.
- Now changing to 19 beamline networks.
  - One beamline – one network.
  - Nasty programs can't disturb other beamlines.
  - Need controlled read and write access through gateways.
- Must run archivers and alarm handlers through gateways.
  - Several problems (see talk at EPICS meeting 2005).
  - No time to investigate problems.
- We commissioned Cosylab to fix the problems.

Archiver

- Archiver got too many events.
  - MDEL was used instead of ADEL to limit event rate.
- GW could only use either “normal” or “archiver” monitors.
  - DBE_VALUE vs. DBE_LOG events.
  - We had to block archivers from GW.
- Fix: new option **`-archive`**
  - Handles archive monitors separately.
  - If client requests DBE_LOG events, GW creates second monitor.

Alarm handler

- Alarm acknowledge corrupted value.
  - Acknowledge through GW wrote 1 to VAL field.
  - CAS bug. Fixed with EPICS base 3.14.9.
- ALH log file flooded.
  - ALH through GW gets all events, not only alarm events.
  - Fix: Post alarm events only if STAT or SEVR changed.
- Frozen enums, rounded floats.
  - ALH requires special data type which stores value as string.
    ALH and other clients share the same data structure.
- Fix: Store value in native type even with ALH connected.

Caching

- When monitor is active, caget through GW gets cached value.
  - This was a design decision to reduce network traffic.
- When using MDEL/ADEL, caget does not get “real” value.
  - Caused unexpected effects when archiving through GW.
- Meta data (e.g. HOPR) is not updated.
  - Only removing all monitors (how to find them?) or restarting GW helps.
  - GW always uses monitors for values and gets meta data only once.
- Fix: new option **–no_cache**
  - GW uses monitors only when clients does.
  - caget is always forwarded.

Beacons

- Booting IOCs are often not seen through GW.
- GW did not send beacons under certain conditions
  - When `-cip` option is used, GW sets EPICS_CA_AUTO_ADDR_LIST=NO
  - In CAS, this variable is default for EPICS_CAS_BEACON_AUTO_ADDR_LIST
- Fix: Explicitly set variable EPICS_CAS_BEACON_AUTO_ADDR_LIST=YES if it does not yet exist.

Huge arrays

- GW hung up when array data was larger than EPICS_CA_MAX_ARRAY_BYTES.
  - GW used 100% CPU time.
  - All clients got timeout.
  - Restart of GW necessary.
  - We had to block all huge arrays.
  - One never knows largest array size in advance.
- Fix: write warning to log file and block request.
  - Due to limitations in CAS, it is not possible to change EPICS_CA_MAX_ARRAY_BYTES dynamically.

DENY FROM

- DENY FROM was disabled in source code.
  - Expensive host name resolution each time a clients connects.
  - But DENY FROM is much more useful than `-signore` flag.
  - We use it to allow reverse GWs access to GW status PVs.
  - Access to everything but status PVs is denied from reverse GW.
- Fix: Do host name resolution only once at startup and compare IP addresses when clients connect.
- DENY FROM enabled with switch in Makefile.

Memory leak

- Frequent caget on enums consumes all available memory.
- CAS bug. Patch available.
  - String table was not unreferenced.

PAUL SCHERRER INSTITUT PSI

SLS

Thanks to

- Ralph Lange for the original gateway.
- Ken Evans for the 3.14 version of the gateway.
- Jeff Hill for the portable channel access server.
- all three for their support during debugging.

Special thanks to

- Gasper Jansa (Cosylab) for fixing the problems.