Chasing Channel Access Clients

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Outline

- Bad Clients
  - Typical symptoms
  - Tracing connections
- Bad Searches
  - Checking search rates
  - Tracing searchers

Bad Clients

- Client program connects to an IOC, monitors one or more channels, then stops listening for updates
  - IOC buffers network data intended for the client
  - Eventually runs out of network buffer space
- Symptoms:
  - New clients unable to connect to the IOC
  - `S_errno_ENOBUFS` errors appearing regularly on the IOC console

Check Buffers

- Make sure the buffers needed are network mbufs:

```
iocmcr1> mbufShow

...

CLUSTER POOL TABLE
=====================================
size      clusters  free      usage
=====================================
64        250       246       23849020
128       400       0         58958613
256       50        0         1315100
512       50        0         107247
1024      25        0         42622
2048      25        0         84046
=====================================
```

Locate the bad Client

- Look for inetstatShow rows with a large Send-Q:

```
iocmcr1> inetstatShow
Active Internet connections (including servers)
PCB       Proto Recv-Q Send-Q  Local Address       Foreign Address
=======   ===== ====== ======  ================== ==================
1d3a2cc   TCP        0      0  164.54.2.169.5064  164.54.2.76.62921
1d391c8   TCP        0   7660  164.54.2.169.5064  164.54.2.131.34431
1d38eb0   TCP        0      0  164.54.2.169.5064  164.54.3.75.48561
1d37464   TCP        0      0  0.0.0.0.5064       0.0.0.0.0
```

- 'Foreign Address' is the client's workstation:

```
zeus% net 164.54.2.131
IP#           NAME    TYPE       ENET ADDRESS       LOC         USER
============ ======= ========== ================== ========== ==========
164.54.2.131 PHOENIX WS U80-M2 08:00:20:E8:FC:0A 401-D1128  SIDOROWICZ
```

Kill Client Process

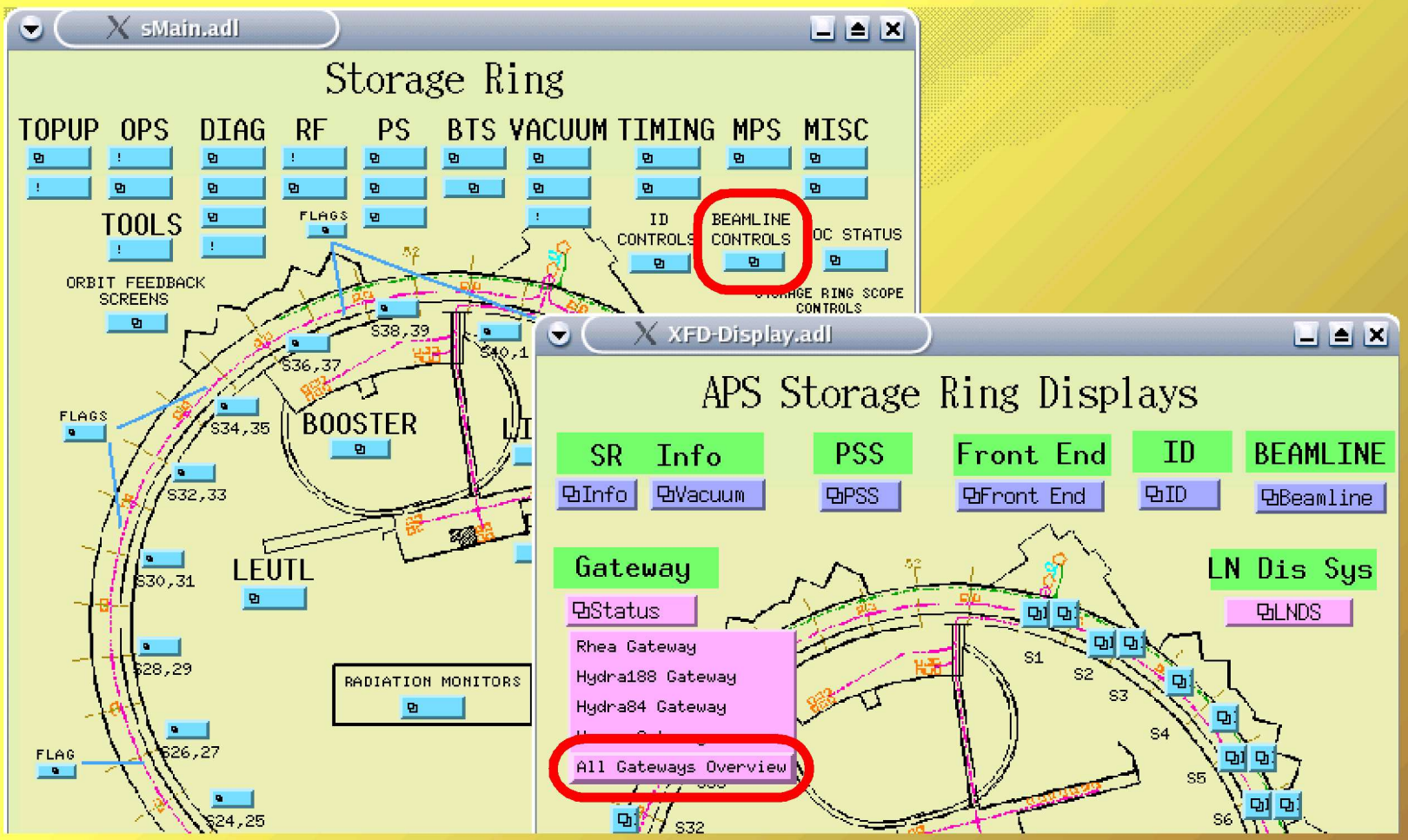
- Use caclients on that host to find the right process

```
phoenix% caclients -s
user=asdops pid=17632 ioc=iocs27vp lport=64906 rxwin=0 cmd='Bcontrol'
user=asdops pid=17632 ioc=iocs37vp lport=64907 rxwin=0 cmd='Bcontrol'
user=asdops pid=17632 ioc=iocs25vp lport=64908 rxwin=0 cmd='Bcontrol'
...
user=asdops pid=17632 ioc=iocacis lport=32777 rxwin=0 cmd='Bcontrol'
user=asdops pid=17632 ioc=iocs15vp lport=32895 rxwin=0 cmd='Bcontrol'
user=asdops pid=17632 ioc=iocmcr1 lport=34431 rxwin=0 cmd='Bcontrol'
```

- Ask the workstation owner or a sysadmin to kill the rogue process (in above case pid=17632)

Checking the CA Search Rate

- Available from the reverse gateways:



Search (Exist Test) Rate Data

GatewayOverview.adl

Statistics For All PV Gateways

Sector:	Alive:	Active:	Inactive:	Dead:	Total VC:	Total PV:	Client Rate:	Post Rate:	Exist Rate:	Loop Rate:	CPU Load:	Server Post:	Server Event:	Gateway:
1	57	37			37	58	4.00	4.00	0.00	56.38	0.00	6.70	6.70	431
2	178	178			178	179	73.32	73.32	11.29	75.02	0.01	402.48	361.62	
3	86	86			86	86	62.64	62.64	0.00	67.93	0.01	175.93	175.93	
4	142	142			142	142	44.19	39.40	0.00	68.09	0.01	203.68	203.68	
5	42	42			42	42	13.20	0.00	0.00	103.48	0.01	0.70	0.70	432
6	48	48			48	48	7.59	6.39	0.00	59.54	0.00	18.68	18.68	
7	52	52			52	69	20.98	8.99	370.43	77.32	0.01	72.63	72.63	
8	7	7			7	7	2.20	0.00	0.00	53.65	0.00	0.70	0.70	
9	26	26			26	28	2.00	2.00	55.80	60.10	0.00	12.70	12.70	433
10	47	47			47	47	3.40	3.20	0.00	58.24	0.00	3.90	3.90	
11	115	96			96	115	55.79	5.00	289.06	72.49	0.01	10.70	10.70	
12	141	105			105	141	17.50	4.20	0.40	91.60	0.03	9.30	9.30	
13	28	28			28	28	4.00	4.00	1.20	55.95	0.00	14.69	14.69	434
14	270	264			264	271	141.26	141.26	2.20	80.42	0.01	221.98	221.98	
15	22	22			22	22	11.99	11.99	0.00	58.95	0.00	14.69	14.69	
16	36	36			36	36	3.60	3.60	0.00	56.20	0.00	10.30	10.30	
17	26	22			22	26	3.20	3.20	0.00	59.50	0.00	3.90	3.90	435
18	47	47			47	47	5.19	3.20	0.00	56.94	0.00	3.90	3.90	
19	27	27			27	27	4.20	4.20	0.00	72.45	0.00	8.89	8.89	
20	28	28			28	28	5.89	2.00	20.08	57.64	0.00	4.70	4.70	
21														436
22	7	6			6	7	0.00	0.00	0.00	57.18	0.00	0.70	0.70	
23	0	0			0	0	0.00	0.00	0.00	53.95	0.00	0.70	0.70	
24														
31	26	26			26	26	3.40	3.40	0.00	57.64	0.00	4.10	4.10	438
32	27	27			27	27	3.00	3.00	0.00	56.94	0.00	3.70	3.70	
33 & 34	248	77			77	248	38.30	33.70	31.40	65.20	0.01	286.70	286.70	
	16458	13059			13059	16497	4644.48	4644.48	4.40	105.09	0.60	5209.95	5231.45	Hydra
														Hydra84
														Rhea
	44	44			44	44	2.80	2.80	71.14	67.64	0.00	4.00	4.00	r431
	44	44			44	44	2.80	2.80	71.20	67.30	0.00	4.00	4.00	r432
	44	44			44	44	2.80	2.80	64.93	65.53	0.00	4.00	4.00	r433
	44	44			44	44	2.80	2.80	71.22	70.22	0.00	4.00	4.00	r434
	44	44			44	44	2.80	2.80	47.85	64.83	0.00	4.00	4.00	r435
	22	22			22	22	1.40	1.40	71.33	65.83	0.00	2.40	2.40	r436
	33	33			33	33	2.10	2.10	65.85	68.15	0.00	3.20	3.20	r438

Tracing Searchers

- Run caSnooper or caClientMonitor
  - Find the workstation and UDP port number where the searches originate
  - Use lsof on that workstation to identify which process owns that UDP port
  - If the port number keeps changing, the above approach won't work
    - The process may be some kind of script that repeatedly calls caget in a loop. Very naughty...

CaSnooper Output

```
Starting CaSnooper 2.1.0.0 (6-5-2003) at Jun 19 10:42:20
EPICS 3.14.2

CaSnooper terminating after 30.02 seconds [0.50 minutes]
  Data collected for 30.02 seconds [0.50 minutes]

Jun 19 10:42:51:
There were 2606 requests to check for PV existence for 119 different PVs.
  Max(Hz):   4.50
  Mean(Hz):  0.73
  StDev(Hz): 1.35

PVs with top 119 requests:
   1 chaos:43593                    ACIS:zF_PTB_TStop                  4.50
   2 landau:32970                   EPS:31:ID:DIW.SEVR                 4.46
   3 landau:32970                   EPS:31:ID:DIW.VAL                  4.46
   4 gateway433:43304               FE:09:ID:SR:HPOS:CC.VAL            4.16
   5 gateway433:43304               FE:09:ID:SR:VPOS:CC.VAL            4.16
   6 charis:51197                   S22BPLD:LimitErrCC.VAL             3.46
   7 charis:51197                   S22BPLD:SCDUconfigErrCC.VAL        3.46
   8 charis:51197                   S22BPLD:BPMTimeRunningCC.VAL       3.46
   9 chiron:35398                   VM:36:VV02:CSlockBI                3.00
```

caClientMonitor Output

```
chiron% caClientMonitor -o
2003-08-20 21:26:00.283229231 Clients=7 Searches=941 Rate=31.26
    Client's UDP Port                    Age  Req's   Names
    landau:32970                        25.15   278       1
        Req's   PV Name
          278   EPS:31:ID:DIW
    gateway434:42047                    29.53    13       1
        Req's   PV Name
           13   EPS:$(sector0):BM:PS1:POS:OP
    gateway432:52003                    27.92   238       7
        Req's   PV Name
           34   S7:ccd2.R08
           34   S7:ccd2.R07
           34   S7:ccd2.R06
           34   S7:ccd2.R05
           34   S7:ccd2.R04
           34   S7:ccd2.R03
           34   S7:ccd2.R02
    gateway433:43304                    29.31   146       2
        Req's   PV Name
           73   FE:09:ID:SR:HPOS:CC
           73   FE:09:ID:SR:VPOS:CC
```

Using lsof

- On the problem workstation, lsof finds the culprit

```
landau% lsof -Di -i udp:32970
COMMAND   PID   USER   FD   TYPE        DEVICE SIZE/OFF NODE NAME
BL_Status 579 xfdops    5u  IPv4 0x300017ba1f0      0t0  UDP *:32970 (Idle)

landau% ps -fp 579
     UID   PID  PPID  C    STIME TTY      TIME CMD
  xfdops   579     1  1   Apr 30 ?       2054:38 /usr/bin/perl BL_Status.pl

landau% net landau
IP#            NAME      TYPE      ENET ADDRESS      LOC        USER
_______________ _________ _________ _________________ __________ ___________
164.54.3.81    LANDAU    WS U30-M3 08:00:20:8F:A9:FC 401-D1109  RAMANATHAN,
```

- Only members of the Unix group 'controls' can run lsof, for security reasons
- An easier-to-use system for monitoring CA clients is currently in the design stages...

Short-lived Clients

- caClientMonitor can also help find clients that only make a few connections, then die

```
chiron% caClientMonitor -bcDnr
2003-08-20 21:58:03.067562915 Died=charis:63435 Age=0.00 Names=1 Searches=1
2003-08-20 21:58:46.883272278 Died=cyclops:64388 Age=0.00 Names=3 Searches=3
2003-08-20 21:58:46.813337095 Died=cyclops:64376 Age=0.00 Names=1 Searches=1
2003-08-20 21:58:46.725359259 Died=cyclops:64356 Age=0.00 Names=1 Searches=1
2003-08-20 21:59:02.368917425 Died=charis:63490 Age=0.00 Names=1 Searches=1
2003-08-20 21:59:47.243055429 Died=cyclops:64464 Age=0.00 Names=8 Searches=8
2003-08-20 21:59:47.187218561 Died=cyclops:64452 Age=0.00 Names=1 Searches=1
2003-08-20 22:00:04.708896436 Died=charis:63577 Age=0.00 Names=1 Searches=1
2003-08-20 22:00:04.323643917 Died=chopin:50503 Age=0.00 Names=1 Searches=1
```

- Unfortunately, by the time the death gets reported the client process is long gone, so lsof can't be used to find the process ID or program name