

Gateway 2.0

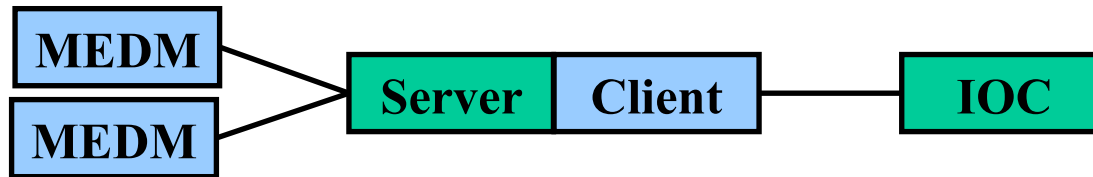
Rok Sabjan

09/01/2008

Based on presentation by K. Evans, APS

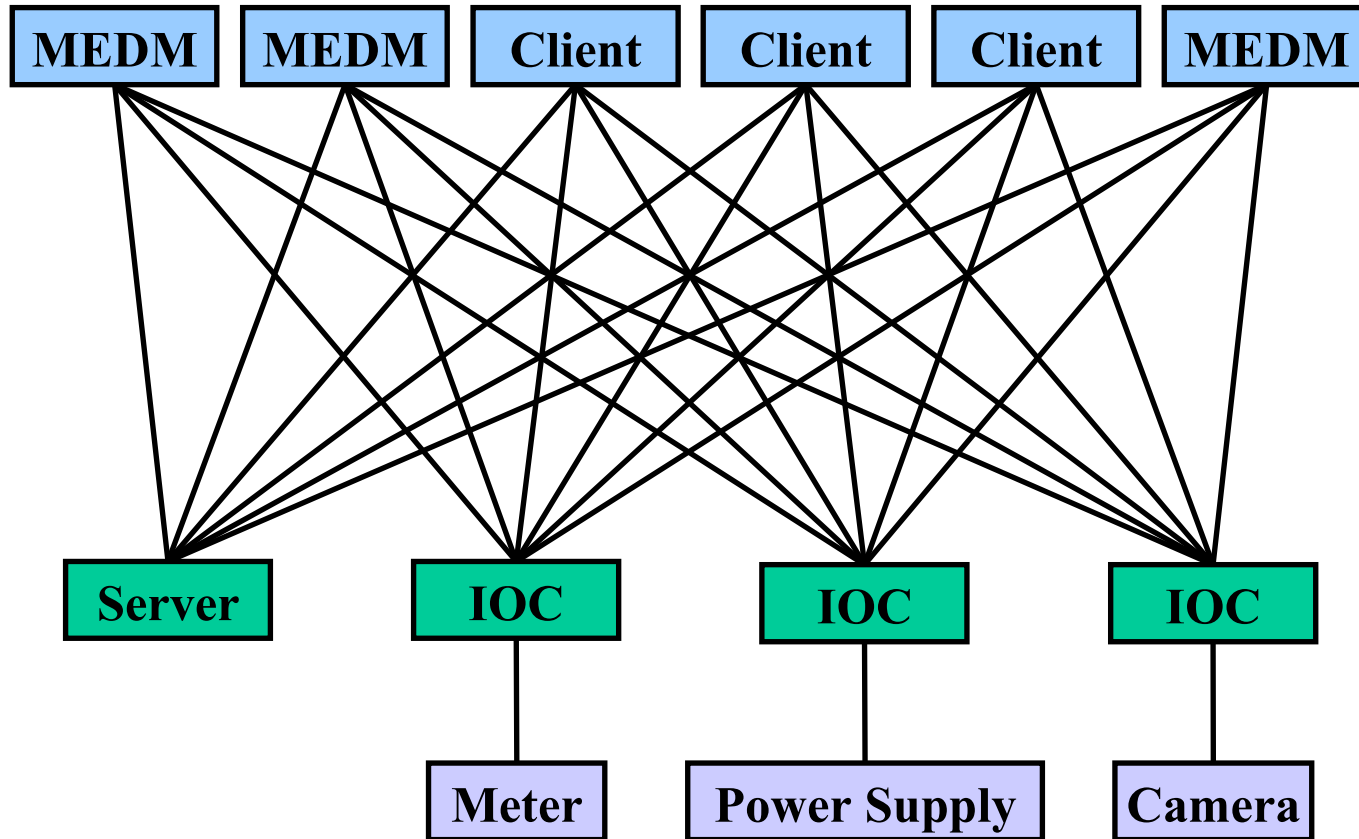
What is the Gateway ?

- **Both a Channel Access server and a Channel Access client**
 - Clients such as MEDM connect to the server side
 - Client side connects to remote servers such as IOCs

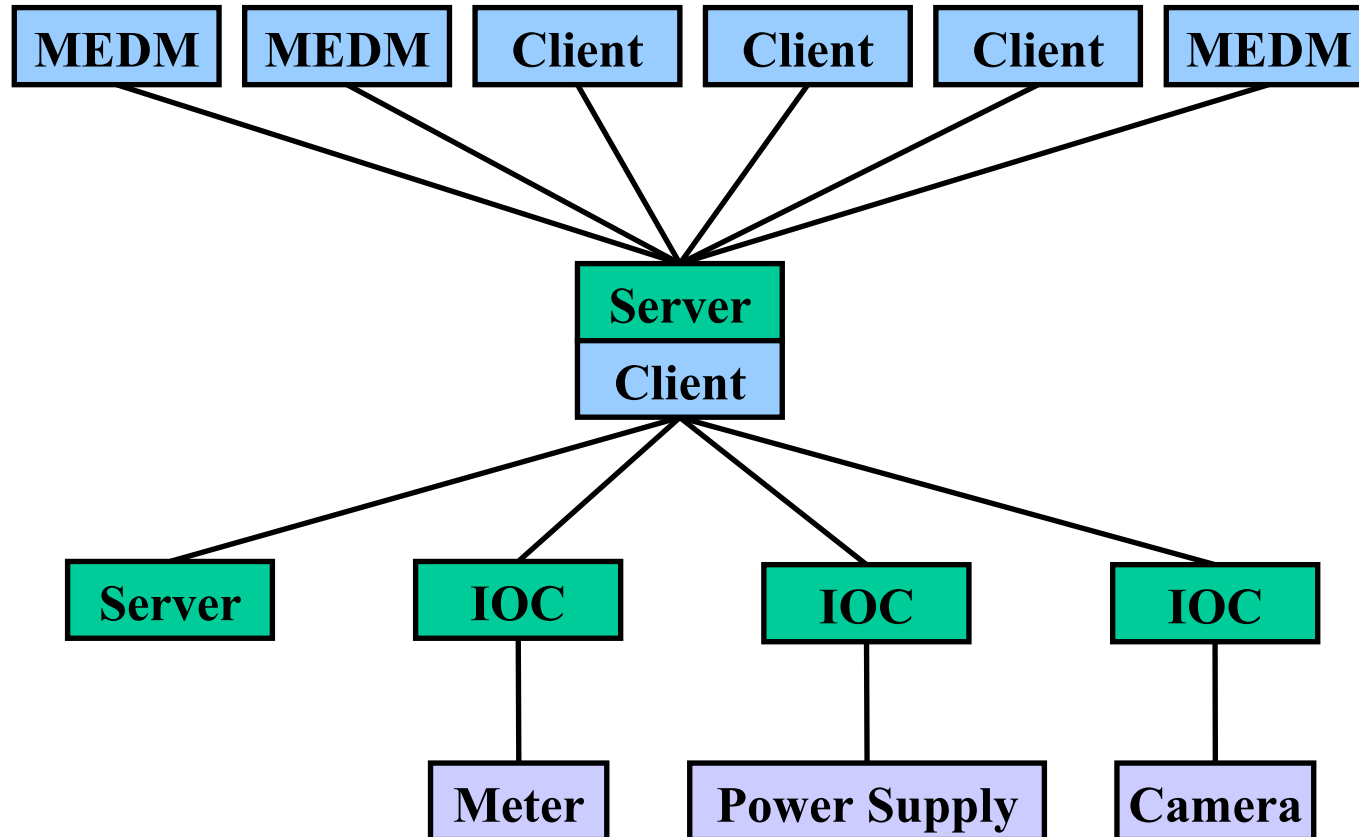


- **Allows many clients to access a process variable while making only one connection to the remote server**
 - Reduces the load on critical IOCs or other servers
- **Provides access from one subnet to another**
 - For example, from an office subnet to a machine subnet
- **Provides extensive additional access security**
 - For example, only read access from offices
- **Can provide aliases for process variable names**

EPICS Overview



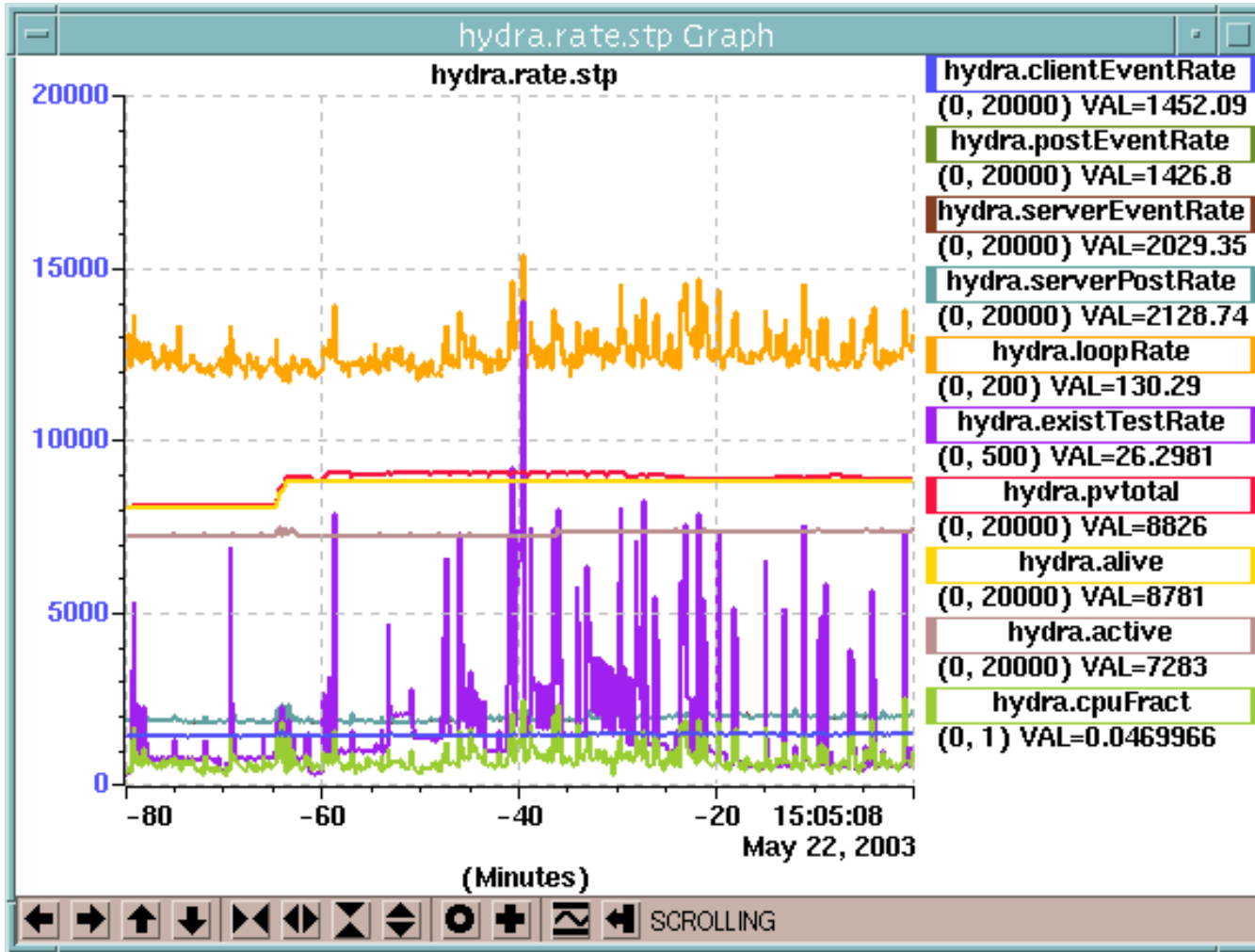
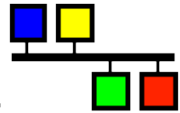
Gateway



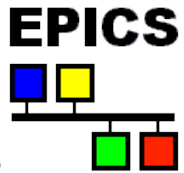
New Features in Gateway 2.0

- **Does not require a specially modified version of base**
 - Does require 3.14 base
 - Needs 3.14.5 (preferably 3.14.6) or later to work right
- **Significant performance improvement**
 - 5 - 10 times less CPU usage
- **Very stable**
- **Runs on Solaris, Linux, and Windows**
- **Extensive diagnostics via internal process variables**
- **Users Manual**
- **Put logging**
- **Other new features and bug fixes**
 - Substantially more stable and powerful than Gateway 1.3

Extensive internal diagnostics via internal PVs



Can be monitored and controlled from MEDM



- There are monitor process variables that give the internal state
- There are control process variables that allow starting and stopping it
- There are process variables that cause reports to be generated
- There is a process variable that rereads the access security without restarting it
- It can be started via an MEDM Shell Command attached to a script (not shown)

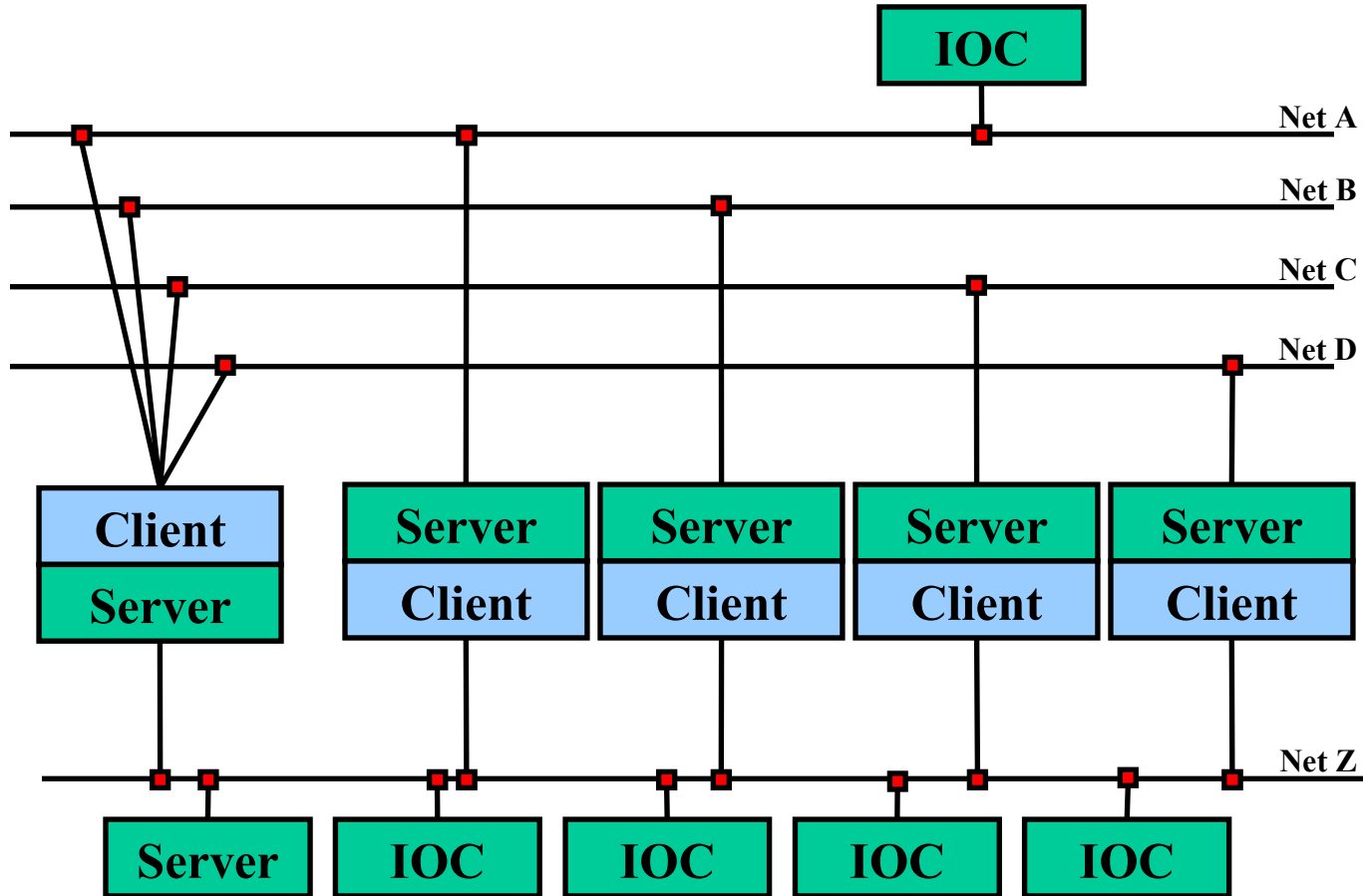
Hydra Gateway	
VC Total:	11105
PV Total:	13061
Connected:	13058
Active:	11105
Inactive:	1953
Unconnected:	3
Connecting:	0
Dead:	3
Disconnected:	0
File Descriptors:	
Client Event Rate:	1512.08
Post Event Rate:	1472.58
Exist Test Rate:	0.20
Loop Rate:	149.59
CPU Fraction:	0.25
Server Post Rate:	2489.40
Server Event Rate:	2436.41
Command:	0 <input type="button" value="Exec"/> <input type="button" value="Cancel"/>
VC Report:	0 <input type="button" value="Exec"/> <input type="button" value="Cancel"/>
PV Report:	0 <input type="button" value="Exec"/> <input type="button" value="Cancel"/>
AS Report:	0 <input type="button" value="Exec"/> <input type="button" value="Cancel"/>
New AS:	0 <input type="button" value="Exec"/> <input type="button" value="Cancel"/>
Quit:	0 <input type="button" value="Exec"/> <input type="button" value="Cancel"/>
Stop Server:	0 <input type="button" value="Exec"/> <input type="button" value="Cancel"/>

The APS Uses Gateways Extensively

- **2 main Gateways to provide access to offices and floor coordinators**
- **29 Remote Gateways that provide access for experimental teams to their own systems and to the main control system**
- **9 Reverse Gateways to provide access to the internal process variables of the remote Gateways**
- **1 Alias Gateway to implement process variable name changes until the new names are completely installed**
- **Special purpose Gateways as for the Video Server which is not allowed on the main subnet**

- **These numbers have been increasing**

Example Topology: Reverse Gateway



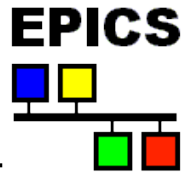
MEDM Status Screen for APS Gateways

GatewayOverview.adl

Statistics For All PV Gateways

Sector:	Alive:	Active:	Inactive:	Dead:	Total VC:	PV:	Client Rate:	Post Rate:	Exist Rate:	Loop Rate:	CPU Load:	Server Post:	Event:	Gateway:
1	11	11			11	11	2,00	2,00	0,00	56,88	0,00	2,70	2,70	431
2	126	126			126	129	18,08	18,08	17,38	62,83	0,01	271,51	271,51	
3	20	20			20	20	3,30	3,30	0,00	57,30	0,00	7,30	7,30	
4	63	63			63	63	15,78	15,78	0,00	61,04	0,00	20,38	20,38	
5	7	7			7	7	2,00	0,00	0,00	54,90	0,00	0,70	0,70	432
6	12	12			12	12	5,59	3,80	0,00	58,24	0,00	23,48	23,48	
7	31	31			31	31	19,18	11,19	284,90	77,42	0,02	105,89	105,89	
8	0	0			0	0	0,00	0,00	0,00	53,65	0,00	0,70	0,70	
9	6	6			6	8	2,00	2,00	69,13	60,44	0,01	28,67	28,67	433
10	0	0			0	0	0,00	0,00	0,00	54,05	0,00	0,70	0,70	
11	102	94			94	102	19,58	0,00	0,00	54,74	0,00	0,70	0,70	
12	65	61			57	65	16,28	2,00	76,72	59,94	0,00	2,70	2,70	
13	26	26			26	26	7,79	7,79	0,00	57,84	0,00	16,48	16,48	434
14	179	98			93	179	18,18	18,18	23,98	62,64	0,00	18,88	18,88	
15	22	22			22	22	15,38	15,38	0,00	60,84	0,00	16,08	16,08	
16	8	8			8	8	0,00	0,00	0,00	53,68	0,00	0,70	0,70	
17	1	1			1	1	0,00	0,00	0,00	55,19	0,00	0,70	0,70	435
18	1	1			1	1	0,00	0,00	0,00	54,38	0,00	0,70	0,70	
19	10	8			8	12	2,80	2,80	44,76	58,44	0,00	7,49	7,49	
20	10	10			10	10	0,00	0,00	0,00	54,60	0,00	0,70	0,70	
21														436
22	1	1			1	1	0,00	0,00	0,00	53,65	0,00	0,70	0,70	
23	0	0			0	0	0,00	0,00	0,00	53,76	0,00	0,70	0,70	
24														
31	37	37			37	37	10,50	10,50	0,00	61,00	0,00	21,70	21,70	438
32	30	30			30	30	3,00	3,00	0,00	57,04	0,00	3,70	3,70	
33 & 34	205	19			19	205	11,39	11,39	32,37	60,74	0,00	140,95	140,95	
	12110	8272			8272	12155	1295,67	1295,67	130,89	135,99	0,05	1884,71	1884,71	Hydra
														Hydra84
														Rhea
	44	44			44	44	2,80	2,80	103,90	67,84	0,01	4,00	4,00	r431
	44	44			44	44	2,80	2,80	160,87	69,15	0,00	4,00	4,00	r432
	44	44			44	44	2,80	2,80	201,77	71,09	0,02	4,00	4,00	r433
	44	44			44	44	2,80	2,80	351,55	75,72	0,00	4,00	4,00	r434
	44	44			44	44	2,80	2,80	166,84	71,43	0,00	4,00	4,00	r435
	22	22			22	22	1,40	1,40	181,60	69,10	0,00	2,40	2,40	r436
	33	33			33	33	2,10	2,10	274,70	72,40	0,00	3,20	3,20	r438

MEDM Control Screen for APS Gateways



Sector:	Generate, View, Edit Reports			Access Security		View	PV Gateway		PV List	Putlog	Exist Rate:	Alive:	Active:	Machine Name:
	VC	PV	AS	Edit	Load		Start	Stop	Edit/View	View				
1	VC Rept.	PV Rept.	AS Rept.		Load			Stop			9,60	61	61	
2	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	76,80	156	156	gateway431
3	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	72	72	
4	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	62	61	
5	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	5	5	
6	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	0,00	11	11	gateway432
7	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	26	26	
8-BM	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	8	8	
9	VC Rept.	PV Rept.	AS Rept.		Load			Stop			64,00	33	33	
10	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	0,00	0	0	gateway433
11	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	195	195	
12	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	133	110	
13	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	45	31	
14	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	0,00	110	110	gateway434
15	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	32	32	
16	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	11	11	
17	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	7	7	
18	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	11,70	1	1	gateway435
19	VC Rept.	PV Rept.	AS Rept.		Load			Stop			39,99	14	10	
20	VC Rept.	PV Rept.	AS Rept.		Load			Stop			7,00	13	13	
21	VC Rept.	PV Rept.	AS Rept.		Load			Stop						
22	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	0,20	3	0	gateway436
23	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,20	0	0	
24	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,20	0	0	
8-ID	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	0,20		11	gateway437
31	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,00	28	28	
32	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	0,00	0	0	gateway438
33 & 34	VC Rept.	PV Rept.	AS Rept.		Load			Stop			0,40	114	4	
Hydra	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	82,02	16290	13475	Hydra
Rhea	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	573,79	2472	2388	Rhea
r431	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1699,50	72	72	gateway431
r432	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1704,47	80	72	gateway432
r433	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1198,38	72	72	gateway433
r434	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1704,52	72	72	gateway434
r435	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1495,79	72	72	gateway435
r436	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1142,72	50	50	gateway436
r437	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1239,79	8	8	gateway437
r438	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1396,32	54	54	gateway438
rct.lapps	VC Rept.	PV Rept.	AS Rept.	!	Load	!	!	Stop	!	!	1694,09	27	21	ct.lapps

Acknowledgements and References

- **Acknowledgements**
 - Originally written by Jim Kowalski in 1996
 - Contributions by Janet Anderson and Ralph Lange
 - Extensive involvement by Jeff Hill from the beginning
- **Reference Manual**
 - <http://www.aps.anl.gov/asd/controls/epics/EpicsDocumentation/ExtensionsManuals/Gateway/Gateway.html>