UPGRADING THE CONTROL SYSTEM AT THE WEIZMANN INSTITUTE ACCELERATOR LABORATORY

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Wiezmann Institute accelerator laboratory:

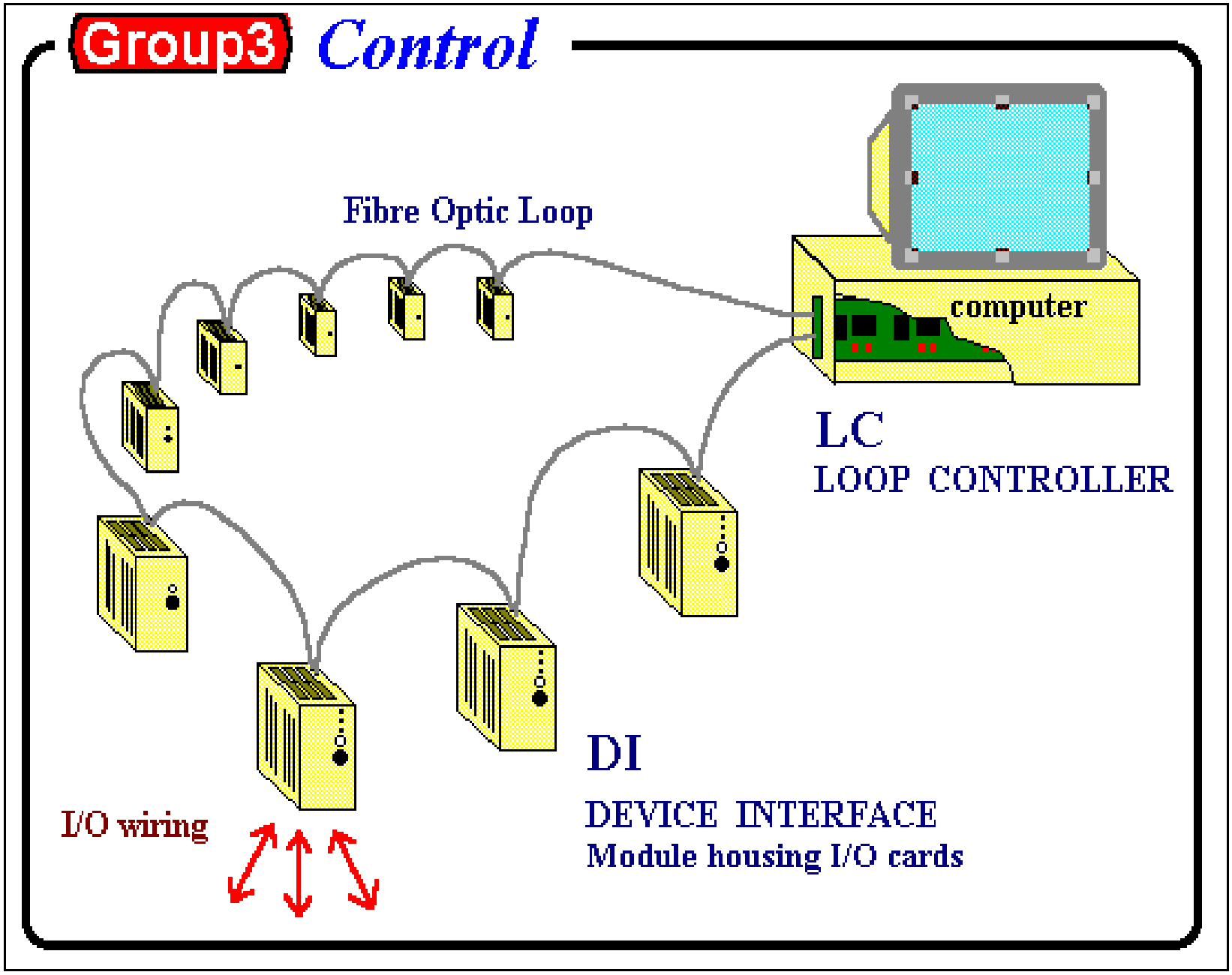
1. 14 UD Pelletron accelerator
2. 3MV Van de Graff Accelerator
3. Low energy ion beam facility + ion traps

Talk Outline

- Hardware
- Previous Software
- New Server Client Scheme
- The Script Utility
- Conclusions

CONTROL HARDWARE

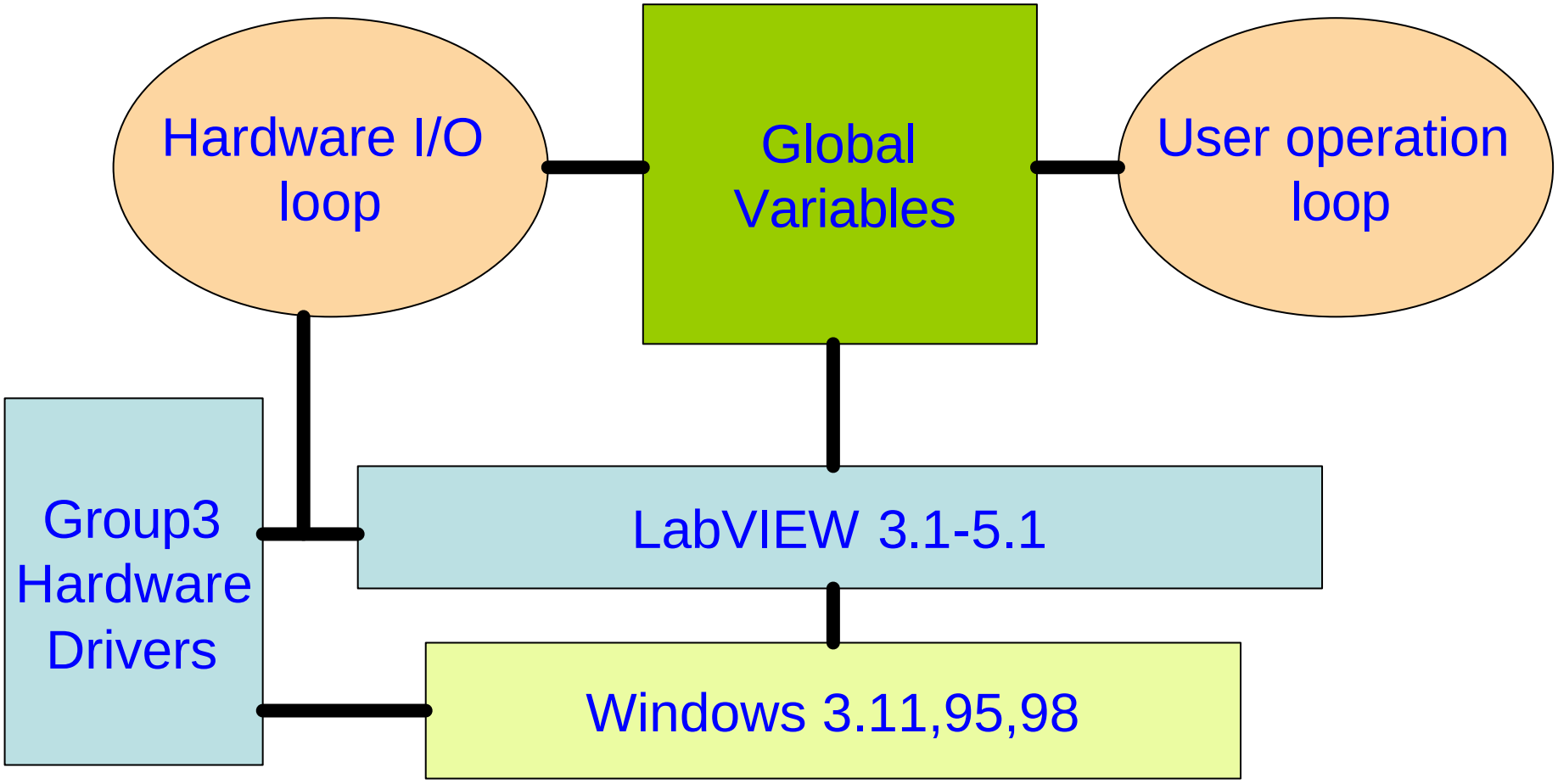
- Group3 Control (New Zealand)
- GPIB
- RS232
- PLC + RS485
- DAQ cards -Timers


Group3 Control
Fibre Optic Loop
computer
LC
LOOP CONTROLLER
DI
DEVICE INTERFACE
Module housing I/O cards
I/O wiring

Group3 Control Features

- **Fibre Optics -** high voltage isolation - noise immunity.
- **Small Size -** easy mounting - keep wiring short to minimize noise pickup.
- **High Resolution -** 16 bit analogs
- **High Update Rate** - scan rates of up to 32,000 channels per second
- **High channel Density** - several thousand channels per computer slot
- **Diagnostic Port** - on device interfaces for system development and debugging.

Software (old version)



Problems and Requirements

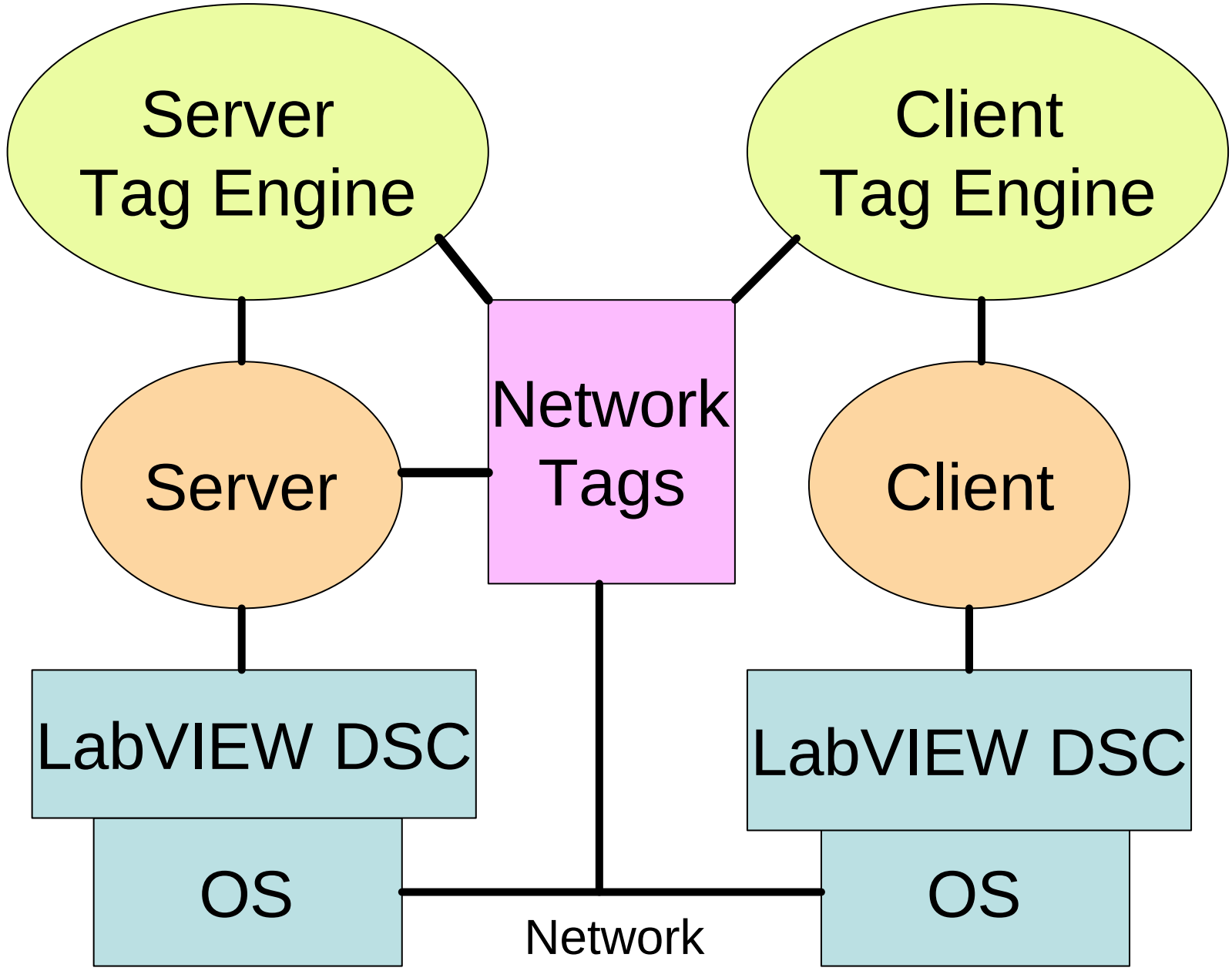
- User interface hardware interface on the same PC.
- Control with other PC’s on the network was not easy.
- Utilities like data logger, alarms and security were not integrated in the system.
- Special flexible automation T&M routines were needed by the users.

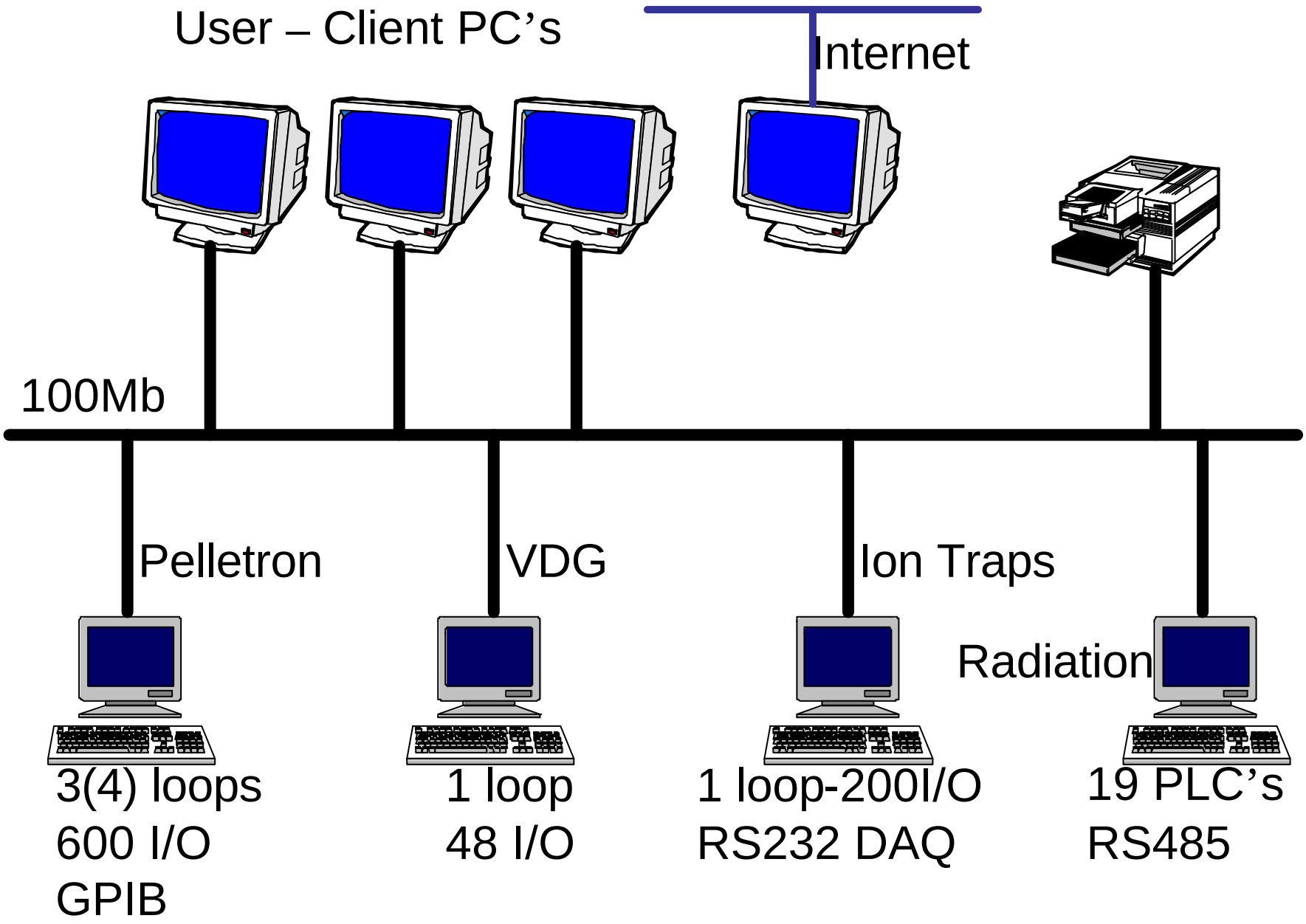
Solutions

- Server – Client scheme. LabVIEW 6.1 + Datalogging and Supervisory Control (DSC) module.
- Script utility for easy user interface for complex control applications.

DSC Module

- Server tools for large # of I/O point.
- Automatic data logging and historical trends, database over the network.
- Built in security and alarms.
- Event driven architecture.
- Tag engine for easy client applications and network communication.
- Everything is programmable by LabVIEW.


Server
Tag Engine
Client
Tag Engine
Server
Network
Tags
Client
LabVIEW DSC
LabVIEW DSC
OS
OS
Network


User – Client PC’s
Internet
100Mb
Pelletron
VDG
Ion Traps
Radiation
3(4) loops
600 I/O
GPIB
1 loop
48 I/O
1 loop-200I/O
RS232 DAQ
19 PLC’s
RS485

Script Utility

- The user types text in a table
- Each text command is a LabVIEW subroutine
- The commands are executed one after the other, all the accelerator parameters can be changed in seconds.
- Complex T&M can be done routinely.

loaded

c:\program files\national instruments\labview 6\u

command

stop

input

index	COMMANDS	PARAMETER	STATUS
0	auto		
1	set	qlst,	
2	chop	on,	
3	na	100,	
4	calc	p1=6	
5	calc		
6	viewer		
7	pmt	on,	
8	fc	16,out	
9	if	target.eq.out,paus	
10	fc	31,out	
11	current	t1,	
12	if	t1.eq.0,pause	
13	fc	31,in	
14	current	i1,	
15	pmt	off,	
16	fc	16,in	
17	current	s1,	
18	if	s1.eq.0,pause	
19	calc	z1=(t1*p1)/(s1*q1	
20	pause	z1 ok?	
21	set	,1	
22	pause	prepare DAQ	

nput

index	COMMANDS	PARAMETER
0	auto	
1	set	qlst,
2	chop	on,
3	na	100,
4	calc	p1=600,
5	calc	q1=11,
6	viewer	out,
7	pmt	on,
8	fc	16,out
9	if	target.eq.out,paus
10	fc	31,out

Conclusions

- The accelerators control system was upgraded successfully.
- Server – Client set up is a very good solution for large number of users and I/O points.
- Future: new HV loop, FieldPoint real time control.