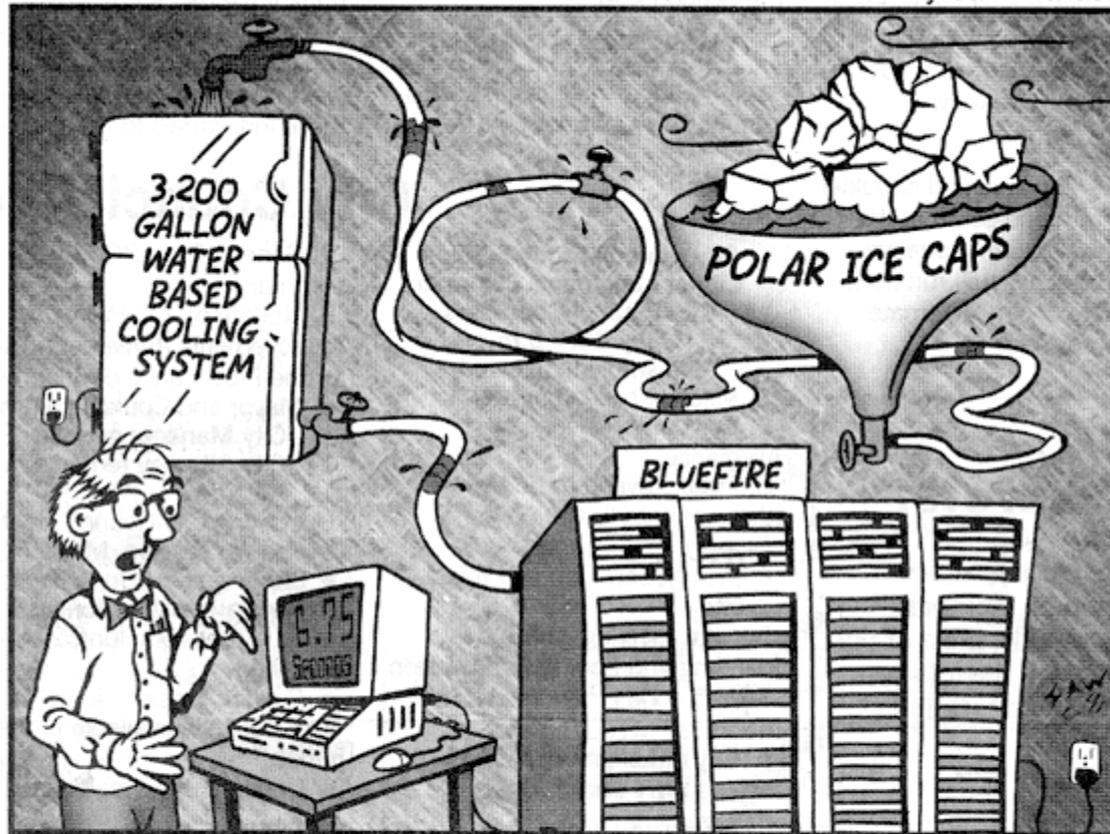


by Sam Wallace



www.sawtoons.blogspot.com

TimesCall.com

AT THE NATIONAL CENTER FOR ATMOSPHERIC RESEARCH IN BOULDER, SCIENTISTS DISCOVERED EXACTLY HOW LONG IT WOULD TAKE TO MELT THE POLAR ICE CAPS IF THEY USED THEM TO COOL THEIR NEW SUPER COMPUTER.



NCAR

bluefire



Special Thanks To

- Physical Plant Services
 - Director – John Pereira
 - Manager – Dave Maddy
 - Administrative Assistant – Maintenance Help Desk - Shannon Miller
 - Administrative Assistant – Materials Procurement - Sandra Sundquist
 - Administrative Assistant – Meeting Minutes - Suzanne Michaud
 - Lead Carpenter – Bruce Kovalski
 - Carpenter – Randy Catton
 - Carpenter – Bob Yale
 - Lead Electrician – Gordon Kinn
 - Electrician – John Harkness
 - Electrician – Butch Thompson
 - Electrician - Tom Winterhalder
 - Lead Maintenance Mechanic – Brian McMillan
 - Maintenance Mechanic – John Adamson
 - Maintenance Mechanic – Louis DiMarco
 - Maintenance Mechanic (controls) – Dave Heckel
 - Maintenance Mechanic – Matt Monahan
 - Maintenance Mechanic – Serijio Bobillo

Special Thanks (cont.)

- Physical Plant Services (cont.)
 - Painter – Larry Harders
 - Painter – Keith White
 - Painter – Clark Langemeier
 - Lead Outside Maintenance (dock assistance) – Rich Johnson
 - Maintenance Worker – Tom Petruzzi
 - Maintenance Worker – Patrick Ryan
 - Maintenance Worker – Chuck Gregory
 - Stores Clerk – Leonard Cooper
- EOL – Design and Fabrication Services
 - Ken Harris
 - Bart Woodiel



Contractors

- Contractors
 - Engineered Solutions Inc. – Gerry Toomer
 - Duffy Crane and Hauling
 - Polar Insulite - Insulators
 - Systems Undercover - Insulators



Stages of Installation

- Planning (IBM P6 system, first of its kind requiring close coordination between NCAR and IBM Research and Development)
- Electrical planning
- Mechanical planning
- Construction planning and installation

Planning

- Highly collaborative effort with IBM
- Worked with two IBM facilities
 - Research and Development in Austin TX,
 - Manufacturing in Poughkeepsie NY
- Visited Austin site in August of 07 to get preliminary information. Visit was helpful to get a look first hand



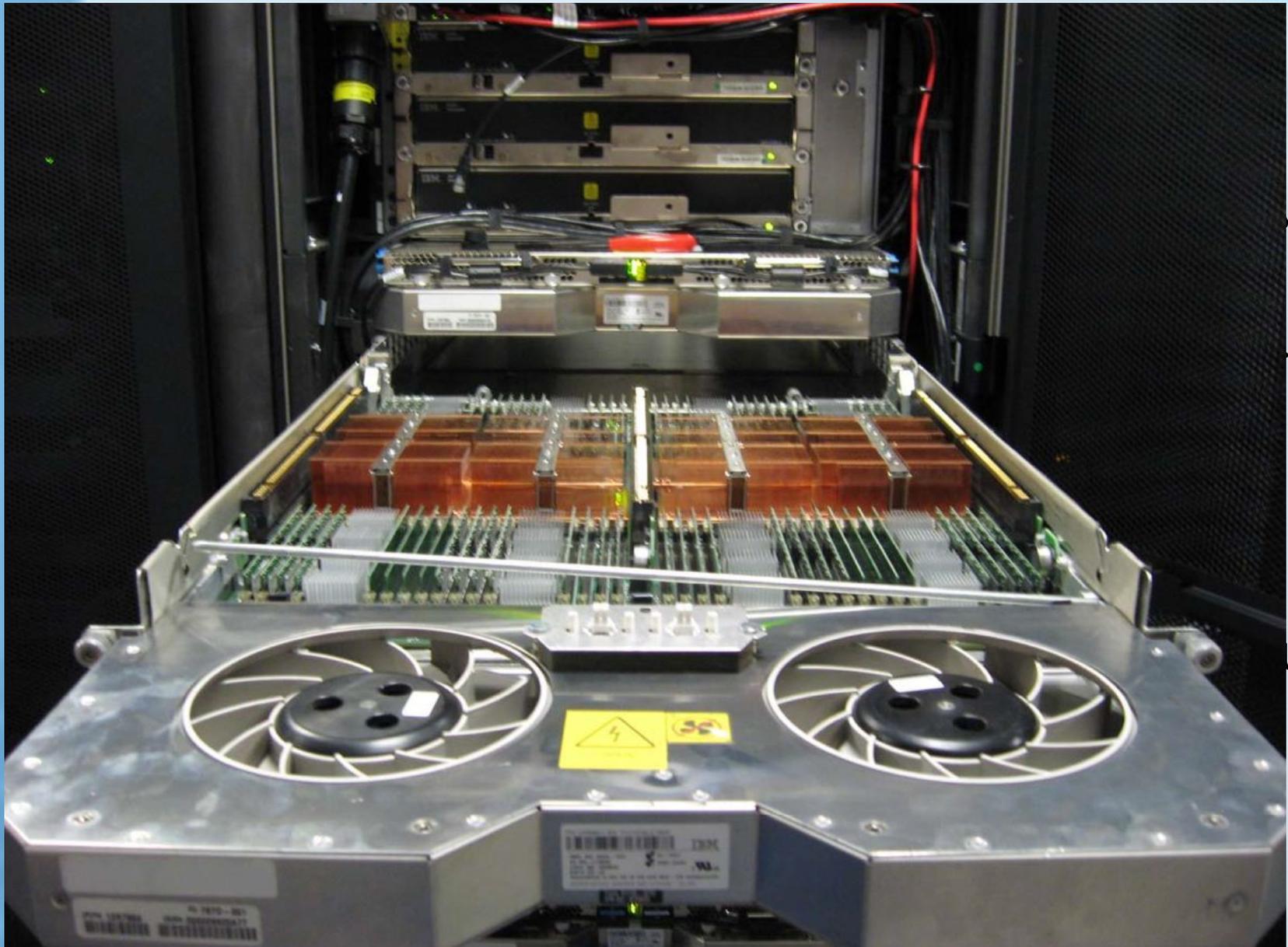
Electrical Planning

- Load per cabinet was significant, looking like approx. 70kw per cabinet (10-14) (average household uses 1 to 1.3 kw)
- System called for four 60 amp 480 volt circuits to each cabinet
- Loads had to be balanced across six 480 volt panels
- Two existing 480 volt compute systems (bluevista and blueice) had to remain in service during the process



Balancing Elec. Loads (cont.)

	ON	Sys	Load	% MAX -->			85% 85% 87%			46% 45% 45%			90% 91% 91%			68% 67% 67%			71% 69% 68%					
				AMPS -->	75%	75%	76%	168.5	169.5	171.5	191.8	191.8	195.8	102.5	100.5	100.5	201.8	203.8	205.8	152.8	149.8	150.8	160.8	154.8
				PANEL 1			PANEL 2			PANEL 3			PANEL 4			PANEL 5			PANEL 6					
				PHA	PHB	PHC	PHA	PHB	PHC	PHA	PHB	PHC	PHA	PHB	PHC	PHA	PHB	PHC	PHA	PHB	PHC	PHA	PHB	PHC
	x	BF	CA1									21.3	21.3	21.3				21.3	21.3	21.3	21.3	21.3	21.3	
	x	BF	CA2				21.3	21.3	21.3						21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	
		BF	CA3																					
		BF	CA4																					
	x	BF	CA5	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3							
		BF	CA6																					
		BF	CA7																					
		BF	CA8																					
		BF	CA9																					
	x	BF	CA10	16.8	16.8	16.8	16.8	16.8	16.8						16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	
	x	BF	CA11	18.5	18.5	18.5	18.5	18.5	18.5						18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	
		BF	TSTA1																					
	X	BV	ALL	71.3	72.4	73.6	73.3	73.9	76.7	21	22.5	22.2	85.4	86.8	89.1	26.5	25.9	26.3	25.8	28.2	27.7			
	X	BI	ALL	40.7	40.6	41.4	40.7	40.1	41.3	39	35.5	35.8	52.6	53.2	52.9	48.5	46.1	46.7	57.2	48.8	48.3			



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Mechanical (cont.)

- Due to insufficient thermal mass (chilled water storage), it was determined that storage tanks were needed. Calculations to achieve sufficient thermal ride through came to 3000 gallons needed
- Tanks had to come through breezeway to get into the computer room, this necessitated using two 1500 gallon tanks while making space for a third tank (future)



dubbed driven
www.toyota.com



Thermal Storage Tank Install



Chilled Water Distribution Piping



Tie -



Loop





Again, Special Thanks To



- Physical Plant Services for all their support, craftsmanship and professionalism through a challenging project
- EOL, they continue to provide CISL with fabrication skills in providing site specific needs
- Our outside contractors for all their support
- All NCAR / UCAR divisions for their understanding and patience during our transition period between machines

Special Thanks (cont.)

- UCAR Contracts for their responsiveness dealing with procurements on a tight schedule
- The NCAR computational user community customers for their business and patience as we strive to expand our capabilities
- All highly skilled and dedicated Software Engineers and System Administrators working to make bluefire a success in representing NCAR to the Scientific Community



Questions?