

Choice Case Study

Design for the Data Center for CDAC (Centre for Development of Advanced Computing), Pune

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PARAM 40 TF is C-DAC's next generation high-performance scalable computing cluster with a peak computing power of 40 teraflop.

Project Preface

Project Date: September 2008 – November 2008

Choice Solutions Ltd. was engaged to consult and design a state-of-the-art datacenter for CDAC at Pune. The preliminary phase of the work included site assessment, feasibility study and providing the specifications of all infrastructure equipment (UPS, Precision AC's Cooling, Electrical Utility, and Diesel Generator) deployed to support the servers and storage within the data center. The size of the data center is 1650 SFT. The second phase of the work was to architect the layout of the racks within the data center to provide for optimal air flow, cooling and foot-print utilization.

Project Background

CDAC was established in March 1988, as a Scientific Society of the Department of Information Technology (formerly, Dept. of Electronics), Ministry of Communications and Information Technology (formerly, Ministry of Information Technology). It is primarily an R & D institution involved in the design, development and deployment of advanced Information Technology (IT) based solutions. In a little over a decade since inception, C-DAC has developed and supplied a range of high performance parallel computers, known as the PARAM series of supercomputers. The PARAM 40 TF is C-DAC's next generation high-performance scalable computing cluster with a peak computing power of 40 teraflop.

The hardware environment is powered by Intel processor based 4-processor, quad-core compute nodes. The nodes are connected through C-DAC's own high-performance System Area Network (SAN), PARAMnet-III. The nodes are also connected with Infiniband and Gigabit-Ethernet back-up networks. The software environment is powered by C-DAC comprehensive HPCC software suite.

C-DAC's National PARAM Supercomputing Facility (NPSF) located in Pune houses its latest and most powerful PARAM 10000, a 100 Gigaflop peak computing power Supercomputer. It is being used by C-DAC's own scientific and business applications development team and researchers and institutions all over the country.

CDAC wanted to set up a state-of-the-art datacenter.

Project Objectives

CDAC wanted to set up a state-of-the-art datacenter at one of its existing sites in Pune to support PARAM 40 TF application. This DC will be of approx. 2500 SFT area to accommodate around 80 racks which will house around 300 servers when fully populated.

Project Challenge

CDAC's major challenge was accomplishing this within a tight timeline without compromising the quality. CDAC wanted the datacenter to be designed with best practices, this being a prestigious show case.

To accomplish this, CDAC wanted to hire the services of a professional consultant who has the required experience, expertise and resources. The aforesaid consultancy services was to be in two phases viz., preliminary phase, for assessment of the identified site for its suitability to support the requirements and creating an optimal design of the datacenter and second phase, for the assessment of the compliance of the agreed technical specifications at each stage of the deployment of the solution.

Choice Solutions was selected on the basis of its proven credentials and strong talent pool.

Choice Solutions was selected on the basis of its proven credentials and strong talent pool which has vast experience in designing and implementing large datacenters and complex IT infrastructure. The following scope of work was defined and executed by Choice Solutions:

- Site assessment services
- Detailed design and specifications for network critical physical infrastructure
- Preparation of floor plans showing the datacenter and rack layout including power and cooling
- Preparation of RFP for various equipment required to support the datacenter and estimation of project costs
- Check list of the technical requirements to facilitate the bids in relation to the requirements
- Project management and supervising the commissioning of datacenter

Choice Role and Solution

Datacenter consultants from Choice Solutions Ltd. spent approx two weeks at the client site, studying the feasibility of the location for a data center. They reviewed various aspects, particularly those related to the site condition and location to recommend if it was suitable for a data center such as vulnerability and risk of natural and man-made disasters, impact due to electromagnetic interference, industrial pollution and vibration, availability of electrical power and strength of the floor.

Once the site passed the selection criteria, we estimated the requirements for UPS, PAC, and floor strength and provided the optimal layout for the racks within the data center. In executing this project, Choice Solutions drew on various industry-leading standards such as EIA/TIA-942, The Uptime Institute, NFPA 75 and ASHRAE TC9.9.

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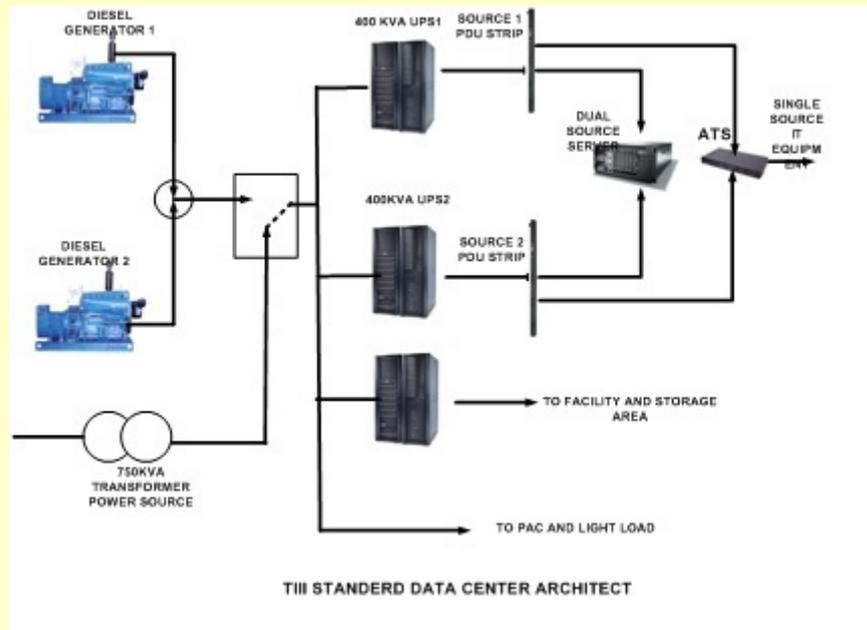
The following were delivered to CDAC:

- i. Site assessment, feasibility study and recommendations
- ii. Optimal design layout and specifications
- iii. Creation of RFP documents and facilitating tender evaluation
- iv. Vendor evaluation and awarding contract
- v. Project estimate, scheduling and progress updates
- vi. Qualitative analysis of the products and services rendered by various vendors
- vii. Approving and certifying the completion of the work
- viii. Documentation of the completed work and best practices for managing the data center

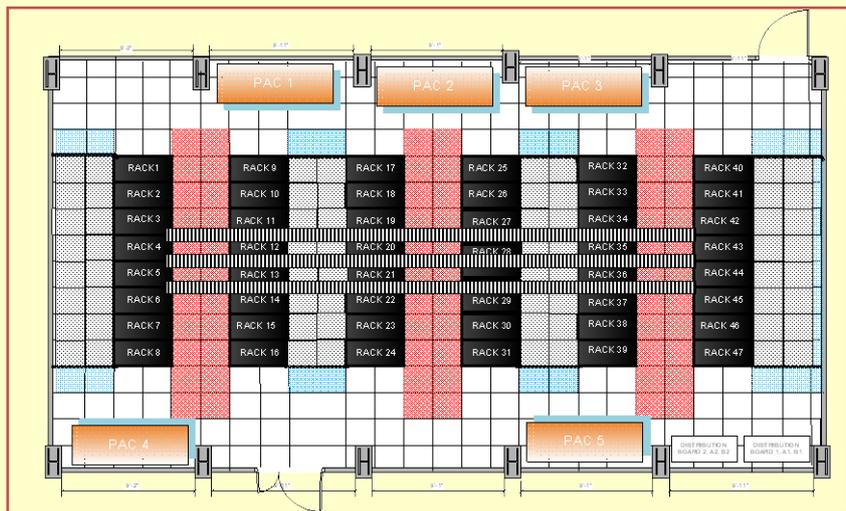
Client Benefits

The recommendations included proper security recommendations, raised flooring design and rack layout within the DC. We had to study the DC needs and recommend sizing for UPS, Electrical mains, Diesel generator and PAC (Precision Air Conditioning). Multiple options were discussed with CDAC regarding the layout. An optimal design was selected considering the priorities and constraints. The power system designed for CDAC has 2(N+1) redundancy as required for a Tier III datacenter shown in image 1.

Image 1



Choice Solutions Ltd. presented a design for the racks to the CDAC, along with Power, DG and UPS requirements. The following figure shows the data center design recommended by Choice Solutions Ltd. for CDAC:



The design on side of the datacenter is reserved for the UPS battery bank. Another side of the datacenter has the UPS and AHU rooms. Another One side of wall is glass brick type and covered with fire rated bricks wall.

Project Management (Phase 2)

In this phase, Choice Solutions Ltd. deputed a team of professionals including a Project Manager to oversee the execution and also to ensure timelines and project budgets.

Various stakeholders from customer side and from Choice side were involved from time to time to ensure adherence to schedule. The project manager interacted with different vendors and assessed the quality of the work and compliance to the design guidelines. Customer was updated periodically regarding the progress of the project.

Next Steps

Choice Solutions Ltd prepared the final documentation including the design specifications, project updates, site acceptance of various components, and certification.

Choice Solutions Ltd. audited the work quality to make sure it is being made to the required standards.

About Choice Solutions

Established in 1991 Choice Solutions Ltd. is a leading IT and Facilities solutions provider. Choice Solutions Ltd. business comprises of Six different practices, namely

IMS

- Desktop, Server, Network, Storage, Support, OS, Assets, Apps, Non IT
- Hardware - A-Add, M-Modify, I-Install, C-Change, R-Repair
- Assets, Security, Software Distribution, Upgrades

Networking

- Packaged Services Monitoring & Management
- Products, Security, Design, Deploy, Maintain
- Auditing & Compliance, SOC

Datacenter

- DC Audit, Monitor & Manage, Training
- Assess, Design, Built, Deploy, Disaster Recovery

Consulting

- Business Consulting, CIO & Technology Services, Physical Security, Power Devices, IT Consulting
- DC Consulting, ERP, CRM & Custom Apps

Cloud Computing

- Cold Site – Backup, Disaster Recovery
- Hot Site – HaaS, Software, Manage
- Public Cloud, Private Cloud, Hybrid Cloud
- CaaS, License Software, IaaS
- Disaster Recovery

Power

- Power Audit, Equipment Management
- Physical Security, Power Devices
- Power Saving Devices
- Design & Audit
- Renewable Energy Products