

# Choice Case Study

## Analysis, Site Selection, Design Solution and Project Management for Equity Bank Datacenter at Nairobi, Kenya

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### Project Preface

Choice Solutions Limited was short listed by Equity Bank, Nairobi Kenya from an international selection of over a dozen consultants to carry out requirement need analysis, do site selection for Datacentre, and design the physical infrastructure for a Tier IV Datacentre and Project Manage the execution.

Equity Bank is a leading public listed Microfinance Bank in Africa with over 4.3 million customers in 2009 (61,000 in 2000) and an asset base of over Kenyan Shillings 100 billion (approx US\$ 1.3 billion). It has a strong quality focus which has helped them win numerous like the Best Microfinance Bank in Africa, 2008 & 2009; Super Brand in East Africa; Global Vision Award 2007; Best Bank in Kenya 2008; Best Performing Ai 100 company in Africa -2008, and many more.

Equity Bank has a wide foot print across Kenya & Uganda and is now planning to grow across the entire African continent. The existing infrastructure is not geared up to handle this growth and hence a total revamp of the system was proposed.

Due to its large customer base, the bank is also reputed to having significant down time of ATMSs occurring towards the end/start of the month when salary related transactions are the highest. The new Datacentre is being populated with high-end IBM hardware equipment and a new core banking solution to ensure high uptime. The bank is at the same time focusing on the support infrastructure to be of similar high resilience to maintain Tier IV uptime levels.

Another issue was the system functionality design. The bank had faced an episode where due to equipment fault, power could not be delivered to the DC although the DG was running.

## The Challenge

In this project, Choice Solutions Ltd. was expected to study the existing Datacentre physical infrastructure issues and propose a high end solution that mitigated the problems and maintain Tier I V up time. Choice Solutions was also expected to provide a feasibility report on the location proposed for the new Datacentre. Finally Choice Solutions Ltd. was required to assist the bank in selecting the right products and project manage its successful delivery.

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A challenge that was identified early was the fact, that the proposed location was not suitable for housing a Datacentre. The bank had assumed that the identified space would be adequate and were assuming that the consultant's sign off for this was but a formality. By carrying our detailed analysis of the space, we concluded the identified location was not suitable. At the same time we also identified an alternate location that was better suited. A thorough and lucid presentation to the stakeholders – which could only be approved by the Bank's CEO and MD - brought instant buy in to this significant change in their plans.

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*Another significant challenge was the HVAC solution.*

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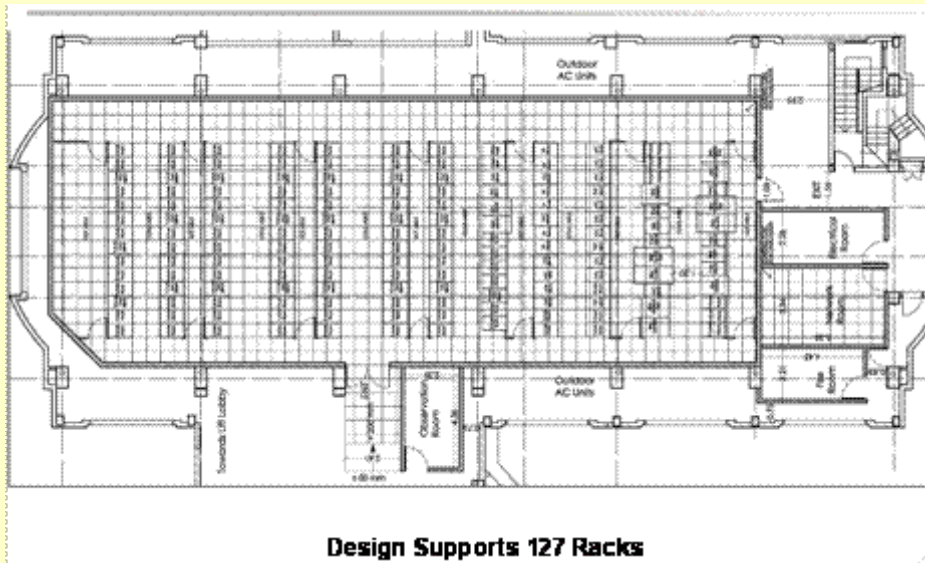
Another significant challenge was the HVAC solution. We learnt soon enough that high-end solutions have never been deployed in Kenya and the local vendors were not geared up for delivering the solution. We were able to discuss these challenges to our partners in India and leverage these relationships to obtain solutions from their South African counterparts.

The project scope included

- “As Is” Analysis of existing DCs
- Requirement gathering for DC
- Site Analysis for New DC and DR locations
- Designing Scalable solution for
  - Physical Layout of the DC and associated Services Areas/Rooms
  - Power load calculations
  - Electrical design for HT and LT network
  - Physical and logical security
  - Fire detection and suppression
  - Surveillance system
  - Access control
  - Network management system
  - Network architecture drawings
  - Precision cooling solution
  - Water Leak detection system
- Issuing Tenders for above systems & Evaluating Vendor responses
- Project Management

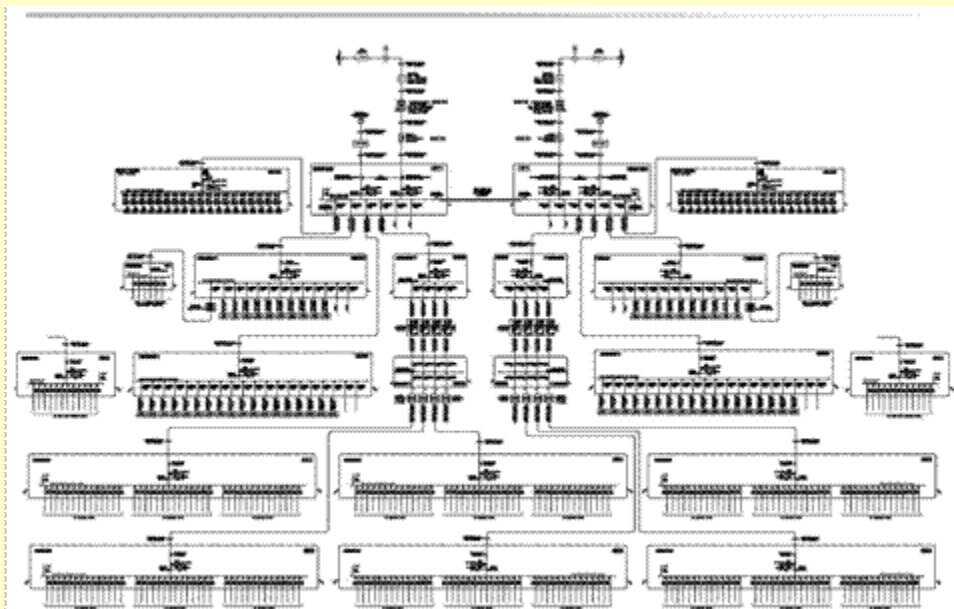
## The Solution

- The diagram shows two independent power distribution paths with all components having redundancy to ensure the highest level of uptime and no single point of failure. The solution allows for modularity to provide a scalable solution to meet future growth needs



*Layout – Progressive Iteration - Design*

- Multiple review sessions were held with the stake holders to progressively iterate the design. This helped bring in different & diverse points of view and the end result was accepted by all the stake holders



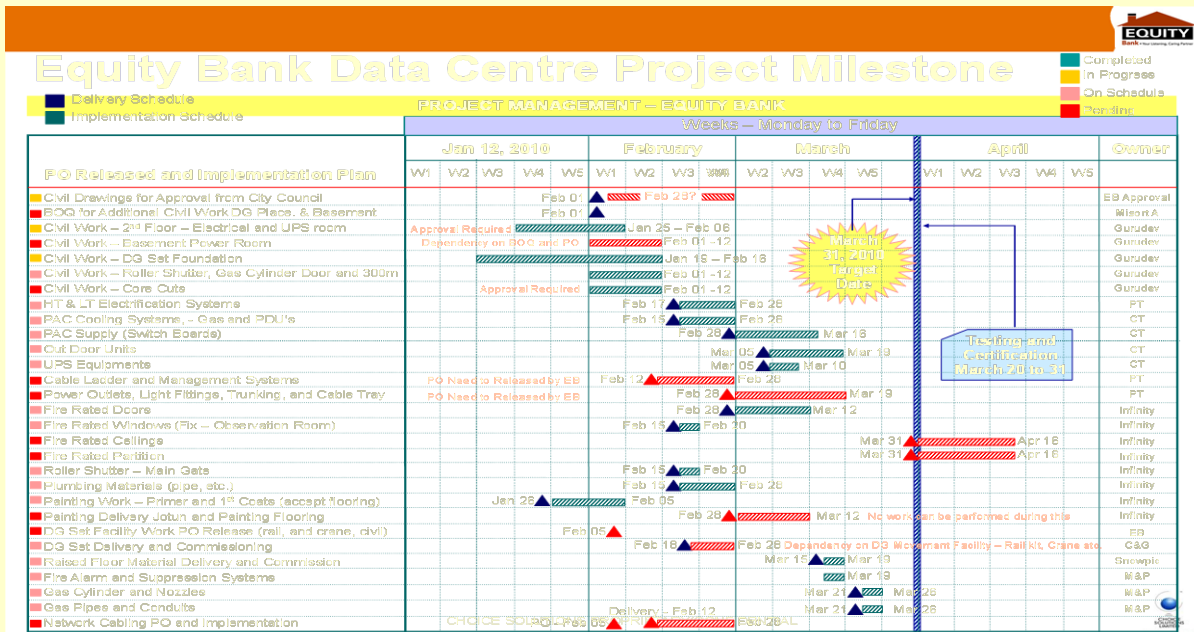
*Electrical SLD – Option 2 with Two DGs*

- Once DC Layout was finalized, the services planning were carried out. Multiple options were provided here to find the optimal balance between functionality, modularity, time line, local support and total investment requirements
- Cooling typically consumes up to 60% of total power consumption. Much attention was provided to ensure optimal sizing. A thorough cost-benefit analysis between perimeter cooling and In-Row cooling systems was carried out. The key parameters were usage of high density servers, low floor to ceiling height, uncertain growth period and pattern, requirement for maintaining high level of diversity without impacting initial cost and future scalability
- This project is the first Tier IV data centre in Kenya and only the second in the African continent. It was proposed to the client to have it certified by Uptime Institute. Proposal has been obtained from Uptime Institute for certifying the Datacentre and the proposal is under consideration by the client

Perimeter Cooling									
		CRACK & LEAK			RESEARCH & DEV			DEVELOPMENT	
Parameter	Description	Rating	Max Score	Envelope South Africa	Yes/No	Score	Computer Technique	Yes/No	Score
Air conditioner Model and Make				CR 032			Introw RFD (ACFF)02		
Condenser Model and Make				CR 032			ACCF0202		
Type of Refrigerant	R410A/R407C/R404A	C	3	R410A	Yes	3		Yes	3
Should be > 2000h		C	3	90%	Yes	3	100%	Yes	3
Total available cooling capacity	The parameter for measuring actual cooling capacity (kW)	C	3	Min 120kW variable	Yes	3	Min 140kW variable at design point	Yes	3
Total air flow rate	PAC in 1000lit/min capacity	C	3	Not provided		0	1200 CFM	Yes	3
Total Power consumption	Efficiency measure	C	3		Yes	3		Yes	3
Type of discharge	Data Centre design parameter	C	3	Horizontal or flow	Yes	3	Up/Quartz air flow	Yes	3
Has the vendor submitted load design sheet		E	3	Not provided		0	Not provided		0
Has the vendor proposed a diffuser layout based on the design of cooling coils in specifications		E	3	Cooling solution based on design specifications	Yes	3	Cooling solution based on design specifications	Yes	3
Has Cold water condenser work done by the vendor		C	3	Yes Vendor has proposed 1000lit/min capacity	Yes	3	Yes Vendor has proposed 1000lit/min capacity	Yes	3
Is the alternative work done the PAC done included in the scope		D	3	Yes	Yes	3	Yes	Yes	3
Is the alternative piping included in scope		D	3	No		0	No (Rate Provided)		0
Is the drain piping included in scope		D	3	No		0	No (Rate Provided)		0
The PACs are to be DR type air-cooled type installed within a rack of racks. With all necessary ductwork of cooling, bearing, humidification, dehumidification, air filtration, condenser management, temperature control, static discharge and data communication.		C	3	Yes	Yes	3	Yes	Yes	3
<b>Coating Cabinet</b>									
Provide cap front covers to be suitably sized with class "C" particulate capture (100% of Virus) conditions. Access from front and rear for compressor removal.		C	3	Yes	Yes	3	Yes	Yes	3
<b>Direct expansion Cooling Circuit</b>									
Refabrication circuit to incorporate scroll compressor with condenser, evaporator, filter drier, receiver, solenoid, sight glass, liquid line subcooler valve and an externally regulated expansion valve.	Scroll types preferred	E	3	As per specification	Yes	3	Reciprocating Compressor	Yes	3

PAC Evaluation

- A detailed vendor neutral VED analysis was carried out to ensure best technical solution for the client. This included all the key packages like Electricals, PAC, Fire Detection & Suppression, Access Floor, etc.



- An easy to comprehend snap shot view of overall status for the client's Steering Committee ensures quick appreciation of the issues and fast decision making. The client is on weekly basis appraised of the status of the project against the required deadline and also the steps to be taken to mitigate potential delay factors

## The Benefits

The client would be able to take advantage of the following benefits from the proposed architecture of this project

**Scalability and Modular Design:** Various aspects of the facilities like UPS, Diesel Gensets and precision air-conditioners in the datacenters are scalable.

**High Service Uptime:** This was ensured using server-level clustering and failover as well as application load balancing using software or hardware devices.

**Protection from Equipment Failure:** There is redundancy for Transformer, UPS, Diesel Gensets, PACs (Precision Air-Conditioners) and the entire power delivery path.

**Low Initial Investment:** The client desired to limit the Day 1 investment which has been achieved.

**Lower Power Consumption:** By creating isolated hot/cold aisles and a scalable AC solution, power wastage due to excessive cooling was avoided.

**Easy to Understand Vendor Neutral Analysis:** By agreeing to a VED analysis along with pre-defined criticality factors, the client was assured of selecting the most optimum techno-commercial solution.

**Client Satisfaction on Delivery Date:** All stakeholders are in-sync on the project progress, the key issues & risks and mitigation strategy. This ensures that we are the best in mapping client expectation to ground reality and therefore ensuring project success.

### Benefits to Choice Solutions Ltd.

The Equity Bank project provided a prestigious international project reference for Choice Solutions Limited. The depth & width of the project included a significant portion of the C.o.E. teams' viz., DC Consulting, Electrical, Civil, IT and Physical Infrastructure. This project thus brought up an excellent opportunity to many team members to firsthand experience a high demand delivery in a new cultural setting. The team also quickly learnt, how to manage varying specifications to meet local regulations and availability. For PAC solution, the team was also able to leverage their Indian partnerships to obtain acceptable solutions from APC and Emerson in South Africa as the required solutions were not available in Kenya. New learning has also come to the team members due to difference solutions e.g Kenya uses carbon scrubbers as against tall flue stacks for DG exhaust.

If we take up the case of the customer, they were able to leverage the skills of several technical verticals by giving the contract to Choice Solutions Ltd. The project being executed worked for the best interests of both the customer and Choice Solutions Ltd.

## 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