

# **IV TIER NATIONAL DATA CENTER BUSINESS PLAN (DRAFT)**

**Establishment of IV Tier National Data Center (4TDC)**  
Bangabandhu Hi-Tech City, Kaliakoir, Gazipur

Dhaka Office: 11<sup>th</sup> Floor, ICT Tower, 14-E/X Agargaon  
Sher-e-Bangla Nagar, Dhaka 1207  
☏ 880-2-8181154  
Bangladesh Computer Council  
Information and Communication Technology Division  
Ministry of Posts, Telecommunications and Information Technology

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## IMPORTANT TERMINOLOGIES

- i. *4TDC* means IV Tier National Data Center of Bangladesh.
- ii. *BDCCL* means Bangladesh Data Center Company Limited, which is a public limited company under ICT Division.
- iii. *Cage Hall* in this document, means the area where sever racks or rack space are located.
- iv. *Cost Delta* is the ratio of the change of price of an option to the change of price of the underlying cost.
- v. *Colocation Service* means infrastructure (power and cooling) availability including space required for hosting data center equipment.
- vi. *Cloud Server* is a computing server that is readily available, flexible and extensible, consisting of CPU, memory, system disk, and operating system, to build an efficient, reliable and secure computing environment, ensure lasting and stable operation of service.
- vii. *Cloud storage* provides users with cross platform unstructured file storage services.
- viii. *Cloud Backup* is a disk based backup service that enables users to create backups for the disk.
- ix. *Cloud Desktop* in this document means a virtual windows desktop service to be provided through ZTE thin client.
- x. *CUB* in this document has been referred to Central Utility Building located on the either side of the data center building to house all utility infrastructures like transformers, generators, chillers, etc.
- xi. *Data Center Product* means services offered by the Data Center to customer against some cost.
- xii. *Event* is change of state that has significance for the management of an IT service or other configuration item.
- xiii. *Incident* means an unplanned interruption to an IT Service or a reduction in the Quality of an IT Service.
- xiv. *MDC Hall* in this document refers to the *cage hall* that contains all modular data centers (MDC).
- xv. *Problem* is the unknown underlying cause of one or more incidents, and a 'known error' is a problem that is successfully diagnosed and for which either a work-around or a permanent resolution has been identified.
- xvi. *Risk* is possible event that could cause harm or loss, or affect the ability to achieve objectives.



## **IV TIER NATIONAL DATA CENTER BUSINESS PLAN - 2020**

### **1.0 INTRODUCTION AND BACKGROUND**

- 1.1 The revolutionary development in the field of ICT has opened up new opportunities for developing countries to move forward. Bangladesh is now aspiring to achieve economic growth through the application of Information and Communication Technology (ICT) at all stratum of the society and accordingly, government has shown keen interest and regarded ICT as a thrust sector. ICT has also been considered as driving tools for increasing efficiency, productivity, transparency, access to information by the citizens. In this respect, government of Bangladesh has pledged to build up a Digital Bangladesh within 2021.
- 1.2 The basic foundation for the digital government records and e-services demands storing data in a secured environment ensure prevention of data loss or pilferage and allow seamless integration with the e-service. The growing demand for digital services, the social-media explosion and constant collection of big data has put increased pressure on Data Center growth. Data Center guarantees uninterrupted service and controls costs while upgrading capabilities for higher bandwidth and increased storage capacity. Bangladesh Government, in light of the vision 2021: Digital Bangladesh envisages bringing the services to the doorsteps of the citizen. This has created an opportunity for Government to Government (G2G,) Government to Citizen (G2C), Government to Business (G2B) and the proposed Data Center will fulfill the demand.
- 1.3 Bangladesh Computer Council (BCC) established a Tier-III Certified Data Center in 2011. The current requirement from different government and non-government organizations, Banks and Financial Institutions, Educational Institutions, etc stands at over 300% of the previously built capacity. Furthermore, the security of the data, information and digital content has become mandatory to have an exclusive and highly secured infrastructure to house the Data Center.
- 1.4 Government of the People's Republic of Bangladesh started the journey of the IV Tier National Data Center in 2015. On 14th October, 2016 the Honorable Prime Minister of the People's Republic of Bangladesh, Sheikh Hasina and the Honorable President of the People's Republic of China Xi Jinping Laid the Foundation for the IV Tier National Data Center at Bangabandhu Hi-Tech City, Kaliakoir, Gazipur. The Data Center has already been built and has achieved Uptime Certification as the first Tier IV Government owned data center in the South Asian Region.
- 1.5 *Salient aspects of the preamble is at Annex - A.*

## **2.0 SCOPE AND PURVIEW OF THIS PLAN**

2.1 IV Tier National Data Center of Bangladesh is owned by the Government and shall be operated by a public limited company named Bangladesh Data Center Company Limited (BDCCL). However, BDCCL or the agencies and individuals authorized by the company reserves the right to regulate the operation, maintenance, management and business growth of this IV Tier National Data Center of Bangladesh.

### **2.2 Scope**

This document establishes the procedures, policies, guidelines, plans, rules and assigns responsibilities for all issues related to the business operation of IV Tier National Data Center of Bangladesh in line with Company's Memorandum of Association (MoA) and Articles of Association (AoA). Unless otherwise stated, or the plan is revised, this plan shall remain in vogue for the purpose of business operation of this IV Tier National Data Center of Bangladesh.

### **2.3 Purview**

2.3.1 The data and information stored in the data center, the equipment, accessories and software needed to access and protect these, the users of the data center services, the supplier and vendor related to the supply chain, all together falls under the purview of this plan.

2.3.2 For the purpose of this plan, IV Tier National Data Center Asset is defined as "equipment or interconnected system or subsystem that is used in the acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by any agency stated above. It also includes computers, ancillary equipment, software, firmware, and similar procedures, services (including support services), and related resources. The term also includes any external device used to access the Data Center".

### **2.4 Ownership and Review**

2.4.1 BDCCL exclusively preserves the right to the ownership of the plan.

2.4.2 BDCCL shall review the current plan at least once in every two years.

2.4.3 However, Data Center Services require being innovative demands adoption to newer technologies and concepts; thereby the Board of Directors may revise the plan at any point of time for the interest of the company.

2.4.4 A special committee formed by the Board of Directors shall be authorized to revise the plan. Managing Director by virtue of the appointment shall chair the committee.

## 2.5 Attributes to be Reflected throughout the Business Plan

All policies outlined in this document must reflect following common attributes:

- (a) Data and Information must be secure to all forms of threat at all times.
- (b) It shall be accessible by and shareable to only authorized persons or agencies enabling it to be used as a resource or customer.
- (c) There must be redundancy in storing information at all level of system architecture and solution.
- (d) There must persist accountability to one single organization (i.e. Information and Communication Technology (ICT) Division) with respect to usage and breaches of this plan.

## 2.6 Legal Issues

Breach of any part or portion of the rules, policies and regulations outlined in this Plan shall be treated under Official Secret Act-1923, National Cyber Law 2006 and ICT Act 2013 of Government of the People's Republic of Bangladesh or any other applicable laws or rules circulated time to time by BDCCL, BCC, ICT Division, Bangladesh Telecommunication Regulatory Commission (BTRC), Ministry of Posts, Telecommunications & Information Technology, or Government of the People's Republic of Bangladesh.

# 3.0 DATA CENTER OVERVIEW

## 3.1 Civil

3.1.1 The Data Center is located in the Bangabandhu Hi-Tech City, Kaliakoir covering an area 28,000 m<sup>2</sup>. It has a large building area of 16000 m<sup>2</sup> with two floors reinforced concrete frame structure, which belongs to Category G buildings and Grade 1 fire-fighting index according to BNBC (Bangladesh National Building Code) version 2006. The ground floor has four cage halls with the capacity of 604 racks and supported infrastructure facilities like battery room, fight fighting room, etc. There are two Central Utility Buildings (CUB) on either side of the main building for Generator, Transformers, Chillers, etc. The first floor has the Network Operation Center (NOC), different Administration Offices, and areas for future expansion.



- 3.1.2 Appropriate business case shall be developed by BDCCL prior to utilizing the reserve space for business expansion. Any expansion of the civil infrastructure shall be in conformance with the existing design following latest BNBC version.

### 3.2 Electrical

- 3.2.1 The data center facilities being Tier-IV certified by Uptime Institute, the downtime is 0.005%, which ensures customer's reachability to data center services round the clock. All infrastructure facilities are fully redundant. Power distribution system of the data rooms is planned according to 2N system. Two independent utility paths created from two Central Utility Building (CUB). Total eight sets of generators, UPS, and chillers are supporting the Data Center having provisions for two dedicated redundant facilities for each cage. It can sustain power outage of 96 hours. The power distribution system of IT load is relatively independent from that of the utility power to safeguard the expensive data center equipment.
- 3.2.2 Necessary expansion of the electrical facilities shall be ensured should there be any expansion of the civil infrastructure or expansion of the Data Center facilities within existing civil infrastructure. In such case, the new expansions or modification to existing design shall follow Uptime Standard and be Uptime certified before making those operational for the Data Center.

### 3.3 Mechanical

- 3.3.1 Mechanical Designs are focused into three key features as *Safety, Economy and Flexibility*. Air conditioning cold source and terminal system adopt 2N design due to the requirements of data center for high system *safety* and uninterrupted support where each cold source possesses uninterrupted cold supply design. In view of the large power consumption and long operation time of data center, the micro module design adopts cool channel sealing, water chilling unit and water pump of cold source adopt variable frequency equipment and indoor precision air conditioner set adopts *economy*. Modular design is adopted so that construction may be conducted by module, the design of this system takes the system expandability into consideration for the convenience of reserved space for equipment and reserved interface for pipeline. Necessary expansion of the mechanical system shall be made should there be any expansion of floor area or increase of electrical load.

### 3.4 Network and Cloud

- 3.4.1 The data center network has been designed with latest industry standard protocols and design parameter. The overall network backbone is 40G. High capacity core switch of 100G has been deployed to handle total data traffic for all cloud

services. The cloud services are created of 266 blade servers (offer 11,200 vCPU) and 2PB cloud storage. It also has the provision of 2000 cloud desktop terminal. The resources are clustered as *common performance* and *high performance* resource pool to facilitate utilization of cloud services according to the requirement of computational power by the agencies. The high-performance resource pool is configured with all full height blade servers. The all-in-one backup node in the backup resource pool can back up VMs, services and storage.

- 3.4.2 In case deployment of new cloud platform, separate computation and security devices shall have to be catered. However, the tenants of the Data Center will be part of the existing cloud and shall share the existing security services.

- 3.5 ***The details of Data Center Overview is at Annex - B.***

#### **4.0 DATA CENTER OPERATION AND MAINTENANCE**

- 4.1 This Data Center shall be maintained with highest standard of operation procedure in order to provide best quality service to the customer. The purpose is to coordinate and carry out the activities and processes required to deliver and manage services at agreed levels to business users and customers.
- 4.2 The objectives of such operational activities are to (a) Maintain business satisfaction and confidence in IT through effective and efficient delivery and support of agreed IT services; (b) Minimize the impact of service outages on day-to-day business activities; (c) Ensure that access to agreed IT services is only provided to those authorized to receive those services.
- 4.3 ITIL standards shall be followed for the operation and management of event management, incident management, problem management, risk management, request fulfillment, availability management, access management, change management, capacity management and service continuity management.
- 4.4 Adequate number of support staffs shall be maintained to ensure smooth operation and maintenance. Whenever any new equipment/device/accessories shall be purchased, proper training on operation and maintenance shall be conducted. Additionally, capacity building training shall be considered as routine activities and to be conducted in each quarter for all technical staffs of the Data Center.
- 4.5 The Data Center has already been awarded with TCDD (Tier Certification of Design Document) and TCCF (Tier Certification of Constructed Facility). In future TCOS (Tier Certification for Operational Sustainability) may also be obtained to ensure that all the business process is performed according to uptime standard. This will immensely contribute the business growth. However, initiative for TCOS shall be taken after the

Data Center has been handed over from the vendor and operated by the integral resources of BDCCL.

- 4.6 *A suggested Operation and Maintenance Procedure is at Annex -C;* however the BDCCL reserve the right to modify the operation and maintenance procedure time to time to respond faster to customer's need.

## 5.0 DATA CENTER SECURITY

- 5.1 Good standard of security measures of the Data Center creates customer's confidence and contribute to business growth. IV Tier National Data Center must display highest level of security to attract the customers. The security rules are intended to ensure the safety and security of data and equipments at the Data Center.
- 5.2 Security must be ensured at levels including (a) Physical security, (b) Security of the devices, (c) Network security, (d) Management security, (e) Virtual security, and (f) Data Security. Failure to adhere to the security rules should be viewed seriously and may result in the expulsion of individuals from the Data Center or result in the declaration of default by BDCCL for the Customer and the termination of the Customer contract.
- 5.3 Appropriate response to violations of these rules shall be solely within the discretion of BDCCL and the company reserves the right to update, modify or amend these rules, as necessary.
- 5.4 Anyone working inside the Data Center other than the regular staff members for any duration exceeding 72 hours should sign an NDA. A sample NDA is attached with this document.
- 5.5 Other relevant details of the *Data Center Security is at Annex - D.*

## 6.0 DATA CENTER MARKET ANALYSIS

- 6.1 The target market for Data Center business in Bangladesh is defined by all government and private organizations including selected individual customers. However, in addition to the government entities, the company shall have considerable focus on educational institutes, research and development organizations, banks and financial institutes, etc.
- 6.2 In order to segment the appropriate customers from the wide range of target customers, the company shall undertake appropriate marketing strategy. All out efforts including seminar workshops, lectures, etc. shall be conducted on a periodical basis in order to promote and maintain good business in this sector. An initial plan of minimum BDT 50

lacs has been proposed for business development, which shall be revised by the company every year during Annual General Meeting (AGM).

- 6.3 IV Tier National Data Center being state owned gives additional confidence to the customers and certainly stimulate a blue ocean market in the said industry. Moreover, this IV Tier National Data Center is Uptime Certified and the first Government owned Tier IV Data Center in the South Asian Region. Thereby international organizations (e.g. Facebook, Twitter, YouTube, Google, Amazon, Alibaba, etc.) may also be interested for utilizing its facilities in order to fulfill their business need.
- 6.4 There are likely to be adequate competition among the clients because of the state of the art technology that has been deployed. It is also important to adopt appropriate strategy for selecting appropriate customer from potential customer segments since a good customer can create many customers. Creating customer variety is also important. Therefore, one single client despite his customer potential may not be allowed for renting large resources; rather variety of customers covering the entire customer segment should be given preference.
- 6.5 A potential customer is expected to be security cleared by the cyber security agencies of Bangladesh. Additionally, the offered Revenue Contribution shall also be rationally compared with the Brand Value and potential Business Risk. A board headed by the Managing Director (MD) shall be responsible to select the appropriate customer as per the matrix given in Annex H. It is worth mentioning that the company reserves the full right to revise the selection criteria at any point of time in order to fulfill the short, medium or long term business need of the company.
- 6.6 ***Salient aspects of Data Center Market Analysis is at Annex - E.***

## **7.0 PRODUCT CATALOG**

- 7.1 Product or Service Catalog is a Database or structured document with information on all live IT services, including those available for deployment. It is part of the service portfolio and contains information about two types of IT service: customer-facing services that are visible to the business is the primary responsibility of BDCCL; and supporting services required by the service provider to deliver customer-facing services is the primary responsibility of the vendor.
- 7.2 Data center offerings are made up of many different services - from the basic provision of power, space and connectivity to web hosting to IT services to cloud-based software as a service. Clients can be offered one of these services or a combination of them. IV Tier National Data Center is capable of offering wide range of products to its valued customers. ***A suggested service catalog has been proposed at Annex - F.***



- 7.3 While creating new products, the company shall adopt appropriate product strategy either by product innovation or cost leadership. Since there is no other Tier-IV Data Center available in this region at present, product innovation may be preferred over cost leadership now; however, the winning strategy shall be revised at least twice every year. At all cases, the newly launched products shall be augmented by good marketing.
- 7.4 The Data Center products should be categorized (e.g Basic, Standard, Advanced, Premium, etc) in order to accommodate variety of customer needs. Price benefit should be given to the premium customers as part of a business strategy, but average price point that Impacts Company's net revenue should be retained.
- 7.5 There is high performance resource pool consisting of high capacity blade servers, which are appropriate for organizations requiring higher computational efficiency. Appropriate organizations should be chosen for utilizing such facility. Additionally, looking at the customer response now, future decisions should be taken for product innovation.
- 7.6 The existing service catalog focuses more on renting the colocation services, which gives stable revenue in the startup. However, if additional cloud services can be created by converting part of the colocation resources to cloud services, the net revenue of the company increases significantly. Thereby, company shall review their financial analysis every year and take appropriate steps to increase the revenue. However, the existing service catalog shall be observed for at least two years to make revise customer response.
- 7.7 The startup prices have been proposed based on the existing market survey. However, the proposed prices shall be revised by the company in every quarter supported by a valid market research and survey.
- 7.8 BDCCL may provide Consultancy, Design, Deployment and other management services based on discussion with customer and availability of the resources. The company may also offer associated network support to install and commission a product.

## **8.0 FINANCIAL ANALYSIS**

- 8.1 This document includes *a financial analysis at Annex G* based on the existing administrative status and market scenario. This would serve as a baseline for future financial analysis. Revision of the financial analysis, supported by new market research and survey, shall be done every year in order to monitor and control revenue earning.
- 8.2 The company may allow investment by local or foreign company or organizations in the form of Public-Private-Partnership in order to contribute to business growth.



## 9.0 SUSTAINABLE BUSINESS STRATEGY

- 9.1 How a product shall be contributing to revenue earning depends largely on the marketing effort. It is important to spot appropriate customer segment from a wide range of target and bring product innovation accordingly. The concept of marketing mix i.e. 5P (Product, Price, Placement, Promotion and People) shall be exercised before launching a product.

### 9.2 Product

- 9.2.1 Data Center product should be innovative having features which other providers do not offer. The products must have optimum standard and quality to create customer satisfaction. Post delivery service support is considered part of product in modern business concept; as such high standard of service support must be ensured at all times with every product.
- 9.2.2 Existing product catalog offers a large amount of colocation services. There is huge demand for colocation services and it also offers stable revenue; as such colocation shall remain as a continuous and saleable product in all times. However, priority maybe given to the organizations requiring to establishment of DC or DR.
- 9.2.3 Since, cloud services provides comparatively higher ROI, efforts should be taken to convert part of the colocation services into cloud services gradually. However, proper market study shall be conducted well before this transformation.
- 9.2.4 Gradually shared DR and multi tenancy should be implemented for similar corporate (e.g. one tenant for all banks, all telco in one tenant, etc). This will reduce dependency on colocation facilities.
- 9.2.5 Collaborate with Industry Software and fulfilling regulatory need is a future looking concept of business. BDCCL may build customized solution common for a group of similar corporations e.g. banks, telcos, garments, etc. and invite them to use. Such solutions may also be built on revenue sharing basis with OEMs/Developers, which will significantly reduce the operating cost and benefit customers. Such models are called Box concept for example Bank- in-Box (BIB), Telco-in-Box (TIB), etc.

### 9.3 Price

- 9.3.1 Since, this is the only Tier-IV certified Data Center, setting premium prices for the Data Center products is justified until the market remains blue ocean for the company. Moreover, the Data Center being state owned gives additional confidence to the customers. Therefore, premium prices may be charged for the products.

- 9.3.2 As per cost delta principle, Tier-IV Data Center can have on an average 38% price escalation over Tier-III. Since there is already an established Tier-III Data Center in the country owned by BCC, BDCCL may use these prices as baseline to set prices for Tier-IV products in the context of Bangladesh.

#### **9.4 Promotion**

- 9.4.1 Frequent seminars, workshops, lectures, etc. shall be conducted in order to promote the Data Center Products.
- 9.4.2 There shall be allocations for business development every year. The initial allocation of minimum BDT 50 lacs maybe a baseline to estimate future requirement.

#### **9.5 Placement**

- 9.5.1 This is the distribution strategy of the Data Center products. The entire products should be easily accessible for purchase by the customers. Large corporate customers may be allowed to have site visit before making purchasing decision.
- 9.5.2 Products shall be delivered and service support to be rendered to the customers within agreed Service Level Agreement (SLA) time.

#### **9.6 People**

- 9.6.1 Periodical training shall be conducted to build and maintain professionalism by the support staffs directly dealing with customers. A dedicated hotline service shall be catered to address customers problem at all times.
- 9.6.2 Whenever any new equipment/device/accessories shall be purchased, proper training on operation and maintenance shall be conducted.
- 9.6.3 Capacity building training shall be conducted in each quarter for all technical staffs of the Data Center.
- 9.6.4 TCOS (Tier Certification for Operational Sustainability) certification may be helpful to raise the standard of the service support and do sustainable business.

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### 9.7 Priority Plan

The Data Center has a state-of-the-art IT facility. This is the first Tier IV certified Data Center in Bangladesh. Thus the services of the data center will be high on demand. This data center will serve its clients according to the following priority:

- Priority-1.** The data center is a Government owned data center. Therefore Government organizations which require high security and deliver wide services to the citizen will have a priority level one in terms of receiving services from the data center. With a view to developing image, network, work scope, etc and increasing income, potential clients like International or Multinational organization as the management thinks fit, may be considered as Priority-1.
- Priority-2.** Government Organizations other than Priority-1: any Government owned organizations or Government owned company or authorities or agencies other than priority level 1 will be given as Priority-2.
- Priority-3.** Non Government Organizations/ Private Organizations: Non-Government or Private Organizations should hold the priority level of Priority-3.

The Management will preserve all rights for giving service preferences, in terms of similar organizations. The management shall also preserve all rights of the discount factor.

### 10.0 CONCLUSIONS

Data Center needs to be operational 24/7, and hardware expansion needs to take place seamlessly without interrupting services. The advantage of this Data Center is the ability to scale, in real time, without changing underlying infrastructure. Expanding the bandwidth or storage capacity of an existing infrastructure is driven more by operational, supply-chain, test-engineering and logistics challenges than by design or architectural decisions.

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## **ANNEX-A: OBJECTIVES, PURPOSE AND BENEFIT**

### **A.1.0 Objectives of the Data Center**

- (a) Provide an international standard national data center as the solid foundation of the Digital Bangladesh Vision 2021.
- (b) Provide unified management data center to all the government ministries to realize the sharing of resource and data.
- (c) Provide cost-effective data center services to the government and enterprises.
- (d) Provide a top level security and safety cloud service to both government ministries and enterprises.
- (e) Create environment for the growth of e-government, e-business, e-commerce, e-education, etc.

### **A.2.0 Purpose of the Data Center**

- (a) To expand the services and storage to government offices connected through wide network to be established under Phase-I Bangla Govnet project and Phase 2 info sarkar project to all the district and upazilla level offices throughout the country.
- (b) To improve government e-service efficiency and promote interaction between ministries/divisions, departments, districts and upazillas by sharing information through government ICT network infrastructure.
- (c) To use ICT system within the public administration to improve efficiency accountability and transparency, reduce wastage of resources, enhance planning and raise the quality of services.
- (d) To maximize the automation of work processes through integrated information management system utilizing National E- Service system (NESS).
- (e) To ensure seamless resource and information sharing between government organizations and improve delivery of services to the citizen.

### **A.3.0 Core Value of the Data Center**

- A.3.1. Intelligent Infrastructure meaning
  - (a) Earthquake Resistant Structure
  - (b) Explosion Proof Wall
  - (c) Extreme Secure & Intelligent Design

(d) Green Energy Features

- A.3.2. Comprehensive Cyber Security focusing
- (a) Cyber Attack Protection & anti-virus
  - (b) Cyber Intrusion Detection
  - (c) Deep Packet Inspection
  - (d) Operation Behavior Audit
  - (e) More Sophisticated Security Features

- A.3.3. Rich Service Offerings includes
- (a) Government self-use
  - (b) Customized service for Big Enterprise
  - (c) Application Suite for SME
  - (d) Bandwidth Rental, CDN Buffer and Disaster Backup Services

- A.3.4. Thorough Trainings including
- (a) One year full on site operation service
  - (b) Oversea training in ZTE University
  - (c) Uptime Institute On-site consultation and certification for Tier IV qualifer.
  - (d) Oversea Tier IV Data Center study
  - (e) Continuous local training for Data Center design, construction and operation.

**A.4.0 Project Benefits**

In addition to the great direct and indirect economic benefits, the project construction also has significant positive influence on the economic and social development of Bangladesh.

**A.4.1 Accelerate to realize the Digital Bangladesh Vision 2021.** As the infrastructure and heart of each e-solution, this Data Center will greatly support the deployment of these solutions. The data center will easily provide the necessary environment to deploy these solutions, and expand with them. This will greatly accelerate the realization of the Digital Bangladesh Vision 2021.

**A.4.2 Increase the job opportunity, reduce the pressure on employment.** To complete such large scale Data Center and related infrastructure, a large quantity of labor is needed, including the construction, operation, maintenance, etc. The project brought many work opportunities to Bangladesh, which greatly reduced the pressure on employment of Bangladesh as well.

**A.4.3 Greatly contribute on the GDP of Bangladesh.** This Data Center will contribute on the GDP of Bangladesh from construction to operation. In the construction stage, large amount of money has been invested to both the data

center itself and the related infrastructures, labors, services, etc. In the operation stage, there will be a team to operate and maintain the data center. Meanwhile, a lot of private enterprises will use the data center services. As a result, the GDP of Bangladesh will increase greatly.

- A.4.4 **Promote the influence of Bangladesh.** With the implementation of this world class Data Center, the advanced large scale data centers will use Bangladesh as a hub to reach out to the whole South Asia countries. The influence of Bangladesh will correspondingly be promoted in the area.
- A.4.5 **Saving the cost of energy, communication, travel.** The utility will realize electronic work flow in both government and private enterprises, and a huge quantity of communication cost, travel cost will be saved. The data center itself is designed to realize the high Power Usage Effectiveness which means the energy will be used with much higher efficiency. Thus, much energy will be saved.
- A.4.6 **Promote government efficiency, shorten the approval time of process, and promote the satisfaction of citizen.** As the Data Center will realize the electronic work flow, the process time for each link of the whole procedure will be greatly shortened. Thus will make the citizen more satisfied with the government.
- A.4.7 **Reduce the cost of Data Center for local enterprises; promote the access speed of Data Center.** As the Data Center is owned by the Government of Bangladesh, the cost of data center services will be lower than the foreign data centers, so the cost of data center for local enterprises will be reduced. Meanwhile, as the connection between data center and local enterprises only goes in Bangladesh, the connection speed will be improved greatly, which will remarkably improve the work efficiency of local enterprises.

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## ANNEX-B: DATA CENTER OVERVIEW

### B.1.0 Civil and Architectural Overview

This sub-section describes the design strength of the Data Center building and other utility infrastructures. Customer's knowledge of the design and layout would provide additional confidence and help them in executing their action plan easily.

### B.1.1 Data Center Building

- (a) Data Center Building has two stories above the ground. The **ground floor** is machine room area. The main machine room area is used for installation, operation and maintenance of processing, storage, network and transmission equipment for electronic information system. **The supporting area** consists of uninterrupted power supply system equipment room (UPS machine room), backup battery room, machine room precision air conditioner room, auxiliary area precision air conditioner room, security monitoring weak-current equipment room, fire-fighting steel cylinder room, strong-current room, and low voltage room, etc. It is used to support and guarantee information processing and necessary technical operation. **The auxiliary area** consists of monitoring room, spare part storage, tool room, test machine room, unpacking area, temporary storage area, exhibition area, meeting room and office area, etc. It mainly refers to the area providing auxiliary function for operation of the machine room. Ground floor also has IT room, battery room, Meet-me-Room (MMR), steel cylinder room, security guard room, and fire-fighting rooms. **IT operation and maintenance corridor** is specially designed, completely separated from the surrounding freight corridors, further improving the safety class of the machine room. Precision air conditioner room is arranged with separate access to avoid relevant maintenance personnel entering the main machine room so as to guarantee its safety. **Corridor** is the main equipment handling channel with width more than 2600mm for rotation and positioning of all the equipment. **The machine room building** uses large gate and unloading platform for the convenience of large cargo transportation.
- (b) The **first floor** is office area, NOC monitoring center and reserved machine room area. Primary area of the machine room includes: main machine room (IT module), supporting area and auxiliary area.
- (c) **Area on the north side:** the principle of the internal spatial layout of the building is to realize "separation of people and goods", the goods entrance of the building is arranged on the north side of the building, with 1 passenger elevator and 1 cargo elevator equipped. Equipment unloading platform, unpacking area, test area,

equipment temporary storage area, dimension of cargo elevator car is greater than 2400 mm\*2400 mm, which is applicable to large freight handling.

- (d) **Area on the south side:** lobby, reception area, waiting area, guard room, deposit area, goods and people are arranged separately without interference. Get in or out of data center main buildings through two-way underpass, with stairs of two-way designed, realizing complete isolation when getting in or out of the underpass. 2 passenger elevators are arranged inside. All personnel enter into the machine room building after passing the security check.

#### B.1.2 Equipment Layout Standards

According to the requirements of equipment transportation, operation and maintenance space and evacuation in the machine room, the distance of the channel and equipment is designed according to the following rules:

- (a) In each IT module, IT equipment cabinet is in strict accordance with the layout of cool and warm channel, face to face, back to back, 1200mm for cold channel, 1200mm for warm channel, dimension of cabinet in the Project is 2000 mm \* 600 mm \* 1200mm.
- (b) Distance between cabinet or rack front arranged face to face is more than 1200mm and between cabinet or rack back arranged back to back is more than 1000 mm as per standard.
- (c) Above 1200mm distance is also catered between cabinets and cabinet to wall. As for those cabinets which are aligned in rows, when their length is larger than 6m, their both ends are installed with exit passageway; when distance between these two exit passageways exceeds 15m, then the exit passageway is added between these two exit passageways. The width of exit passageway is more than 1m.
- (d) On both sides of the Data center, there are two power station buildings, and the height of the power station building is 7.5m, and the ground floor level is 1.2m higher than the finish ground level.

#### B.1.3 Dust and Humidity Control

According to relevant specifications, dust-free materials with good air tightness which is easy to clean with little deformation at the action of temperature and humidity change is selected. Indoor decoration in the machine room, wall and ceiling are flat and smooth to reduce dust deposition surface and are kept away from glare, and have preferable anti-static and noise absorption effect. Full slab area is laid with anti-static floor, cement mortar are adopted for plastering of ground surface and four walls below the anti-static floor. Ground surface materials are flat and smooth and wear-proof. When the space below the floor is static pressure box, dust-free finish materials which are difficult for dust deposition, easy for cleaning and thermal insulation are selected for four walls and ground.

#### B.1.4 Machine Room Insulation

Thermal insulation is conducted for roof, wall surface and ground in cage machine room and MDC machine room. Roof surface of cage machine room is directly laid with insulation cotton. The ground is laid with insulation cotton, which is then added with flash plating zinc steel plate. Rock wool is filled in the composite color steel plate for the wall surface. Roof surface in micro module machine room is directly laid with insulation cotton; rock wool is filled in the composite color steel plate for the wall surface.

#### B.1.5 Lighting System

Glare-free and energy-efficient lights are fixed with high luminance, uniform luminance and low noise. Overall tone is quietly elegant and gentle. Lighting system is arranged with normal lighting and emergency evacuation lighting. Energy-efficient LED light source is adopted for light fixture, together with lamp panel to generate soft effect without glare, which is especially recommended for computer offices. Normal lighting power supply of light fixture is supplied by mains supply, controlled by breaker in the distribution box and rocker switch on the wall. The type of total panel with individual panel is adopted for normal lighting. A total panel is arranged on each layer of fire zone and an individual panel for lighting is arranged for each module. The middle set of fluorescent light fixtures at proper positions are adopted as stand-by lighting light fixture for emergency, power supplied after switching between mains supply and UPS power supply. When normal lighting goes out due to fault, evacuation lighting is arranged for exit and channel which shall ensure safe evacuation of personnel. Light fixture for evacuation lighting has self-contained battery with power-on time not less than 30 minutes.

#### B.1.6 Lightning Protection and Grounding System

The building is arranged with favorable lightning protection and grounding system. Power supply system and communication system share common grounding devices, resistance of grounding system shall be less than  $1\Omega$ . To prevent induction stroke and side flash from entering into the machine room along power line and damaging important equipment inside, Class III surge protection system design has been adopted. Parameters of lightning protection system inside the machine room shall be matched with those of the building's power distribution system. For weak current system, weak current lightning protection equipment shall be installed for the communication cable through the building.

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### B.1.7 **Doors and Windows**

Equipment in the data center is relatively high, in order to guarantee smooth transportation and positioning, dimension of simple gate is 1000\*2300 mm, dimension of double door is 1500\*2300 mm, dimension of double door in local room is 1800\*2700 mm, all are steel fire doors. Considering safety, and in order to prevent internal and external heat conduction, external window is not needed in the rooms of data center. Large doors are arranged in large equipment room so as to guarantee equipment transportation and positioning and maintenance replacement in late period.

### B.2.0 **Electrical Overview**

This sub-section describes the electrical design strength of the Data Center and other supporting infrastructures. Two-way special mains 11KV power supply is provided for the Data Center. Transformers, diesel generators and relative distribution panels are arranged in two Power Station Buildings on both sides of the Data center.

#### B.2.1 **System Deployment**

Power distribution system of the data rooms is planned according to 2N system. For each machine room module, modular design is adopted for power distribution system which is arranged with two power transformation and distribution rooms (A, B) backed up with each other. Each power transformation and distribution room has two parts, transformers and low voltage power distribution panels are in two power station buildings on both sides of the Data Center, UPS and UPS relative power distribution panels are in the Data Center building, closed to data hall modules. Two power transformation and distribution rooms operate independently, share 50% load of machine room module and power system under normal condition.

#### B.2.2 **Mains Supply System**

Two independent 11KV main supplies are introduced from Bangabandhu High-Tech City to the Data Center. 11KV power supply is introduced to two mutually independent power transformers and distribution stations in two power station buildings on both sides of the Data Center building; power cables are laid along separate ways. Two 11KV power supplies are used simultaneously for mutual standby. Single bus bar section is adopted for 11KV mains supply power distribution system, each section of bus bar can bear live loads in the Project, each bearing 50% of loads under normal use condition.

#### B.2.3 **Diesel Generator System**

- (a) Diesel generator set is installed in the CUBs on both sides of data center. Daily oil tanks are also set in the power station buildings with complete air intake and exhaust system and sound deadening and smoke exhaust system. Underground oil

tank are arranged out of power station buildings, which supplies fuel to generator unit via daily oil tank.

- (b) Diesel Generator uses Class C diesel oil according to Uptime standard requirements. Diesel oil tank is directly buried and the arrangement position is at both sides of building. Power distribution system of diesel generator, used to meet the requirements for standby power supply of all important loads including data center IT equipment, power equipment providing continuous refrigeration for data center, precision air conditioner in machine room, standby and emergency lighting equipment in data center, all fire equipment and security equipment.

#### B.2.4 Low-voltage Distribution System

- (a) Voltage class of low-voltage distribution system is 230/400V. In two power station buildings, eight power transformation and distribution rooms are arranged in total for 4 IT data hall modules; eight transformers as well as corresponding low-voltage distribution cabinets are arranged in total; each two transformers and distribution cabinets on left and right sides of the building are regarded as one set, composing 2N power distribution systems backing up each other. In case of power failure or overhaul of any one transformer and distribution equipment, the other transformer and distribution equipment is able to continue working so as to meet the requirements of all loads.
- (b) Eight sets of UPS, batteries and UPS inlet power panels, outlet power panels are installed in the Data Center building, closed to IT data hall modules, composing 2N power distribution systems backing up each other. In case of one set is out of running, the other set is able to continue working so as to meet the requirements of all loads.

#### B.2.5 Power Distribution System of IT load

- (a) As for IT load, 2N backup UPS system is adopted for power supply. Each power transformation and distribution room has been respectively arranged with UPS power distribution device, each group of UPS is configured with storage battery capable for single machine operating for 15 min at full load; two groups of UPS and storage batteries may ensure that the IT load operates for 30 min at full load. Each two group of UPS power distribution devices back up each other. If any group of UPS power distribution device is out of service due to failure, the other group of UPS power distribution device may continue working so as to meet the requirements of all loads.
- (b) As for IT equipment in module, power supply with two circuits is taken into consideration; the cables of UPS power supply are led from different routes in different power transformation and distribution rooms.

#### B.2.6 **Power Distribution System of Power Load**

Data room power load shares one group of transformer with IT load and adopts different circuit and different UPS for power supply. Like IT equipment power supply, as for important power loads, such as chilled water pump and terminal precision air conditioner, special power UPS is adopted for power supply, so as to completely ensure the power utilization reliability of air conditioning system and meet the continuous power supply of important power load in case of mains supply interruption and before diesel generator startup.

#### B.2.7 **Overvoltage Protection of Electrical Equipment**

As electrical equipment grounding device shares with lightning protection grounding device, in order to prevent transformer winding on the high-voltage side from being damaged, arrester is installed on each phase of high/low-voltage side of the transformer, and connected with grounding device. Surge absorption device TVSS is installed in all-level power distribution devices in accordance with specifications.

#### B.2.8 **Machine Room Grounding System**

Special grounding grid for IT equipment is arranged under the movable floor in the modularized machine room, which consists of 40\*4 copper belt; grid size is 1.2 m×3.0 m. M-type or SM-type equipotential bonding mode is determined according to IT equipment frequency susceptible to interference.

#### B.2.9 **Utility Power**

IDC Utility Power is two lines of stable and isolated power supply access to designed IDC Medium Voltage Distribution Room with 11KV. The power load requirement capacity is 8500kVA. ON the contrary Building Utility Power is also two lines of stable power supply access to the building with 400V. The power load requirement capacity is 400KVA.

#### B.3.0 **Mechanical System Overview**

This sub-section describes the mechanical design strength of the Data Center that enhances customer's knowledge of the mechanical safety of their hosted equipment and services.

#### B.3.1 **Outdoor Air Computation Parameter**

The construction site of the Project is high-tech Park at northeast corner of Dhaka Bangladesh; the majority of regions of Bangladesh have a monsoon climate in subtropical zone, which are damp, hot and rainy. Uptime requirements that the outdoor

dry bulb calculating temperature of air cooling type water chilling unit meets the extreme dry bulb temperature of  $N=20$  years in ASHRAE handbook fundamental. There is no meteorological parameter table for cities of Bangladesh in ASHRAE Handbook, meteorological parameters of Agartala, India are taken as outdoor air computation parameters.

#### B.3.2 Air-conditioned Room

At present, the installation mode of *cool and warm channel* is mostly adopted for computer equipment and racks in data room, i.e., cabinets are placed in a *back-to-back, face-to-face* way. In this way, cold air outlets are arranged at the middle of the channel that the front of the two rows of cabinets faces, forming a cold air area *cool channel*, cold air flows through equipment and forms hot air which is discharged into *warm channel* between the backs of the two rows of cabinets, cool and warm channel arrangement mode enables the air flow and energy flow in the whole machine room to flow without hindrance, improves the utilization ratio of precision air conditioner in machine room and further improves the refrigerating effect.

#### B.3.3 Air Conditioner in NOC and Auxiliary Area

NOC has separate cold source. Direct Expansion Air Conditioning Unit is installed in NCC equipment room with 1+1 type. Two sets of comfortable variable-frequency VRV are installed in NCC, and it will not be used with other air conditioning systems together. The air conditioning systems for NCC equipment room and NCC have two UPS power supplies. The cold resources of such personnel accumulation area as office area, visit corridor and auxiliary area are entirely separate from those of the Data Center. Comfortable variable-frequency VRV is adopted, which is capable of conveniently and reliably regulating the room temperature according to the comfort of human body.

#### B.3.4 Continuous Cooling System

The cooling system is designed to a continuous cooling system consisting of primary pump and open chilled-water tank, the capacity is able to support 10 minute continuous operation of the system under full load, chilled-water pump and precision air conditioner units in IT room are powered by UPS. The chilled-water tank in normal operation is in chilled water storage state and filled with  $10^{\circ}\text{C}$  chilled water. In case of commercial power failure, the mechanical system switches to the state of power supply by diesel generator. Before the system restores to normal operation, the chilled-water pump and the precision air conditioners in the room will keep continuous operation, the chilled water tank is in chilled water release state and supplies chilled water to the precision air conditioners for IT room and UPS room so as to ensure continuous cooling in IT room.

### B.3.5 Precision Air Conditioner System

- (a) Precision air conditioners in Cage room are allocated in 2N mode. Precision air conditioner is equipped with downward EC fan (whose wind rate is variable), single cold coil, micro-electronic controller and G4 level filter. All precision air conditioners are not equipped with humidifier and electric heater.
- (b) Precision air conditioners allocated in N mode are used in transformation and distribution room and battery room. The air conditioners shall have the total cooling capacity meeting 100% load operation of UPS rooms on a side. The air conditioner units are equipped with EC fan (variable wind rate), single cold coil, micro-electronic controller and Tier IV level filter.

### B.3.6 Row Cooling Precision Air Conditioner System

Row cooling precision air conditioners are used at the back end of micro module room, row cooling precision air conditioner and CDU are allocated in 2N mode. Row cooling precision air conditioners are equipped with EC fan (variable wind rate), micro-electronic controller and Tier IV level air filter. Row cooling precision air conditioners are not equipped with humidifier and electric heater.

### B.3.7 Air-Conditioning Water System

- (a) Two indoor chilled water pipelines are accessed to air-conditioned rooms and connected with the corresponding precision air conditioners through different physical isolation routes, the pipelines are physically isolated completely so failure of any system won't affect the other one and it ensures high-reliability service of module T4.
- (b) Outdoor pipelines are equipped with leak detection system, leak detection rope are enwound between two insulating layers, and galvanized steel sheets are arranged outside of the insulating layer, the insulating layer and the protective sheet shall be connected tightly to prevent false alarm due to rain water ingress.
- (c) Indoor pipelines are equipped respectively with leak detection systems in A and B pipelines, and leak detection ropes are enwound between water pipe and insulating layer.
- (d) The branches of the water pipe, entering the room, shall be equipped with electrical butterfly valve that is interlocked with leak detection alarm system. When the leak detection system detects leakage, corresponding electrical valve shall close the pipeline in an interlocking way.
- (e) The main pipe of each chilled water pipeline, entering the room, is equipped with electrical butterfly valve, and the leak detection system for the main pipeline is

interlocked with the electrical valve, so the failure of the main pipeline can be detected automatically and the pipeline can be isolated automatically.

#### B.3.8 Room Air Distribution

- (a) All IT cabinets adopt the cool and warm channel mode "face-to-face and back-to-back", the air distribution in Cage room shall be in the mode of under floor air supply and upper air outlet, and air supply space of cage room is 800mm height of floor elevated, air supply space of cage room is 450mm height of floor elevated the air conditioners in the room supply cool air into the space of the plenum chamber under raised floors, and blow the air to the computer equipment through holed grilles.
- (b) The air distribution in micro module rooms adopts the mode of front air supply and back air outlet by row cooling precision air conditioners. To improve the cooling efficiency of the air conditioner, the cool channels are designed in an enclosed way -- the upper part and both ends are enclosed by clear glass, and doors are arranged at both ends in purpose of the personnel's access (see the attached schematic diagram). The row cooling precision air conditioner units supply cool air into the enclosed cool channel by which cool capacity is centralized maximally to the equipment air inlet to inform cold pools.

#### B.3.9 Humidification System

The mode of wet-membrane humidification featured in low power consumption and operation & maintenance convenience is planned in the project, considering high air outlet temperature in the rooms and no need of additional heating, wet-membrane humidifier is planned to be equipped in the air outlet area of the room in purpose of energy conservation -- a wet-membrane humidifier is equipped for each air conditioned room for each module, the humidification capacity of each humidifier meets 10kg/h and the outlet air is humidified. Indoor dew point temperature-sensing elements control the humidification rate of the humidifiers, the humidification controlling system is accompanied with the humidifier, and supports remote communication interface.

#### B.3.10 Room Make-Up Air System

Cage rooms and micro module rooms are equipped with make-up air systems, and the make-up air volume is designed to the operation of ventilation once per hour. Make-up air satisfies the minimum make-up volume demand of the personnel, 40m<sup>3</sup>/person-hour and ensuring the minimal positive pressure requirement in the room, 5~10Pa. For auxiliary rooms like NOC and office, make-up air is supplied by total heat exchanger or Direct Expansion Air Conditioning Unit



### B.3.11 Ventilation and Exhaust System

- (a) In air protection area, post-firefighting emptying system is equipped and the system has a ventilation rate of 5 times/h, fireproof smoke exhaust valve is equipped on emptying branch for each IT room, and it is close in normal operation. After fire extinction by gas, fireproof smoke exhaust valve, interlocked with exhaust fan, is opened to empty the fire-fighting gas in the rooms.
- (b) The battery room is arranged with exhaust air system whose daily ventilation is 1 time/h and emergency ventilation is 12 times/h. Hydrogen gas detection and alarm device is arranged in the battery room, and interlocked with emergency fan.
- (c) Mechanical smoke extraction is used for walkways that have a length of over 20m and no direct natural ventilation, or ones that have direct natural ventilation but a length of over 40m, and smoke extraction system is used for corridor of each module.
- (d) Mechanical smoke extraction is used for the ground window-free or window-fixed rooms with an area of 300m<sup>2</sup> where there are persons staying or many combustible substances.
- (e) Exhaust air system is equipped for cylinder room and the design rate of ventilation is: 3 times/hour.
- (f) Ventilation system is equipped in sanitary room, and its rate of ventilation is 12 times/hour.

### B.3.12 Environmental Protection, Industrial Hygiene and Safety

- (a) Driven equipment mainly include water chilling unit, water pump, etc., and discharge no waste like waste water, waste gas or waste residue, so they has no adverse effect on environmental hygiene.
- (b) Environmental equipment and material meeting the national requirements are used, and water chilling unit and fan arranged outdoor and air conditioner outdoor unit shall be low-noise equipment.
- (c) Rational rotation speeds are selected for pump and fan so as to control noise sources, matched vibration dampers or cushions are used for water chilling unit, water pump, air processing unit and centrifugal fan, spring support and hanger are used for fans.
- (d) Flexible joints are used for equipment inlet and outlet, and connected with the pipeline in a reasonable way, to reduce noise and vibration. Pipeline noise deadeners are arranged for air hoses according to fan outlet noise and applied room noise sideband.
- (e) Environmental cooling medium is used for water chilling unit

#### B.4.0 Cloud Overview

Cloud platform provides leasing service of unified, elastic and high-reliability computing, storage, and network resources to meet customers' low cost, quick delivery, and on-demand leasing requirements for information and Internet services. Cloud platform integrates many hardware servers through the cloud technology to establish a virtual high-performance resource pool, which supports unified management, on-demand resource scheduling, and resource leasing.

#### B.4.1 iROS

The iROS, *operation management platform* is the core of the internal cloud resource pool, the implementation of internal cloud resource pool of register, allocation, resource deployment, change, recycling, monitoring, statistics, operational functions such as delete, and provides the realization of the function of customer service and related interfaces with other systems. Operation management to the management personnel and the users also provide man-machine interoperability capabilities (such as a portal or workbench), provides the entry for management personnel to the management of the system, and for the user application, use and querying all kinds of resources to provide entrance.

#### B.4.2 Cloud Platform Resources

- (a) The cloud platform (uSmart DC) is composed of a common resource pool and a high-performance resource pool (reinforced by full height blades and FC SAN) having 330 blade servers and 10 disk arrays in total. Chassis in both resource pools are 2\*40GE\*2 for the service and storage network, 2\*10GE\*2 for the management network, and 2\*GE\*2 for IPMI.
- (b) The backup pool is configured with 8 rack servers as backup nodes, each having 2\*10GE (storage plane), 2\*GE (management plane), and 1\*GE (IPMI). The all-in-one backup node in the backup resource pool can back up VMs, services and storage. When backing up VMs, the 10GE storage plane of the all-in-one backup server is connected with the management plane of the cloud platform, the management switch is connected with the management core through 40GE, and it supports VLAN division for the interconnection port.

#### B.4.3 Disaster Recovery

There are enough space ports on core switch, router, FC SAN switch in Data Center design, and the disk array support the function to synchronize the data between two devices through FC SAN or IP SAN network.



#### B.4.4 Multi Tenancy

The logical topology of the VDC service network is shown below, the total VDC service network is divided into multiple tenant networks, every tenant can design the sub-topology and firewall policy for itself. The red line show the flow that an internet terminal visit the service of tenant1, the process is just the same as traditional IT system.

#### B.4.5 iCache

The iCache design goal is to serve all the cloud desktop users in the data center with Internet surfing acceleration services. The users' access to the website which hosted in the data center can be accelerated by this iCache system.

#### B.4.6 DPI

DPI (Deep packet inspection, also called complete packet inspection and information extraction) is a form of computer network packet filtering that examines the data part (and possibly also the header) of a packet as it passes an inspection point, searching for protocol non-compliance, intrusions, or defined criteria to decide whether the packet may pass or if it needs to be routed to a different destination. DPI can realize the purpose of collecting statistical information that functions at the Application layer of the OSI (Open Systems Interconnection) model. There are two level of DPI requirement model, one is hardware requirement other is software function requirement. In the Data Center, the whole IT system has data flow of 40Gbps. So DPI system hardware is designed to have the capacity of processing 40Gbps data flow. DPI system also has the ability to store data flow analysis information, report and other system data. In the software level requirement, DPI system must have following functions: Identifying technology including behavior mode identifying, feature character identifying, behavior mode and feature character identifying, control protocol identifying, basic policy supporting function, access control function.

#### B.4.7 UBOSS

- (a) ZSmart Monitor and Control (ZMC) is a network and data center infrastructure management software that helps large enterprises, service providers and SMEs manage their datacenters and IT infrastructure efficiently and cost effectively. ZMC is a part of ZSmart product, which is positioned as Security Operational Center (Alarm Center) and Element Management System (EMS). ZMC includes system monitoring, network performance management, asset management, unified alarm center and other functions, which ensures system maintainability and reliability.
- (b) Do-it-yourself plug-ins extend the scope of management to include network change and configuration management and IP address management as well as

monitoring of networks, applications, databases, virtualization and NetFlow-based bandwidth. It helps with a holistic view of IT resources.

- (c) It helps monitor the performance of various components of an application and helps troubleshooting production issues quickly. This helps reduce finger pointing and improves quality of service to end users.
- (d) OFM system consists of incident management, problem management, change management, service request fulfillment, common work orders, service catalogue, service desk/self-service desk, work plan, CMDB, release management, service level management, report and knowledge base module.

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## **ANNEX-C: OPERATION AND MAINTENANCE PROCEDURE**

### **C.1.0 Operation Service Plan**

The data center physical infrastructure rental service mainly includes rack and bandwidth rental and system monitoring report. The infrastructure operation service mainly includes routine equipment inspection and maintenance. The daily and routine patrolling and maintenance service is made to check the equipment alarm, system operation state and equipment operation environment through active and precautionary maintenance and make primary operation analysis to eliminate various hidden dangers, and ensure the stable operation of the equipment. It is the main object of the daily maintenance work to ensure the service quality of the datacenter and stable work of the IT loading equipment's so as to provide the 24/7 on-site attendance service and solve all the on-site problems of the equipment room.

### **C.2.0 Event Management**

An event is change of state that has significance for the management of an IT service or other configuration item. The term is also used to mean an alert or notification created by any IT service, configuration item or monitoring tool. Events typically require IT operations personnel to take actions, and often lead to incidents being logged. Following event management procedure shall be followed:

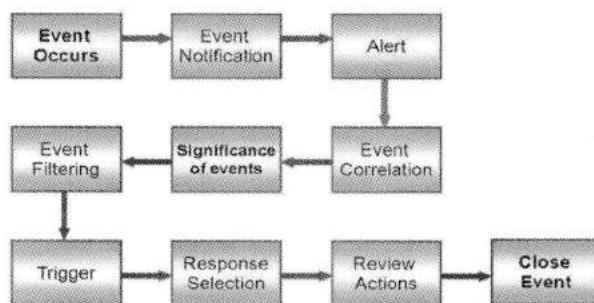


Figure F1 - Event Management Flow Chart

### **C.3.0 Incident Management**

Incident means an unplanned interruption to an IT Service or a reduction in the Quality of an IT Service. Failure of a Configuration Item that has not yet impacted Service is also an Incident. Incident management aims to restore normal service operation as quickly as possible and minimize the adverse effect on business operations, thus ensuring that the best possible levels

of service quality and availability are maintained. Following Incident Management Process shall be followed:

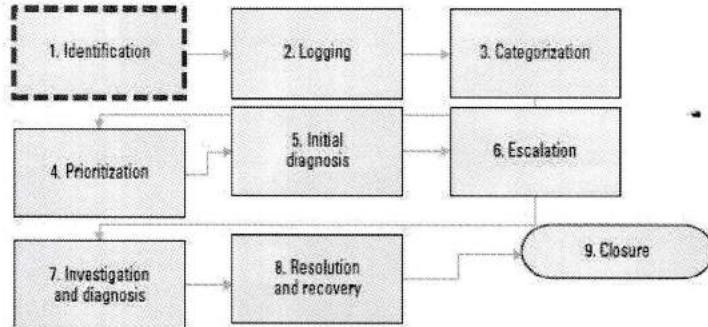


Figure F2- Incident Management Flow Chart

#### C.4.0 Problem Management

A 'problem' is the unknown underlying cause of one or more incidents, and a 'known error' is a problem that is successfully diagnosed and for which either a work-around or a permanent resolution has been identified. Problem Management aims to resolve the root causes and prevent Incidents from happening, and to minimize the Impact of Incidents that cannot be prevented. Problem management can be reactive and proactive. Following Problem Management Process shall be followed:

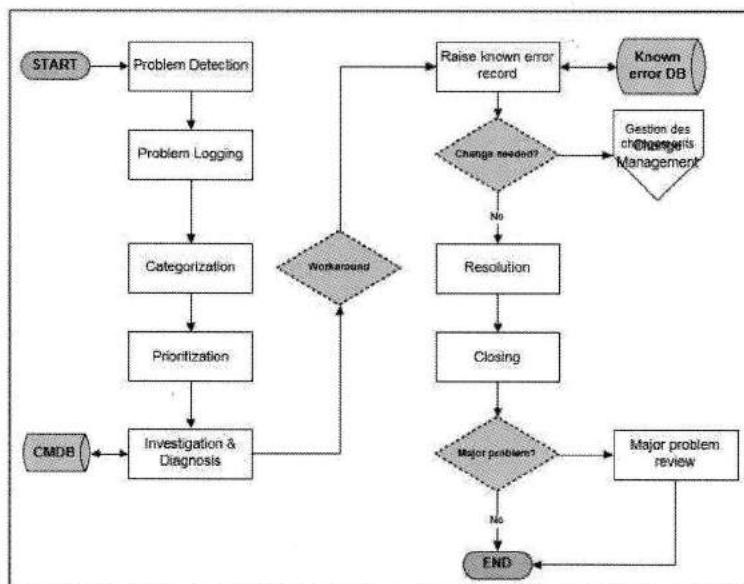


Figure F3 - Problem Management Flow Chart

#### C.5.0 **Risk Management**

Risk is possible event that could cause harm or loss, or affect the ability to achieve objectives; can also be defined as uncertainty of outcome, and can be used in the context of measuring the probability of positive outcomes and negative outcomes. Risk management is the process responsible for identifying, assessing and controlling risks. Following procedure shall be followed:

- (a) Identifying the Risks.
- (b) Analyzing the Risks.
- (c) Managing risks.
  - (i) Once risks have been assessed and documented by concerned stakeholder together with their **action plans**, the risk management plan must be reviewed to ensure appropriate actions have been taken and are working as expected.
  - (ii) If any of the risks changes status during implementation, they must be **monitored** and built into the normal project control mechanisms – e.g. every project meeting should include a review of the risk management plan and the assessment of any new risks.
  - (iii) Risk management is a repetitive activity and it is likely that the entire process will be repeated several times.

#### C.6.0 **Request Fulfillment**

Service Request from a user for something to be provided – for example, a request for information or advice; or to reset a password; or to install a workstation for a new user. Service requests are managed by the request fulfillment process, usually in conjunction with the service desk. Service requests may be linked to a request for change as part of fulfilling the request. Request Fulfillment is process responsible for managing the lifecycle of all service requests.

#### C.7.0 **Access Management**

Access management means ensuring authorized accesses at appropriate level. Access Management is responsible for allowing **USERS** to make use of IT Services, data, or other Assets. Access Management helps to protect the Confidentiality, Integrity and Availability of Assets by ensuring that only authorized Users are able to access or modify the Assets. The details of the access management have been covered in security procedures.

#### C.8.0 **Availability Management**

Availability is the ability of a service, component or Configuration Item to perform its agreed function when required; often measured and reported as a percentage. Component availability involves all aspects of service availability and unavailability and the impact of component availability, or the potential impact of component unavailability on service

availability involves all aspects of component availability and unavailability. Availability Management is responsible for ensuring that all IT Infrastructure, Processes, Tools, Roles etc are available and appropriate for Tire-IV standard.

Availability is calculated as: [(Agreed Service Time (AST) – Downtime)/AST] x 100%. For example, for 6 hours downtime in a month, availability is = ((720 hours - 6 hours) / 720 hours) x 100% = 99.17%. So, total system availability = product of each component availability that is: availability 1 \* availability 2 = total availability.

#### C.9.0 Change Management

Change management ensures that standardized methods and procedures are used for efficient handling of all changes. Change management aims to ensure controlling the Lifecycle of all Changes. The primary objective of Change Management is to enable beneficial Changes to be made, with minimum disruption to IT Services. Changes to ‘Scope of Services’ (“Change”) may become necessary or desirable during the operation and maintenance period. Any such Change may be effected as per this section. Both VENDOR and BDCCL may request a change order in the event of actual or anticipated change(s) to the Maintenance Services. In such an event, where relevant, the entity requesting the change shall place such requests to the other entity through a Change Order Form.

Any Change shall be subject to the both entities' mutual written agreement. Only the Changes approved and agreed by the Change Management Authority of both the entities shall be valid and considered for implementation. Changes shall be carried out according to the agreed Change schedule between the Entities.

Following procedures will be followed for change management:

- (a) Change Requests may include changes in the functional or technical requirements, changes in the quality, kind or execution of the work or any part thereof, as well as changes to the Delivery Schedule. The Changes may increase or decrease the value of the project.
- (b) After the Change Request Form is submitted to the other entity, meeting(s) shall be arranged between the Entities where all the issues surrounding each Change will be discussed. Depending on the nature of the Change, such meetings shall be attended by the Change Management Authority. The primary objective of the meeting shall be to determine the viability of the Change, whether to accept the Change and whether to commit the funding and resources to build and test the Change.
- (c) Changes shall include the following information, as applicable:
  - (i) Detail of change to vendor's scope of service.
  - (ii) Detail of change to the Purchaser's obligations.

- (ii) A detailed schedule for the execution of the Change Order showing required resources and any significant milestones
- (iv) The effect of the proposed Change on the value of the Agreement
- (v) Any effect the Change has on the Delivery Schedule with documentation demonstrating of such an effect.
- (vi) Equipment.
  - (a) Warranties.
  - (b) Installation and all other equipment related services.
  - (c) Miscellaneous.
- (vii) If accepted, the BDCCL shall submit its acceptance of the Written Proposal and other supporting documents to vendor. Upon such acceptance, such Change and other agreed modifications to other relevant or incidental terms and conditions shall be binding on both the entities and vendor shall start to implement the Change.
- (viii) Based on the business requirement, emergency, risk analysis and other issues any request for Change can be classified into three classes –
  - (a) Normal Change,
  - (b) Standard Change and
  - (c) Emergency Change.
- (ix) The classification of the Change will be done by mutual agreement of the Entities in writing. Based on the classification of the change, the Delivery Schedule and Pricing may vary.
- (x) All changes shall take place at the end or beginning of the service year.

#### C.10.0 **Release Management**

Release Management will ensure that collection of hardware, software, documentation, Processes or other Components required to implement one or more approved Changes to IT Services. The contents of each Release are managed, Tested, and Deployed as a single entity. A separate committee will be formed for a formal release management.

#### C.11.0 **Capacity Management**

Capacity is the maximum throughput a configuration item or IT service can deliver. Capacity Management is responsible for ensuring that the capacity of IT services and the IT infrastructure is able to meet agreed capacity- and performance-related requirements in a cost-effective and timely manner. Capacity management considers all resources required to deliver an IT service, and is concerned with meeting both the current and future capacity and performance needs of the business. VENDOR is primarily responsible to ensure that all IT equipment and accessories are utilized at an optimum capacity for efficient service management during the operation and maintenance period.

#### **C.12.0 IT Service Continuity Management**

Service Continuity Management means implementation and management of Quality IT Services that meets the organizational need. IT service continuity management (ITSCM) covers the processes by which plans are put in place and managed to ensure that IT services can recover and continue even after a serious incident occurs. It is not just about reactive measures, but also about proactive measures – reducing the risk of a disaster in the first instance.

#### **C.13.0 Advanced Maintenance**

Following advanced IT support shall be maintained

- (a) Capacity Review once in a year
- (b) System Health Check once in every 3 months
- (c) System Redundancy Drill Test once in every 6 months
- (d) Backup recovery process review once in every 6 months
- (e) System Log Analysis once in every 15 days
- (f) Bug Fixing during change and release management
- (g) Patch Management as and when patch is released



**TEMPLATE OF CHANGE REQUEST FORM**

Change Request ID:		
Change Requested Date:		
Contract No/Project ID:	Project Name:	
Requester Name:		
Requester Position:		
Requester Company:		
Requester e-mail:	Contact No.	
Description of Requested Change:		
Reason for Change:		
Justification of Change:		
Supporting Information or Document:		
Affected Models or Areas:	a) Systems Affected:	
	b) Sub-Systems Affected:	
	c) Documentation Affected:	
Priority:		
Expected Implementation Date:		

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**TEMPLATE OF SERVICE REQUEST FORM**

Category		Location	
Sub-Category		Item	
Subject			
Description			

Requester Details			
Name		Job Title	
Contact Number		Department	
Service/Site			
Attachments			

**TEMPLATE FOR PROJECT MANAGERS AND NOTICE RECIPIENTS**

Vendor's Coordinator	
Name:	
Address:	
Office Phone:	
Mobile Phone:	
Fax:	
E-mail:	

BDCCL's Coordinator	
Name:	
Address:	
Office Phone:	
Mobile Phone:	
Fax:	
E-mail:	

## ANNEX - D: DATA CENTER SECURITY

### D.1.0 Levels of Access to The Data Center

There are 3 “Levels of Access” to the Data Center – General Access, Escorted Access and Limited Access.

- (a) **General Access** is given to people who have free access authority into the data center. General access is granted to employees of BDCCL whose job responsibilities require that they have access to the area. Individuals with Limited access will be granted a different key combination or access pass for the data center. Individuals with General access to the area may escort authorized individuals for Escorted access to the data center. If a person with General Access allows Escorted Access to an individual then that person should be accountable.
- (b) **Escorted Access** is closely monitored access to people who have a legitimate business need for infrequent access to the Data Center. “Infrequent access” is generally defined as access required for 15 days per year. Individuals with Escorted Access will *not* be issued a door combination to access the Data Center with. A person given Escorted Access to the area must submit the authorized letter from his/her organization to the BDCCL authority and must sign in and out under the direct supervision of a person with General Access. A person with Escorted Access must follow all protocols at all times during the visit and must proceed according to the ticket generated for him/her.
- (c) **Limited Access** is granted to a person who does not qualify for General Access but has a legitimate business reason to access the data center. Unescorted Access personal cannot authorize others to be granted access to the Data Center. The authorized personal is responsible for these individuals and must escort them in the Data Center at all times. BDCCL staff with limited access should not authorize any personal to enter into the Data Center.

### D.2.0 Data Center Authorized Area

- (a) **Level 1** area consists of the key function area with all the IT equipment Rooms and Monitoring Room and NOC Room MDC, Cage hall 1, Cage hall 2, Cage hall 3, MDA, MMR, NOC Equipment room, 185 Control Room, 235 NOC Room and other IT room, Team Leader/Big Boss office Room. This area is used mostly by the General Access level employees. Only authorized personal with escorted access can enter into this security area.



- (b) **Level 2 Technical** area consists of **All DCPI Room**; Power Distribution Room, Battery room, AC room, room 113, LV, EL, FAU room, Pump house, Substation, Warehouse and other DCPI room. This area can be accessed by both Limited and Escorted Access and should follow the proper protocols for the access according to their job responsibility.
- (c) **Level 2 Non-Technical** areas consists of 236 office, Prayer Room, Corridor inside building is to be monitored strictly. No photograph policy will be applied to this area.
- (d) **Level 3** consists of the reception area, office area and outside area. Unauthorized personal is prohibited from this area.

#### D.3.0 General Guidelines of Physical Security Policy and Procedures

- (a) All Customers and Customer vendors shall conduct themselves in a courteous professional manner while visiting the Data Center. Customers shall refrain from using any profanity or offensive language.
- (b) Customers may not tamper with, or in any manner adversely affect, security, infrastructure monitoring, and/or safety systems within the Data Center.
- (c) Alcohol, controlled substances, firearms and explosives are not permitted on BDCCL property. Smoking, drinking, and eating are strictly prohibited within the Data Center raised floor space. Smoking is expressly prohibited in all Data Center area.
- (d) Persons under 18 years of age or requiring adult supervision are not permitted within the Data Center without the express written permission of BDCCL
- (e) All visitors to the Data Center should wear appropriate footwear and attire.
- (f) Unless otherwise expressly permitted by BDCCL in writing, storage of combustible materials (e.g. wood, cardboard and corrugated paper, plastic or foam packing materials, flammable liquids or solvents) are prohibited within the Data Center
- (g) Customers may use cell phones inside the Data Center. Except Data Center issued, two-way radios are not permitted in the Data Center. Cell phones with camera capabilities may not be used for picture or video capture.
- (h) Sharing BDCCL Proprietary information, without the express written permission of BDCCL, is strictly prohibited.
- (i) All hand-carry containers, boxes, bags, laptops, purses, backpacks, or equipment carried into or out of the Data Center are subject to inspection by BDCCL staff and/or Security.
- (j) BDCCL does not accept Mail/Post on behalf of Customers at the Data Center. All Mail/Post should be directed to customer's business address.

- (k) Customers must cooperate and obey all reasonable requests of Data Center personnel while within the Data Center, including immediately addressing any violations of rules when brought to Customer's attention.
- (l) Upon activation of a smoke detector or emergency alarm, all Customers (their employees and vendors) must be prepared to evacuate the building and to receive further instructions from the BDCCL staff.

#### D.4.0 **Photos and Videos**

- (a) Any use of cameras, video and other photographic equipment along with but not limited to audio monitoring and audio capture devices are prohibited within the Data Center without the express written permission of BDCCL. No person, other than BDCCL personnel, shall be permitted to take photo or videotape records within the Data Center.
- (b) Customers are not permitted to take pictures or videos of the Data Center. Customer site pictures or videos must be arranged in advance and according to BDCCL Security regulations.
- (c) If pictures or video are required for insurance or marketing purposes, contact BDCCL assistance.

#### D.5.0 **Physical Security**

- (a) Data Centers are secured facilities. Access to the data center and other areas of the facility are restricted to those persons without authorization.
- (b) Customers are restricted to authorized areas only, including the lobby, conference rooms, common areas and customer space on the data center floor
- (c) Security controls include 24 x 7 security officer presence, sign-in procedures for all ingress and egress, managed key and access card plans, man trap, managed access permissions and access request methods.
- (d) Closed-circuit television (CCTV) cameras are used to monitor all areas of the facility including lobbies, common areas, customer lounge, data center floor space, admin areas, and engineering plant areas for your safety. All CCTV cameras are monitored and images are retained. Violations noted by camera will be addressed promptly.
- (e) BDCCL will provide Vehicle parking with adequate lighting.
- (f) Tampering with, or in any manner adversely affecting, security and/or safety systems within the Data Center is strictly prohibited.
- (g) BDCCL reserves the right to access any part of the Data Center at any time for safety and security reasons.

#### D.6.0 **Data Center Ingress and Egress**

- (a) All persons entering the Data Center must:
  - (i) Possess a valid government issued photo ID.
  - (ii) Have authorization to access the facility.
  - (iii) Sign-in and out as required by the facility.
  - (iv) Display their BDCCL security badge at all times while in the facility.
  - (v) Surrender their security badges, access cards, keys, BDCCL owned tools or phones prior to exiting the facility
- (b) Customers are expected to be familiar with and adhere to all OSHA standards associated with work in a computer room environment.
- (c) Entrance to the site must be preapproved based on “what is the purpose” and “who is the receiver name and phone number”.
- (d) Security Confirm with the Manager and got the entry permission.
- (e) Receiver must come to the Main Gate.
- (f) Receiver signs on the record and accompany with the visitor entering the site.
- (g) During leaving the site, must check exist record from security book.

#### D.7.0 **Entrance Card management**

- (a) The entrance card is for self-use only, and cannot be lent to others. Because of adverse consequences, making sub tenancy entrance card by the sub lessee will shoulder all responsibilities.
- (b) The entrance card for one into a system, please avoid stranger following enter, otherwise cause safety accidents, by the entrance card owner will shoulder all responsibilities
- (c) Entrance Access card is no logo white card. After the card issuing, need to post card information. Indicate the type of the card and user name.
- (d) Card need monthly inventory of all entrance card on auditing; ensure the normal use of the card issue.

#### D.8.0 **Access List Management**

- (a) BDCCL are responsible for maintaining and updating their access list. BDCCL requires a written submission for additions and deletions to the Customer's access permissions list. Individuals identified on this list will be granted access to the Customer's Cabinet, Cage. BDCCL may grant temporary access to their Cabinet or Cage for an employee, vendor or technician by submitting an Access Ticket (see Exhibit I). The following e-mail address should be used for submitting the



Access Request:

Access to BDCCL Facilities area- facility.support@bdccl.com.bd

Access to BDCCL Service area- service.support@bdccl.com.bd

- (b) BDCCL is not responsible for providing access to or for the activities of individuals whose authorization is reflected in Customer's access list which was not updated by Customer to revoke such authorization at the time such access was granted by BDCCL. The Customer remains responsible for the activities of these individuals as with any other authorized Customer employees, contractors or vendors.

#### D.9.0 **Common Areas and Customer Lounge**

- (a) The common areas, Customer lounge, and conference room areas within the Data Center are for the common use by all BDCCL Customers with sites within their respective Data Centers.
- (b) BDCCL and Customers using the common areas must throw away their trash in the appropriate receptacles. If you reserve and use a conference room, please be responsible for clean up after using the facilities. Coordinate all catering events through the management of BDCCL.
- (c) Customers may request dedicated administration space or reserve a conference room by submitting an email to the e-mail address below:

Administration – admin.support@bdccl.com

- (d) A staging area is available, on a first-come, first-served basis, for the temporary unpacking and configuration of servers. The staging areas are offered as a convenience and not as a permanent storage area. Extended use or monopolizing all or some of the staging areas of a Data Center, for more than 10 calendar days in any 30-day period is not permitted in the Data Center staging area. BDCCL is not liable for Customer assets left unattended in this area.
- (e) BDCCL reserves the right to deny access to those Customers who abuse the common areas and the rights of other Customers.

#### D.10.0 **Cage/Cabinet and Cabling Requirements**

- (a) Customer cage or cabinet shall, at all times, be clean, neat and orderly. Customer space shall not pose any danger or hazard to customer or employees (including subcontractors) that may be requested or required to enter the cage to perform a service or to any other customers of the Data Center.
- (b) Customers must take all necessary precautions to ensure the physical security of property contained within their customer location(s). Cage and cabinet doors

must be secured at all times when a Customer is not physically present.

- (c) Customers must remove all refuse materials (which include, but are not limited to boxes, crates, corrugated paper, plastic, foam packing materials, and any other materials which are non-essential to the operation of Customers' equipment) within Four (04) hours. Materials must be placed in designated disposal receptacles.
- (d) All spare equipment shall be stored in a cabinet or must be kept in approved plastic or metal containers. Containers must be sealed, stacked neatly and cannot impede ingress/egress or cooling.
- (e) "Un-racked", operating equipment outside of cabinets or racks, is strictly prohibited.
- (f) No combustible material, i.e. cardboard, foam, or paper may be stored in Customer cabinet or cage.
- (g) Remote Hands Service requests may be denied should Customer's Cage, Cabinet or Suite be identified as noncompliant with Data Center Policies regarding refuse and combustible materials.
- (h) Customer may not hang or mount anything on the cage mesh walls or cabinets unless authorized by the Data Center Management staff.
  - (i) The tops of the cabinets cannot be used for physical storage.
  - (j) To ensure maximum ventilation Blanking Panels must be utilized on all open rack spaces within and between racks at all time.
  - (k) Unsecured cabling across aisles or on the floor is strictly prohibited. All devices must be installed in racks or cabinets.
  - (l) Cable wrapping, wire management, zip ties and/or Velcro, must be used to organize cabling in a rack or cabinet. Should Customer need assistance with cable management, Customer may open a trouble ticket with BDCCL.
  - (m) Cabling must not obstruct airflow/ventilation/AC (perforated tiles) or access to power strips.
  - (n) Remote Hands Service requests may be denied Customer's Cage, Cabinet or Suite be identified as noncompliant with Industry Best Practices. Industry Best Practices for cabling standards is the Telecommunications Industry Association/Electronic Industries Association (TIA/EIA) Cabling Standards 568 and 569.
  - (o) All data cable must be fire rated (LSZH) in datacenter premises.
  - (p) BDCCL reserves the right to decline implementation of a Change Order if BDCCL determines the Customer cage, cabinet or cabling is not in compliance. Customers in violation will be notified by BDCCL in writing and Customer must remedy the situation immediately. SLAs do not apply until the cage, cabinet or cabling complies with the requirements.

- (q) If Customer intends to use Remote Hands Services, all devices and cabling must be clearly labeled in a unique naming fashion. In order to reduce confusion, there should never be two devices or cables with the same name. BDCCL recommends that Customer should not use its name as a naming convention to protect Customer privacy and confidentiality. For additional security purposes, external I.P. addresses should not be visible from outside of the customer's space.
- (r) Non-compliance with any of the cage, cabinet or cabling requirements will result in notification to Customer and a request that the Customer promptly take action to remedy the situation.
- (s) Customer may not climb onto cabinet and or scale cage walls. Customer must request Data Center Staff assistance when needing to access cabinet / rack tops.
- (t) Customer may not make physical alterations or modifications to the space, without prior written permission from BDCCL.

#### D.11.0 **Rack/Cabinet Doors**

- (a) Cabinet doors may be removed while Customer is working within the cage and must be replaced before Customer exits the Data Center.
- (b) If the locks or doors are to be damaged by the customer, Customer shall be responsible for repair.
- (c) Cage doors should be closed and locked to prevent unauthorized access.
- (d) Customer can introduce rack security at their own.

#### D.12.0 **Floor Tiles of Raised Floor**

Customers are prohibited from lifting or moving floor tiles. The sub-floor area is restricted area, accessible by BDCCL staff only. The perforated tiles are strategically placed for HVAC cooling patterns. If Customer is experiencing temperature problems, Customer should notify BDCCL to open a trouble ticket. Only BDCCL staff is permitted to access the sub-floor.

#### D.13.0 **Data Center Equipment**

- (a) Data Center equipment such as tools, carts, server lifts, monitor and keyboards may be available to Customers on a first-come, first-served basis. Customer is responsible for all loaned equipment while it is checked out and shall return the equipment immediately.
- (b) Modification of equipment on loan from the Data Center is not permitted without prior written approval from Data Center management.

D.14.0 **Shipping and Receiving**

- (a) Customer may bring small “hand carry” equipment through the lobby. Customer may contact Data Center Staff or Guards for assistance. Large amounts of equipment, shipments or large devices must enter the Data Center through shipping/receiving dock. Customers must notify BDCCL management of any such deliveries that will require processing through the loading dock by submitting a Delivery Notification e-mail to the e-mail address below:

Administration – admin.support@bdccl.com

- (b) Hand carried equipment brought into the Data Centers may require BDCCL technician assistance with the installation to help calculate the additional power draw of any new equipment being added to a customer’s rack. This assistance is to help ensure customer power SLAs are not jeopardized. To ship equipment, contact Data Center Site 10 days prior to shipment delivery to alert the Data Center of a delivery.
- (c) All packages shipped to the Data Center must have the Customer’s name and customer number on the shipping label. Unidentified packages are a security risk. Any unidentified packages delivered to the Data Center will be refused for security reasons. Packages and smaller shipments will be received and stored in the locking cages in the Customer Staging area. Customers will need to coordinate pick-up of such items within a period of time no longer than two weeks.
- (d) Unless agreed to in writing by BDCCL, all equipment received at the Loading Dock must be removed to the Customer Area or other authorized area, within 2 days of its arrival at the Data Center. Customer will be charged storage fees for any equipment remaining in the Loading Dock area more than 2 days.
- (e) Data Center staff will not move, unpack or uncrate any Customer owned equipment (racks, cabinets, racks of equipment, etc). Customer is responsible for unpacking, uncrating, and movement of heavy equipment to the Data Center floor, including all associated costs.
- (f) Customer, in coordination with the Data Center staff, must implement appropriate protection plans to prevent damage to Data Center infrastructure (plywood on raised floors, cage wall removal, overhead clearance, etc.).
- (g) Customer should contact Data Center staff before moving equipment greater than 300 pounds to the Data Center floor.
- (h) The BDCCL will not pack and ship any Customer owned equipment.
- (i) Customer is responsible to ensure their shipper provides all packing material and physically packs the devices for shipping them. BDCCL shall not be liable for improper packing and shipping of Customer owned devices.



**D.15.0    Audits**

All Customer requests for audits shall be made in writing and submitted to BDCCL. All desired audit points must be defined in the request for review. Unauthorized audits are strictly prohibited.

**D.16.0    Removal of Equipment at End of Term**

- (a) Unless otherwise agreed to in writing, Customer will have all customer-owned hardware removed from the Data Center no later than the Effective Cancellation Date. Customer-owned hardware remaining in the Data Center after the Effective Cancellation Date becomes the property of BDCCL
- (b) Upon termination or expiration of Service, Customer must leave the Space in as good condition; normal wear and tear accepted.

**D.17.0    Web Cams and Audio Monitoring devices**

- (a) Web cams may be permissible as long as they are fixed-mount placements with no pan-tilt-zoom capabilities and the field of view is limited to Customer's cage floor space ONLY. The camera manufacturer and model number must be submitted through the change order process to be given the opportunity for Data Center Management to conduct an Engineering Review of the camera. Cameras found not to be compliant will not be allowed into the center.
- (b) The Data Center Management staff must verify the field of view of all cameras. Should the device be moved after verification, BDCCL reserves the right to deny the use of the camera until it is compliant with the limited field of view requirements. Data Center Management will disable any camera found to be non-compliant through physical means, until the camera can be proven to be in compliance.
- (c) Audio recording and audio capture devices are expressly forbidden in the Data Center.

**D.18.0    Environmental Devices**

- (a) Readings from Customer installed environmental sensing devices in a cage or cabinet will be considered secondary to BDCCL's environmental monitoring.
- (b) Individual or free-standing electrical devices such as humidifier/dehumidifier, fans, air circulators, or air filters are not permitted in cage areas or cabinets. Fans integrated into racked equipment (servers, routers, switches) and customer provided racks are permitted. Should Customer need assistance with environmental conditions, Customer may open a trouble ticket with BDCCL.

**D.19.0 Customer Provided Racks**

- (a) Customers may provide their own racks or cabinets upon BDCCL. The dimensions and height of the Customer provided cabinet must be listed in the SOW. BDCCL will provide assistance in the installation of the Customer provided racks to ensure proper grounding and compliance with all applicable ordinance codes.
- (b) If the height or depth is greater than the specified Tier-IV standard, the rack or cabinet must be reviewed by BDCCL for weight, HVAC impact, and CCTV camera field of view impairment.
- (c) Power load distribution per rack must comply according to colocation design.

**D.20.0 Customer Provided Power Strips**

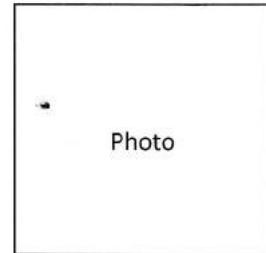
- (a) Use of customer provided power strips must be discussed and reviewed with BDCCL account team. Power strips must be industry approved; provide some type of over-current protection; and, must be mounted in the racks.
- (b) Customers are prohibited from plugging their own power strips into Data Center or customer provided power strips (daisy-chaining). This is violation of electrical and safety codes and BDCCL reserves the right to demand their removal. Any violations of this plan must be rectified within one business day. Failure to correct this violation after one business day is a material breach of the terms of the customer's contract.
- (c) Customer provided power strips are considered custom power.
- (d) BDCCL shall not be responsible for an outage caused by a Customer provided power strip.
- (e) BDCCL may conduct periodic power audits of Customer Space. Any violation of power limitations must be addressed immediately.

**D.21.0 Customer Provided Additional Security Devices**

Customers are not allowed to add security devices that would hinder Data Center's access to the cage or cabinet. This is for security and safety reasons. BDCCL must have access to all areas of the Data Center at all times.



Establishment of IV Tier National Data Center (4TDC)  
Bangladesh Computer Council (BCC)  
Information and Communication Technology Division  
ICT Tower, Floor 11, E-14/x, Agargaon, Dhaka-1207  
Application for Access into Tier IV National Data Center (Kaliakoir, Gazipur)



1. Party/Company.....
2. Full Name:.....
3. National ID/Passport No:.....
4. Sex:.....
5. Telephone/Mobile:.....
6. Date of Birth:.....
7. Marital status:.....
8. Native Place:.....
9. Nationality:.....
10. Position:.....
11. Religion:.....
12. Home Address & Postal Code:.....
13. Purpose of visit:.....

*OFFICE USE ONLY*

*Authorized Area :*

LEVEL 1  LEVEL 2-TEC  LEVEL 2-NON TEC  LEVEL 3

*Special Instructions (if required):*

Applicant's Signature & Date:

Approver's Signature & Date:

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**Exhibit I:**  
**Example of an "Access Ticket"**

**Subject:** Customer # 0010 Access Ticket for 12/20/19

**Access Ticket:**

Customer # 0010; ABC Corporation  
Name of Vendor: Alim Dar (IBM Technician)  
Task being performed: Working on the IBM Storage Array.  
Purpose of access: Schedule maintenance  
Start Date\Time: 08-20-2019 at 01:00 PM  
End Date\Time: 08-20-2019 at 05:00 PM  
Location of Task: ABC Corporation's cage in BDCCL  
Escorted Person: MD. Ashrafur Rahman

Eresh Sarwar  
Director IT  
ABC Corporation

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**Exhibit II:**

**Personal Accountability**

Failure to knowingly comply with the following procedures is grounds for immediate removal from the facility. All persons allowed access to critical areas must review these policies and work rules and demonstrate their understanding of these procedures most applicable to their activity.

I have been given a copy of the BDCCL Data Center Policies & Work Rules and acknowledge their receipt. I have had an opportunity to review and ask questions about these procedures and policies. I agree to follow these procedures and policies to the best of my abilities.

*It is vitally important that you understand the potential for negative impact your actions could have on this site as a result of working inappropriately and our desire to avoid such instances. These procedures and guidelines have been developed to clarify our quality expectations and to reduce the chance of mistakes and unintended events. Failure to comply with any procedure may result in your immediate removal from the site and may result in permanent loss of your access to the facility*

Company \_\_\_\_\_  
Name \_\_\_\_\_  
Signature \_\_\_\_\_ Date: \_\_\_\_\_  
Accepted by BDCCL \_\_\_\_\_ Date: \_\_\_\_\_

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### **TEMPLATE FOR NON-DISCLOSURE AGREEMENT (NDA)**

This CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT (hereinafter referred to as the ‘Agreement’) is made at Dhaka on this the \_\_\_ day of \_\_\_, 2019 of the Christian era.

This Confidentiality and Non-Disclosure Agreement is entered into by and between IV Tier National Data Center, located at Bangabandhu Hitech City having its registered office at BCC Bhaban (11<sup>th</sup> Floor), (hereinafter referred to as “BDCCL”, which expression shall unless excluded therein, be deemed to mean and include its executors, successors-in-interest, assigns and legal representatives) of the one part;

AND

(Individual Name).(insert address) (hereinafter referred to as “Person” or “Support Person” which expression shall unless excluded therein, be deemed to mean and include its executors, successors-in-interest, assigns and legal representatives) of the other part.

(BDCCL and the Person are individually referred to as “Party” and collectively as “Parties”.)

#### **RECITALS**

WHEREAS:

- A. The Parties are desirous to discuss and negotiate for future projects in greater detail with the possibility of them entering into agreements (“Purpose”);
- B. For such purpose, the Parties will have to disclose to each other commercially valuable non public, confidential or proprietary information deemed confidential by the Parties, such as but not limited to commercial, financial or technical information or documents that may be disclosed by a Party (“the Disclosing Party”) to the other Party (“the Receiving Party”) during negotiations.

In consideration of the Parties’ mutual disclosure of Confidential Information (defined hereinafter) to each other, which each party acknowledges to be good and valuable consideration for its obligations hereunder, the Parties hereby agree and undertake as follows:

#### **Article-1      Definitions**

“Confidential Information” as used in this Agreement shall mean any information or material which is proprietary to the Disclosing Party or designated as “Confidential Information” by the Disclosing Party whether or not owned or developed by the Disclosing Party, which is not generally known by the Receiving Party or the Receiving Party’s personnel, and of which the Receiving Party may obtain knowledge through or as a result of the relationship established hereunder with the Disclosing Party, access to the Disclosing Party’s premises, or communications with the Disclosing Party’s employees or independent proposers. For avoidance of doubt, “Confidential Information” shall include information disclosed by the Disclosing Party related to the Purpose of entering this Agreement.

“Related Company” shall mean any corporation, company or other entity, which controls, or is controlled by one Party or by another Related Company of such Party, where control means ownership or control, direct or indirect, of more than fifty (50) percent of such corporation’s, company’s or other entity’s voting capital. However, any such corporation, company or other entity shall be deemed to be a Related Company of one Party only so long as such ownership or control exists.

Without limiting the generality of the foregoing, Confidential Information includes, but is not limited to, the following types of information and other information of a similar nature (whether or not reduced to writing or still in development) : designs, concepts, drawings, ideas, inventions, specifications, techniques, discoveries, models, data, source code, object code, documentation, diagrams, flow charts, research, development, processes, procedures, know-how, new product or new technology information, marketing techniques and materials, marketing plans, timetables, strategies and development plans) including prospective trade names or trademarks or service marks), customer names and other information related to customers, pricing policies, and financial information.

## **Article-2      Confidentiality**

### All Confidential Information

- (i) shall be used by the Receiving Party exclusively for the Purpose, unless otherwise expressly agreed to in writing by the Disclosing Party;
- (ii) shall not be distributed or disclosed in any way or form by the Receiving Party to anyone except to the employees of the Receiving Party or those employees of its Related Company and except to consultants, advisers or bankers advising the receiving Party and/or its Related Company with regard to the Purpose ("Advisers"), who each of them reasonably need to know such Confidential Information for the Purpose and who are bound to confidentiality either by their employment agreement or otherwise in writing to an extent not less stringent than the obligations imposed on the Receiving Party under this Agreement. Prior to any disclosure to a Related Company or to an Adviser, the Receiving Party must have in place a written agreement with such Related Company or such Adviser imposing on such Related Company or on such Adviser confidentiality obligations in respect of the Confidential Information not less stringent than the obligations imposed on the Receiving Party under this Agreement;
- (iii) shall be kept confidential by the Receiving Party with the same degree of care as is used with respect to the Receiving Party's own equally important confidential information to avoid disclosure to any third party, but at least with reasonable care; and
- (iv) Shall remain the property of the Disclosing Party.

## **Article-3      Exceptions**

The obligations under Article 2 shall not apply, however, to any information which:

- (i) was in the Receiving Party's possession without an obligation to confidentiality prior to receipt from the Disclosing Party;
- (ii) is at the time of disclosure already in the public domain or subsequently becomes available to the public through no breach of this Agreement by the receiving Party or the breach of the corresponding obligations of any Related Company and/or of the Advisers;
- (iii) is lawfully obtained by the Receiving Party from a third party without an obligation to confidentiality, provided such third party is not, to the Receiving Party's knowledge, in breach of any obligation to confidentiality relating to such information;
- (iv) Is developed by the Receiving Party or its Related Companies independent of any Confidential Information or under the exceptions as set out in Article 3 lit. i) - iii) or vi);
- (v) is required to be disclosed by any ruling of a governmental or regulatory authority or court or by mandatory law, provided that written notice of such ruling is given without undue delay to the Disclosing Party so as to give the Disclosing Party an opportunity to intervene and provided further that the Receiving Party uses reasonable efforts to obtain assurance that the Confidential Information will be treated confidentially; or
- (vi) Is approved for release by written agreement of the Disclosing Party.

The Party intending to rely on the foregoing exclusions shall bear the burden of showing that any of the foregoing exclusions apply to any information or materials.

## **Article-4      Purpose**

Each party agrees to attempt to limit its disclosure of the Confidential Information made to the other party to those which are reasonably necessary to serve the limited Purposes of this Confidentiality and Non-Disclosure Agreement as set forth above.

## **Article-5      Release of Information received under this Agreement**

Without limiting the generality of any of the provisions of this Confidentiality and Non-Disclosure Agreement, the parties specifically agree that any reports, press releases or other publications containing Confidential Information which are not made or authorized by the Disclosing Party and which appear in any publication prior to the Disclosing Party's official disclosure of such Confidential Information, shall not release the Receiving Party from its obligations hereunder with respect to such Confidential Information. Each party agrees that it shall not publish any review, notice or other report containing any of the other party's Confidential Information prior to obtaining written permission from the Disclosing Party to disclose such Confidential Information hereunder but only to the extent that it is actually disclosed by the Disclosing Party to the Receiving Party. Without prior

written consent, any review, notice or other report published by either party shall be limited to information which is not Confidential Information.

**Article-6      Limited Use of Information received under this Agreement.**

It is understood that the parties may furnish to each other certain materials, either in writing or otherwise fixed in tangible form, constituting or containing Confidential Information. The Parties agree that any and all these materials shall be furnished in confidence and all of the terms and conditions of this Confidentiality and Non-Disclosure Agreement shall apply to the disclosure or furnishing of these materials. The Receiving Party shall not copy, alter, modify, disassemble, reverse engineer or decompile any of these materials without the prior written consent of the Disclosing Party. Each party agrees to return to the Disclosing Party all these materials, together with any copies that may have been made, promptly upon the request by the Disclosing Party or, if not requested earlier, promptly after the Purpose(s) for which they were furnished has been accomplished or abandoned (at least with respect to the Receiving Party).

**Article-7      Representations and Warranties**

Each party represents that it has not provided or communicated any of the other party's Confidential Information which it has received the date hereof to any third party, and hereby agrees that all such Confidential Information shall be subject to the terms and conditions of this Confidentiality and Non-Disclosure Agreement.

**Article-8      No right to Assignment or License**

Nothing in this Confidentiality and Non-Disclosure Agreement shall be construed as creating any obligation on the part of any party to disclose any Confidential Information whatsoever. Nothing in this Confidentiality and Non-Disclosure Agreement shall be construed as granting any license or right to assign or any other rights with respect to either party's proprietary rights or Confidential Information.

**Article-9      Obligation/liability**

Nothing contained in this Confidentiality and Non-Disclosure Agreement shall be construed as creating any obligation or an expectation on the part of either party to enter into a business relationship with the other party, or an obligation to refrain from entering into a business relationship with any third party. Nothing contained in this Confidentiality and Non-Disclosure Agreement shall be construed as creating a joint venture, partnership or employment relationship between the parties, it being understood that the parties are independent proposers vis-à-vis one another. Except as specified herein, no party shall have the right, power or implied authority to create any obligation or duty, express or implied, on behalf of any other party hereto.

**Article-10      Indemnification**

Each Party ("Breaching Party") shall at all times hereafter indemnify and keep the other Party ("Non-Breaching Party") fully indemnified against all claims, demands, actions, proceedings, losses, damages, costs, charges, expenses, interests and disbursements of any nature whatsoever which the Non-Breaching Party may pay or incur or suffer or sustain or be liable to pay or incur or suffer or sustain as a result or consequence, direct or indirect, of any breach of the provisions of this Agreement by the Breaching Party.

**Article-11      Liability for the Parties, Related Companies and Advisers**

11.1 Each Party shall be liable for acts or omissions of its Related Companies or by Related Companies' employees - even where such Related Company ceases to be a Related Company - or by any Party's Advisers resulting in unauthorized distribution, use and/or disclosure of Confidential Information as if such acts or omissions had been its own acts or omissions. Notwithstanding anything to the contrary in this Confidentiality and Non-Disclosure Agreement both parties shall be entitled, to the extent as both parties deems fit and necessary, without being liable in any manner whatsoever to any party and without being bound to any obligation of confidentiality provided in this Confidentiality and Non-Disclosure Agreement, to disclose the Confidential Information or any part(s) thereof, provided that such disclosure to a third party is made pursuant to a confidentiality agreement that is no less protective of the rights of the Disclosing Party than the terms of this Agreement:

- (a) to its legal, technical, insurance, financial advisers and accountants; or

- (b) in connection with the procurement of any insurance or presentation of any insurance claim; or  
(c) in connection with any financing obtained or proposed to obtain.
- 11.2 If the Receiving Party is required to disclose the Confidential Information of the Disclosing Party by a governmental, judicial or regulatory authority, the Receiving Party shall immediately notify the Disclosing Party to permit the Disclosing Party to obtain a protective order or other protective measure. If the Disclosing Party's Confidential Information is subject to a protective order or other similar protective measure, it shall continue to be treated as the Confidential Information of the Disclosing Party under the terms of this Agreement.

#### **Article-12      Entirety**

This Confidentiality and Non-Disclosure Agreement sets forth the entire understanding and Agreement of the Parties with respect to the subject matter hereof and supersedes all other oral or written representations and understandings. The formation, interpretation and performance of this contract shall be governed by the laws of Bangladesh, excluding its conflict of law rules. The Confidentiality and Non-Disclosure Agreement may only be amended or modified in writing signed in advance by the authorized representatives of each of the Parties.

#### **Article-13      Survival**

This terms and conditions of this Confidentiality and Non-Disclosure Agreement shall survive termination of this Confidentiality and Non-Disclosure Agreement and remain in full force and effect unless and until expressly terminated in writing and signed by both Parties thereto. The Non-Disclosure Agreement becomes legally effective from the date of signing of both the parties. Notwithstanding the foregoing, the Parties agree that each Party's duty to protect and refrain from using the Confidential Information of the other Party shall continue indefinitely beyond the term of this Agreement, unless and until such Confidential Information ceases to satisfy the definition of "Confidential Information" in Article-1 of this Agreement.

#### **Article-14      Governing Law and Jurisdiction**

This Agreement shall be governed by, and construed in accordance with the laws of Bangladesh.

#### **Article-15      Arbitration**

If any dispute arises between the parties hereto during the subsistence or thereafter, in connection with or arising out of this Agreement, the parties hereto shall endeavor to settle such dispute amicably amongst themselves. In the case of failure by the parties to resolve the dispute in the manner set out above within 30 days from the date of receipt of dispute notice sent by either party, the dispute shall be referred to arbitration under the Arbitration Act, 2001 by a panel of three arbitrators. Each party will appoint one arbitrator and the two arbitrators so appointed will appoint the third or the presiding arbitrator. Arbitration shall be held in Dhaka, Bangladesh. The proceedings of arbitration shall be in the English language. The arbitrator's award shall be final and binding on the parties.

#### **Article-16      Term**

The term of this Agreement shall commence on the date this Agreement is executed and accepted by both parties for a period of Six (06) months. This Agreement may be terminated by either party in case of parent contract termination (if any) and upon 30 days' written notice to the other party.

IN WITNESS THEREOF, the Parties have hereunto set their hands and seals as of the date first above written.

FOR AND ON BEHALF OF BDCCL  
Signatures  
Name and Address

FOR AND ON BEHALF OF (name of other party)  
Signatures  
Name and Address

Witness :

Witness



## **ANNEX-E: DATA CENTER MARKET ANALYSIS**

### **E.1.0 Overview**

With the rapid development of Internet business, IDC market is entering a rapid growth. P2P HD/high-definition network video, large 3D online cloud computing business are rising immensely that the traditional network cannot fully meet the market demand. Cloud computing data center is based on the calculation of the Internet i.e. sharing of software and hardware resources and information are provided through the network to provide scalable distributed computing ability.

### **E.2.0 Data Center Market in Bangladesh**

Apart from the state owned Data Center for some ministries, armed forces, there are only few private Data Centers (Coloasia, Colocity, DakaColo) in Bangladesh. Some of the large corporate like Basundhara Group, Beximco Group, TK group, Square group etc, have hosted Data Centers and are used by them. Following are the facts underlying in Bangladesh Data Center market:

- (a) Only few government ministries own small scale Data Center. Some other ministries have Data Center requirement, but do not have any.
- (b) At present no Data Center in Bangladesh is capable of providing cloud services.
- (c) Most of the existing Data Centers do not have Disaster Recovery Site (DRS). Some Data Centers have DRS, but most of the DRS are too near to the main site. In conclusion, almost all of the existing Data Centers do not do well on disaster recovery work.
- (d) Some local enterprises use Data Center services from other countries (e.g. Singapore). There is a submarine cable between India and Singapore, which means the data sent from Bangladesh will first be transmitted to India then go to Singapore. The transmission speed is very limited, which seriously affects the efficiency of the Data Center industry.
- (e) Most of the private enterprises cannot afford to build a Data Center; but they have the requirement for the Data Center services especially cloud services.
- (f) Most of the private enterprises do not rely on local Data Center service provider, they think their data are stored in the other ones place, it is extremely unsafe, and they eager to use the Data Center owned by government.
- (g) Around 90% existing Data Centers built in Dhaka.
- (h) Almost all of the enterprises such as insurance companies, TV stations, public universities who have the potential requirement for Data Center do not own Data Center, and do not use Data Center services, neither.

- (i) As time window has come to launch the 4G/5G service by local mainstream operators such as Gramophone, Banglalink, Robi, etc and the data usage will rise sharply, but right now there aren't any Data Center used for these data storage.

In conclusion, there is a huge potential Data Center market in Bangladesh and a state owned Data Center can be symbol of enterprises confidence and stimulate a blue ocean market. Meanwhile, there also is a requirement that to unify the government Data Center, to realize the unified management and to make more government units use Data Center service.

#### E.3.0 Examples of Existing Market Price of Data Center Products

Most of the private Data Centers in Bangladesh, including government owned Tier-III Data Center offers only colocation services as Data Center product. The existing price ranges (revisable by the companies anytime due to business need) found are :

Product Detail	Govt Facilities in BD		Private Sector in BD		International	
	NDC Tier-III	BdRen	ColoAsia	Dhaka Colo	Colocity	Alibaba
10KW Rack/32Amp						327,600
4KW Rack/16Aamp	262,500	107,000	1,60,000	1,10,000	1,17,000	163,800

#### E.4.0 Selection Matrix for Potential Customer

Customer Category	*Security Status	Revenue (60)	Brand value (30)	Business Risk (20)
Government Organizations				
Non-Government Organizations				
Private Organizations				
International Organizations				
Individual Customer				

## **ANNEX – F: SUGGESTED PRODUCT CATALOG**

### **F.1.0 Data Center Product Range**

Data Center business models can be viewed as a series of successive layers often referred to collectively as the “service stack”. This pattern is common to most business sectors where within a given market some companies specialize and others provide multiple services. What perhaps singles Data Centers out is the sheer number of different layers of service, the speed at which new services are evolving and the flexibility for customers to choose their approach according to their requirements.

Data Centers provide the basis for a wide range of service offerings. These services take the form of successive layers rather than an end-to-end service. Some organizations prefer just one layer while others may prefer multiple services. A list of service variety is as under:

- (a) Property Company i.e. may be a real estate company or a wholesale Data Center operator that actually operates the facility.
- (b) Colocation services includes “position, power and ping” – guaranteed security, resilience, connectivity and power.
- (c) Wholesale Services providers often own the building and provide space on relatively long term leases.
- (d) Retail Colocation Services tend to share pre-existing infrastructure and lease space that is already fitted out ready for action.
- (e) Some wholesale providers offer retail colocation space as well as wholesale space.
- (f) Managed colocation is essentially a range of managed network infrastructure services provided by retail colo operators.
- (g) Cloud services i.e. Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS).
- (h) Application Management.

### F.2.0 Product Identification

The Data Center solution contains Data Center Infrastructure (racks, air conditioners, UPS & Battery, etc), IT hardware (server, storage, network equipment), cloud platform (cloud computing resource, cloud storage resource and cloud network resource, cloud resource management system), cloud security solution and Billing and Operation Support system. The project is ready for providing rack and space on rent, co-location services, cloud server and storage renting, virtual desktop services, etc for the departments of government or enterprises in Bangladesh.

Catalog is prescribed based on existing system and service architecture. Current IT market in local and overseas service structure is also considered.

- (a) Computing services
- (b) Storage Services
- (c) Backup Services
- (d) Cloud Desktop Services
- (e) Colocation Services
- (f) Consultancy Services

### F.3.0 Proposed Charges

#### I.3.1 Computing Services

##### A. Elastic Computing Server service

Sl.	Product	Feature		Unit Price per Month (BDT)
(a)	ECS Basic Package	Basic:	2vCPU, 8 GB RAM, 20 GB Storage	8,071.77
		Standard:	4vCPU, 16 GB RAM, 40 GB Storage	16,143.54
		Advance:	8vCPU, 32 GB RAM, 40 GB Storage	32,287.08
		Premium	16vCPU, 64 GB RAM, 80 GB Storage	64,574.16
(b)	ECS Data Disk Package	Basic:	40 GB	2,548.00
		Standard:	80 GB	5,096.00
		Advance:	120 GB	7,644.00
		Premium	200 GB	12,740.00
(c)	Security Requirement	General Public Level:		-
		Firewall, Anti-DDOS,IPS,DPI		-
		Tenant Private Level:		-
		(i) WAF		72,618.00
		(ii) Firewall		108,927.00
(d)	Network Requirement	Public IP (Maximum 8)		1,183.00
		Internet Bandwidth 10 Mbps		31,467.00
		Private IP		-

Sl.	Product	Feature	Unit Price per Month (BDT)
		Intranet Bandwidth 10Mbps	31,467.00
		NAT Gateway	31,200.00
		Standard VPN: 5 Users,5Mbps	7,261.80
		Advance VPN: 10 Users,10Mbps	14,523.60
(e)	Installation	Shall be completed by Customer, any requirement of cable from BDCCL devices to customer devices shall be borne by the customer	NA
(f)	BDCCL Commissioning Support	Necessary support will be provided as required during installation activities of customer. During the activity a representative of BDCCL will be there always to coordinate and support.	NA
(g)	Compliance	Customer shall support BDCCL during their activity as informed that is relevant with the compliance of following Data Center standards like ISO 20000, ISO 27001, TIA 942	NA
(h)	Resource Access	Remote access from to resources is available provided that customer's devices have management ports and Data Center IP configured on those. All remote access is possible after proper authentication of IPSec VPN users provided to the Customer.	NA
(i)	Post Implementation Support	(i) On request physical reboot to customer devices	NA
		(ii) Support to ensure availability of power, cooling and network into customer devices	

#### B. Database Server service

Sl.	Product	Feature	Unit Price per Month (BDT)
(a)	DB Server Basic Package	Basic: 16vCPU, 64 GB RAM, 80 GB Storage	71,854.16
		Standard: 32vCPU, 128 GB RAM, 120 GB Storage	143,708.32
(b)	Data Disk Package	Basic: 100 GB	7,644.00
		Standard: 200 GB	15,288.00
		Advance: 500 GB	38,220.00
		Premium: 1 TB	76,440.00
(c)	Security Requirement	General public level:	-
		Firewall, Anti-DDOS,IPS,DPI	-
		Tenant private level:	-
		(i) WAF	72,618.00
		(ii) Firewall	108,927.00
		Public IP (Maximum 8)	1,183.00
(d)	Network Requirement	Internet Bandwidth 10 Mbps	31,467.00
		Private IP	-
		intranet Bandwidth 10Mbps	31,467.00

Sl.	Product	Feature	Unit Price per Month (BDT)
		NAT Gateway	31,200.00
		Standard VPN: 5 Users,5Mbps	7,261.80
		Advance VPN: 10 Users,10Mbps	14,523.60
(e)	Installation	Shall be completed by Customer, any requirement of cable from BDCCL devices to customer devices shall be borne by the customer	NA
(f)	BDCCL Commissioning Support	Necessary support will be provided as required during installation activities of customer. During the activity a representative of BDCCL will be there always to coordinate and support.	NA
(g)	Compliance	Customer shall support BDCCL during their activity as informed that is relevant with the compliance of following Data Center standards like ISO 20000, ISO 27001, TIA 942	NA
(h)	Resource Access	Remote access from to resources is available provided that customer's devices have management ports and Data Center IP configured on those. All remote access is possible after proper authentication of IPSec VPN users provided to the Customer.	NA
(i)	Post Implementation Support	(i) On request physical reboot to customer devices	NA
		(ii) Support to ensure availability of power, cooling and network into customer devices	

### I.3.2 Storage Service:

Sl.	Product	Feature	Unit Price Per Month (BDT)
(a)	File Storage Package	Basic: 1 TB, On Demand Data Storage	84,721.00
		Standard: 5 TB, On Demand Data Storage	423,605.00
		Advance: 10 TB, On Demand Data Storage	847,210.00
		Premium: 20 TB, On Demand Data Storage	1,694,420.00
(b)	Security Requirement	General public level:	-
		Firewall, Anti-DDOS,IPS,DPI	-
		Tenant private level:	-
		(i) WAF	72,618.00
		(ii) Firewall	108,927.00
(c)	Network Requirement	Public IP (Maximum 8)	1,183.00
		Internet Bandwidth 10 Mbps	31,467.00
		Private IP	-
		Intranet Bandwidth 10Mbps	31,467.00
		NAT Gateway	31,200.00
		Standard VPN: 5 Users,5Mbps	7,261.80
		Advance VPN: 10 Users,10Mbps	14,523.60
(d)	Installation	Shall be completed by Customer, any requirement of cable from BDCCL devices to	NA

Sl.	Product	Feature	Unit Price Per Month (BDT)
		customer devices shall be borne by the customer	
(e)	BDCCL Commissioning Support	Necessary support will be provided as required during installation activities of customer. During the activity a representative of BDCCL will be there always to coordinate and support.	NA
(f)	Compliance	Customer shall support BDCCL during their activity as informed that is relevant with the compliance of following Data Center standards like ISO 20000, ISO 27001, TIA 942	NA
(g)	Resource Access	Remote access from to resources is available provided that customer's devices have management ports and Data Center IP configured on those. All remote access is possible after proper authentication of IPSec VPN users provided to the Customer.	NA
(h)	Post Implementation Support	(i) On request physical reboot to customer devices (ii) Support to ensure availability of power, cooling and network into customer devices	NA

### I.3.3 Backup Service:

Sl.	Features	Value	Unit Price Per Month (BDT)
(a)	Backup Storage Package	Basic: 40 GB, On Demand Data Backup	2,904.72
		Standard: 100 GB, On Demand Data Backup	7,261.80
		Advance: 200 GB, On Demand Data Backup	14,523.60
		Premium: 1000 GB, On Demand Data Backup	72,618.00
(b)	Security Requirement	General public level:	-
		Firewall, Anti-DDOS,DPI,PS	-
		Tenant private level:	-
		(i) WAF	72,618.00
		(ii) Firewall	108,927.00
(c)	Network Requirement	Public IP (Maximum 8)	1,183.00
		Internet Bandwidth 10 Mbps	31,467.00
		Private IP	-
		intranet Bandwidth 10Mbps	31,467.00
		NAT Gateway	31,200.00
		Standard VPN: 5 Users,5Mbps	7,261.80
		Advance VPN: 10 Users,10Mbps	14,523.60
(d)	Installation	Shall be completed by Customer, any requirement of cable from BDCCL devices to customer devices shall be borne by the customer	NA
(e)	BDCCL Commissioning Support	Necessary support will be provided as required during installation activities of customer. During the activity a representative of BDCCL will be there always to coordinate and support.	NA

Sl.	Features	Value	Unit Price Per Month (BDT)
(f)	Compliance	Customer shall support BDCCL during their activity as informed that is relevant with the compliance of following Data Center standards like ISO 20000, ISO 27001, and TIA 942	NA
(g)	Resource Access	Remote access from to resources is available provided that customer's devices have management ports and Data Center IP configured on those. All remote access is possible after proper authentication of IPSec VPN users provided to the Customer.	NA
(h)	Post Implementation Support	(i) On request physical reboot to customer devices (ii) Support to ensure availability of power, cooling and network into customer devices	NA

#### I.3.4 Colocation Service:

Sl.	Product	Features	Unit Price Per Month (BDT)
(a)	Packages	42U, 2000*1200*600 mm, 4KW	3,08,140.00
		42U, 2000*1200*600 mm, 10KW	6,21,250.00
		42U, 2000*1200*600 mm, 4KW with Rack	3,27,320.00
		42U, 2000*1200*600 mm, 10KW with Rack	7,07,560.00
(b)	Network Requirement	Public IP (Maximum 8)	1,183.00
		Internet Bandwidth 10 Mbps	31,467.00
		NAT Gateway	31,200.00
(c)	Installation	Shall be completed by Customer, any requirement of cable from BDCCL devices to customer devices shall be borne by the customer	NA
(d)	BDCCL Commissioning Support	Necessary support will be provided as required during installation activities of customer. During the activity a representative of BDCCL will be there always to coordinate and support.	NA
(e)	Compliance	Customer shall support BDCCL during their activity as informed that is relevant with the compliance of following Data Center standards like ISO 20000, ISO 27001, and TIA 942	NA
(f)	Resource Access	Remote access to resources is available provided that customers devices has management ports and Data Center IP configured on those. All remote access is possible after proper authentication of IPSec VPN users provided to the Customer.	NA
(g)	Post Implementation Support	(i) On request physical reboot to customer devices	
		(ii) Support to ensure availability of power, cooling and network into customer devices	

### 1.3.5 Managed Service:

Sl.	Features	Value	Unit Price Per Month (BDT)
1	Consultancy, Design, Deployment & Management	Based on discussion and availability of the resource's services will be delivered to the customer. (per person per day)	40,000.00
	Implementation of Reference Architecture	Basic: 1 NFS-500GB, 3 APP, 1 DB Standard: 1 NFS-1 TB, 5 APP, 2 DB	400,000.00 600,000.00

### 1.3.6 Cloud Desktop Service:

Sl.	Features	Value	Unit Price Per Month (BDT)
(a)	Cloud Desktop Package (ZTE Thin Terminal)	Basic: 2 vCPU, 4 GB RAM, 40 GB Storage	5,110.00
		Standard: 4 vCPU, 8 GB RAM, 100 GB Storage	12,775.00
(b)	Data Disk Package	Basic: 100 GB	4,900.00
		Standard: 200 GB	9,800.00
		Advance: 500 GB	24,500.00
		Premium: 1 TB	49,000.00
	Security Requirement	General public level:	-
		Firewall, Anti-DDOS,IPS,DPI	-
(c)	Network Requirement	Public IP (Maximum 8)	1,183.00
		Internet Bandwidth 10 Mbps	31,467.00
(d)	Installation	Shall be completed by Customer, any requirement of cable from BDCCL devices to customer devices shall be borne by the customer	NA
(e)	BDCCL Commissioning Support	Necessary support will be provided as required during installation activities of customer. During the activity a representative of BDCCL will be there always to coordinate and support.	NA
(f)	Compliance	Customer shall support BDCCL during their activity as informed that is relevant with the compliance of following Data Center standards like ISO 20000, ISO 27001, and TIA 942	NA
(g)	Resource Access	Remote access from to resources is available provided that customer's devices have management ports and Data Center IP configured on those. All remote access is possible after proper authentication of IPSec VPN users provided to the Customer.	NA
(h)	Post Implementation Support	(i) On request physical reboot to customer devices	NA
		(ii) Support to ensure availability of power, cooling and network into customer devices	

## ANNEX - G: FINANCING ANALYSIS

### G.1.0 Business Case Parameters

- (a) The business operation starts from June 2020.
- (b) No new investment would be available before project reaches to breakeven.
- (c) Data Center Management preserves all rights to change/modify/add services/prices of each services of the data center. The Prices might be revised in every 3 years considering market analysis.
- (d) All investment before June 2020 are considered as Initial Investment.
- (e) The loan from China Exim Bank 1199.36 crore will be returned at 2% interest in 15 installments.
- (f) The investment by GOB is considered to be equity. The cost of GOB Fund is considered 5%.
- (g) Warranty and maintenance is free for all equipment for 3 years after PAT (June 2019) and is 10% for next 3 years i.e. from 2022-23, 2023-24, 2025-26.
- (h) IDC Equipment are depreciated at 10% and IT equipment are depreciated at 15% in reducing balance method.
- (i) Existing fuel consumption is = 2-hours power outage/day\*half (8/2=4) generators running at a time\*365 days\*500 liter/hour =
- (j) Generators are considered to reduce performance 10% every year and thus there will be increase of fuel consumption. Cost of diesel is considered Taka 50 for next 5 years.
- (k) Existing power consumption =  $(128*4\text{KW Rack} + 2*4*\text{10KW rack})*150\% = 1128$  considering that 50% additional load for Rack Power. (1 Unit = KW\*H\*24\*365 = \$ 863 = BDT 72,492)
- (l) Existing and projected utilization of Racks are given below. However, if BDCCL uses available racks in MDC, they are likely to produce revenue greater than what would be earned by renting rack.
- (m) IT Resources includes both SOFTWARE and HARDWARE.
- (n) Warranty and maintenance is free for all IT resources for 3 years after PAT (June 2019) and is 10%, 12% and 15% for next 3 years i.e. from 2022-23, 2023-24, 2025-26 respectively.
- (o) All other costs are as per contract.
- (p) Employee Salary as per Company Structure would start from July 2020
- (q) Each year company shall invest minimum BDT 50 lacs for business development.

- (r) Revenue for first 5 years is calculated as per the parameters set above and considered to have 10% growth from 6th year onward.
- (s) OPEX is calculated for first 5 years and considered to 5% increase annually.
- (t) IDC equipment are depreciated 10% annually and IT equipment are depreciated at 15% annually, at reducing balance method

## G.2.0 CAPEX

Details	All amounts in Crore					
	Initial Investment	Year 2020-21	Year 2021-22	Year 2022-23	Year 2023-24	Year 2024-25
Investment by Exim Bank	1,199.36					
Investment by GOB	400.00					
<b>Total</b>	<b>1599.36</b>					

## G.3.0 OPEX

### J.3.1 OPEX for IDC

Type of Rack/Rack Space	Existing Capacity	Available for Utilization	Projected Utilization in				
			Year 2020-21	Year 2021-22	Year 2022-23	Year 2023-24	Year 2024-25
4KW Rack - MDC	128	66	75%	90%	90%	90%	90%
10KW Rack - MDC	24	3	75%	90%	90%	90%	90%
4KW Rack - Cage Halls	404	404	60%	80%	90%	90%	90%
10KW Rack - Cage Halls	48	48	60%	80%	90%	90%	90%
Space for NOC Desk	40	28	75%	75%	80%	80%	80%

Details	All amounts in Crore					
	Unit Cost per Year	Year 2020-21 Utilized	Year 2021-22 Utilized	Year 2022-23 Utilized	Year 2023-24 Utilized	Year 2024-25 Utilized
		Cost	Cost	Cost	Cost	Cost
Electricity Bills	72,492	4,171	5,118	5,542	5,542	5,542
		30.238	37.104	40.172	40.172	40.172
Warranty & Maintenance		Warranty	Warranty	<b>21.651</b>	<b>21.651</b>	<b>21.651</b>
Liters of Diesel for Generators	50	1,606,000	1,766,600	1,943,260	2,137,586	2,351,345
		8.094	8.904	9.794	10.773	11.851
<b>Total</b>		<b>38.332</b>	<b>46.008</b>	<b>71.617</b>	<b>72.597</b>	<b>73.674</b>

### J.3.2 OPEX for IT

Details	All amounts in Crore				
	Year 2020-21 Cost	Year 2021-22 Cost	Year 2022-23 Cost	Year 2023-24 Cost	Year 2024-25 Cost
IT Resources Warranty & Maintenance	Warranty	Warranty	69.105	89.836	103.657
Internet- Level3	13.800	13.800	13.800	13.800	13.800
Internet- BTCL	4.544	4.544	4.544	4.544	4.544
Dark Fiber – SCL	0.629	0.629	0.629	0.629	0.629
Dark Fiber – BTCL	0.364	0.364	0.364	0.364	0.364
<b>Total</b>	<b>19.338</b>	<b>19.338</b>	<b>88.442</b>	<b>109.174</b>	<b>122.994</b>

### J.3.3 OPEX for Administration, Logistics and Management

Details	All amounts in Crore				
	Year 2020-21	Year 2021-22	Year 2022-23	Year 2023-24	Year 2024-25
Salaries of Employees (as per Company Structure)	30.258	30.258	30.258	30.258	30.258
Transportation & Logistics	1.000	1.000	1.000	1.000	1.000
Business Development	0.500	0.500	0.500	0.500	0.500
<b>Total</b>	<b>31.758</b>	<b>31.758</b>	<b>31.758</b>	<b>31.758</b>	<b>31.758</b>

### J.3.4 Total OPEX

Details	All amounts in Crore				
	Year 2020-21	Year 2021-22	Year 2022-23	Year 2023-24	Year 2024-25
OPEX for IDC	38.332	46.008	71.617	72.597	73.674
OPEX for IT	19.338	19.338	88.442	109.174	122.994
OPEX for Admin & Logistics	31.758	31.758	31.758	31.758	31.758
<b>Total</b>	<b>89.428</b>	<b>97.104</b>	<b>191.817</b>	<b>213.529</b>	<b>228.426</b>

#### G.4.0 REVENUE CALCULATION

##### J.5.1 Revenue from IT (All Amounts in Crore)

Details	Unit Cost per Year	Available Capacity for Commercial Use	Year 2020-21	Year 2021-22	Year 2022-23	Year 2023-24	Year 2024-25
			Utilization	Utilization	Utilization	Utilization	Utilization
			Revenue	Revenue	Revenue	Revenue	Revenue
(ECS-Cloud Platform) 2C8G (60 GB)	96,861	13,248 vCPU	70%	90%	90%	90%	90%
			44.913	57.745	57.745	57.745	57.745
(Cloud Storage) 100 GB	22,567	1,310,000 GB	50%	75%	75%	80%	90%
			50.068	75.102	75.102	80.109	90.123
(Cloud Backup) 10 GB	8,714	240,000 GB	50%	75%	75%	80%	90%
			10.457	15.685	15.685	16.731	18.823
(Cloud Security) vFWWF	2,178,540	256	80%	80%	80%	80%	80%
			44.616	44.616	44.616	44.616	44.616
VPNSSL VPN5Users 5Mbps	87,142	5,000	50%	50%	70%	75%	80%
			4.357	4.357	6.100	6.536	6.971
Internet Bandwidth 100Mbps	3,020,909	40,000 MBPS	50%	50%	60%	70%	80%
			0.755	0.755	0.906	1.057	1.208
Intranet bandwidth 10Mbps			50%	50%	60%	70%	80%
			0.755	0.755	0.906	1.057	1.208
(Cloud Desktop) 2C4G (40 GB HDD)	153,181	2,000	40%	60%	80%	90%	90%
			4.906	7.358	9.811	11.038	11.038
(iSpace) 10 GB	10,725	350,000 GB	40%	60%	80%	90%	90%
			11.760	17.640	23.520	26.460	26.460
<b>Total</b>			<b>172.59</b>	<b>224.02</b>	<b>234.39</b>	<b>245.35</b>	<b>258.19</b>

##### J.5.2 Revenue from IDC ( All amounts in crore)

Details	Unit Cost per Year	Available Capacity for Commercial Use	Year 2020-21	Year 2021-22	Year 2022-23	Year 2023-24	Year 2024-25
			Utilization	Utilization	Utilization	Utilization	Utilization
			Revenue	Revenue	Revenue	Revenue	Revenue
42U 4KW/Rack	3,731,448	128-62=66	75%	90%	90%	90%	90%
			19.443	23.331	23.331	23.331	23.331
42U 10KW/Rack	8,490,720	24-21=03	75%	90%	90%	90%	90%
			1.910	2.292	2.292	2.292	2.292
42 U 4KW/Rack space	3,172,848	404-0=404	60%	80%	90%	90%	90%
			89.632	119.509	134.448	134.448	134.448
42 U 10KW/Rack space	7,932,120	48-0=48	60%	80%	90%	90%	90%
			21.470	28.627	32.206	32.206	32.206
Space for NOC Desk	10.08.000	40-12 = 28	75%	75%	80%	80%	80%
			2.117	2.117	2.258	2.258	2.258
<b>Total</b>			<b>134.57</b>	<b>175.88</b>	<b>194.54</b>	<b>194.54</b>	<b>194.54</b>

#### G.5.0 Calculation Of NPV (Net Present Value)

#### J.5.1 Calculation of Net Operating Profit

Details	IT Revenue		IDC Revenue			
	Revenue		OPEX			
	Gross Profit		IDC Depreciation (10% Reducing)			
-13.39	13.06	-0.33	92.75	92.42	125.31	103.66
56.48	30.41	86.89	92.75	179.65	123.14	103.66
15.06	8.11	23.17	92.75	115.92	121.19	103.66
9.21	4.96	14.16	92.75	106.92	119.44	103.66
8.90	4.79	13.69	92.75	106.44	117.86	103.66
25.50	13.73	39.23	92.75	131.98	116.44	103.66
43.64	23.50	67.13	92.75	159.88	115.16	103.66
130.85	70.46	201.31	92.75	294.06	10.36	
152.59	82.16	234.75	92.75	327.50	9.32	
176.43	95.00	271.43	92.75	364.18	8.39	
202.60	109.09	311.69	92.75	404.44	7.55	
231.34	124.57	355.91	92.75	448.66	6.79	
262.94	141.58	404.52	92.75	497.27	6.11	
297.68	160.29	457.97	92.75	550.72	5.50	
335.90	180.87	516.77	92.75	609.53	4.95	
						Year 2020-
						Year 2021-
						Year 2022-
						Year 2023-
						Year 2024-
						Year 2025-
						Year 2026-
						Year 2027-
						Year 2028-
						Year 2029-
						Year 2030-
						Year 2031-
						Year 2032-
						Year 2033-
						Year 2034-

## J.5.2 Calculation of Free Cash Flow and NPV

				Details
	Add expense for (Installments)			Year 2020-21
1,400.17	199.19	199.19	0.97	204.67 125.31 92.75 Year 2021-22
-1,142.18	457.18	257.99	0.95	272.38 123.14 92.75 Year 2022-23
-931.08	668.28	211.10	0.92	229.00 121.19 92.75 Year 2023-24
-732.45	866.91	198.63	0.90	221.40 119.44 92.75 Year 2024-25
-540.79	1,058.57	191.66	0.87	219.51 117.86 92.75 Year 2025-26
-341.35	1,258.01	199.44	0.85	234.69 116.44 92.75 Year 2026-27
-133.31	1,466.05	208.04	0.83	251.55 115.16 92.75 Year 2027-28
<b>55.00</b>	<b>1,654.36</b>	<b>188.31</b>	<b>0.80</b>	<b>233.96 10.36 92.75 Year 2028-29</b>
254.48	1,853.84	199.49	0.78	254.66 9.32 92.75 Year 2029-30
466.09	2,065.45	211.61	0.76	277.57 8.39 92.75 Year 2030-31
690.83	2,290.19	224.74	0.74	302.90 7.55 92.75 Year 2031-32
929.77	2,529.13	238.94	0.72	330.89 6.79 92.75 Year 2032-33
1,184.04	2,783.40	254.27	0.70	361.80 6.11 92.75 Year 2033-34
1,454.85	3,054.21	270.81	0.68	395.94 5.50 92.75 Year 2034-35
1,743.48	3,342.84	288.64	0.67	433.61 4.95 92.75 Year 2034-35