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Tanda Terima

Untuk PT ANGKASA PURA I PERSERO
Tanggal 8-Aug-19
Keterangan BMD081900001524
PO 4400001731

Telah diterima beberapa berkas sbb :

Document No.	Posting Date	PO. No	Amount (Rp.) INCLUDE PPn	Keterangan
INVOICE	8-Aug-19	PO 4400001731	10,500,000,000.00	ASLI
KWITANSI	8-Aug-19			ASLI
E FAKTUR	8-Aug-19			2 LEMBAR
PO				COPY
DO				ASLI
SURAT PERMOHONAN BAYAR				1 LEMBAR
BAPP				2 LEMBAR
BASTP				2 LEMBAR
LAMPIRAN LAPORAN PRESTASI FISIK PEKERJAAN				2 LEMBAR
IMPLEMENTATION DOC.				1 Rangkap
DAILY OPERATION GUIDE				1 Rangkap
IBM STORWIZE v5100 SAN STORAGE UAT TEST PLAN				1 Rangkap

Diterima Oleh

Dikirim Oleh

BHINNEKA.COM
PT Bhinneka MentariDimensi

(Tanda tangan dan nama jelas)

(Tanda tangan dan nama jelas)

Angkasa Pura 1 Persero.
Up: Bpk. Fandy.
HP: 082125173942.
gd. Dapenra
Lt. 5
Ruang IT

BHINNEKA.COM
INDONESIA'S NO 1 WEBSTORE

KWITANSI

No.	**: BMD081900001524**
Tanggal	**: 8-Aug-19**

Sudah Terima Dari : **PT. Angkasa Pura I Persero**

Banyaknya Uang : #Sepuluh Milyar Lima Ratus Juta Rupiah#

Untuk Pembayaran : Pembelian atas No.PO 4400001731

Rp 10,500,000,000

Jakarta, 08 Agustus 2019

METERAI TEMPEL
175E5AFF88049528
6000
ENAM RIBU RUPIAH

(Invoicing)

Kwitansi ini dianggap sah, apabila pembayaran dengan bilyet giro / cek tsb. sudah dapat diuangkan

PT Bhinneka Mentaridimensi

Jl. Gunung Sahari Raya 73C #5-6 10610 Jakarta Pusat

Kepada Yth.	**PT. Angkasa Pura I (Persero)**	Invoice No.	**BMD081900001524**
Address	Kota Baru Bandar Kemayoran Blok B-12 Kav. 12, Gunung Sahari Selatan, Kemayoran 10610 Jakarta Pusat	Invoice Date	08/08/19
		PO No.	4400001731
		Payment	14##000-Term 14 Tunai IDR
Phone No.	(021) 654-1961	**Ship To**	**Angkasa Pura I/Endry**
Contact	Endry	**Ship Phone**	**02122620318, 02122620330**
Contact HP	02122620318, 02122620330	**Shipment**	**Armada - Armada Reguler**
Sales Name	Nico	**Ship Address**	**Kota Baru Bandar Kemayoran Blok B-12 Kav. 12, Gun ung Sahari Selatan, Kemayoran**
Sales Contact	0818765587		

No	Nama Barang	Qty	Harga Per Unit		Total
1	3323971654 IBM Storwize V5100 NVMe Control Enclosure (460TB Flash Nvme, 614 24 x 19.2TB 2.5In NVMe FCM,20 x 30.72TB 12 GB SAS 2.5 Inch Flash Drive,1 x 16Gb FC 4 Port Adapter Pair,2 x V5100 64 GB Cache upgrade,1 x 120 GB M.2 Boot drive Pair, Rackmount 2U	1	9,545,454,545	Rp	9,545,454,545

SubTotal	:	**Rp**	**9,545,454,545**
Shipping	:	Rp	**0**
PPN	:	Rp	954,545,455
Total	:	**Rp**	**10,500,000,000**

Terbilang

Sepuluh Milyar Lima Ratus Juta Rupiah

Keterangan	Dikirim Oleh	Barang & Invoice Diterima Oleh	Invoice Dibuat Oleh
Pelunasan -Full Pay- harap ditransfer ke rekening dibawah : Bank BNI cabang Kramat, Jakarta A/C 020.304.9707 a/n PT Bhinneka Mentaridimensi	Nama Jelas	Nama Jelas	**(INVOICING)**

METERAI TEMPEL 6000 ENAM RIBU RUPIAH

SO000051900001023

1. Barang HARUS diperiksa dengan baik (tipe, merk, kondisi fisik & kelengkapan) sebelum staff perusahaan kami meninggalkan tempat. pengajuan klaim setelah staff perusahaan kami meninggalkan tempat tidak akan dilayani dan sepenuhnya menjadi tanggungan pembeli
2. Bila barang yang anda beli tidak berfungsi sebagaimana mestinya, SEGERA hubungi sales konsultan yang sebelumnya melayani anda dalam 2x24 jam.
3. Bila nilai invoice ini tidak sesuai dengan perjanjian, mohon SEGERA menghubungi kami kembali di Tel : (62-21) 29292828. Batas waktu klaim terhadap ketidak sesuai nilai invoice adalah 30 hari setelah barang diterima.
4. Klaim kerusakan atas fungsi barang yang diajukan di atas 2x24 jam akan dilayani dalam bentuk service atas barang yang sama dengan syarat dan kondisi yang berlaku. silahkan menghubungi Technical Support kami di nomor (62-21) 29292828.
5. Penggunaan Software bajakan adalah pelanggaran hukum. Kami hanya menjual Software asli dan dengan 'APA ADANYA' serta 'SEGALA KEKURANGANNYA'
6. Barang yang sudah dibeli tidak dapat dikembalikan.

Angkasa Pura | AIRPORTS
Kantor Pusat Jakarta

PURCHASE

Vendor	:	BHINNEKA MENTARI DIMENSI	**Pemesan**	:	PT. Angkasa Pura I (Persero) Kantor Pusat Jakarta
To	:	JL. GUNUNG SAHARI RAYA 73C/5-6,	*Ordered by*	:	Kota Baru Bandar Kemayoran
		JAKARTA PUSAT TEL: 021-292928 FAX: 021-425778 **NPWP: 016089419027000**			Blok B12 Kav. 2, Jakarta Pusat 10610 TEL: 021-6541961 FAX: 021-6541514 **NPWP:010004877093000**
Purchase Order		4400001731	**No.SPK/SPJB/SPP**		
Document Date		13.05.2019	**Waktu Pelaksanaan**		13.05.2019 - 31.10.2019
			Page	:	1 of 1

NO *NO*	**Material** *Material*	**Deskripsi** *Description*	**PPN** *VAT*	**Kuantitas** *Quantity*	**Harga Satuan** *Net Price*	**Jumlah** *Amount*
1		Storage All Flash	V1	1 SET	Rp. 9.545.454.545	Rp. 9.545.454.545

Notes :
Pengadaan Perangkat Pendukung Operasional Kantor Pusat

Notes: *V0 = Bebas PPN 10 % ; V1 = PPN 10 % dapat Dikreditkan*
V3 = PPN 10% tidak dapat Dikreditkan

Terbilang : *Sepuluh Milyar Lima Ratus Juta Rupiah*

Subtotal	:	Rp. 9.545.454.545
DPP	:	Rp. 9.545.454.545
PPN	:	Rp. 954.545.455
Total	:	Rp. 10.500.000.000

Unit Teknis

E BHINNEKA.COM
PT Bhinneka MentariDimensi

Angkasa Pura | AIRPORTS

Order #100000345

Tanggal Order: 13 Mei 2019

Alamat Pengiriman

Unit IT Kantor Pusat (Information Technology Group)
PT.ANGKASA PURA I
Kota Baru Bandar Kemayoran Blok B. 12 Kav. 2
DKI Jakarta, Jakarta Pusat, 10610
Indonesia
T: (021)

Alamat Penagihan

Unit IT Kantor Pusat (Information Technology Group)
PT.ANGKASA PURA I
Kota Baru Bandar Kemayoran Blok B. 12 Kav. 2
DKI Jakarta, Jakarta Pusat, 10610
Indonesia
T: (021)

Metode Pengiriman

Flat Rate - Pengiriman Jakarta (4 Hari)

Cara Pembayaran

Purchase Request

Nomor Purchase Order: 4400001731

Produk yang di-Order

Product Name	SKU	Harga	Jml	Subtotal
IBM Storwize V5100 NVMe Control Enclosure (460TB Flash Nvme, 614TB SAS)	V373323971654	Rp10.500.000.000,00	Order: 1	Rp10.500.000.000,00
			Subtotal	Rp10.500.000.000,00
			Shipping & Handling	Rp0,00
			Grand Total	**Rp10.500.000.000,00**

BHINNEKA.COM
PT Bhinneka MentariDimensi

7/2/2019 Bhinneka - Delivery Order

PT Bhinneka Mentaridimensi

Jl. Gunung Sahari Raya 73C #5-6 10610 Jakarta Pusat

DELIVERY - ORDER

Client Name : Angkasa Pura I

Address : Kota Baru Bandar Kemayoran Blok B-12 Kav. 12, Gunung Sahari Selatan, Kemayoran - Jakarta Pusat

Phone : 02122620318, 02122620330

Contact Person : Endry

PO Number : 4400001731

Pack No. : PK071900000487

PK Date : 02/07/2019

Delivery Method : Armada Reguler

SO ID : SO0000051900001023

Ship-to Phone : 02122620318, 02122620330

No	Item Description	Qty
1	3323971654 IBM Storwize V5100 NVMe Control Enclosure (460TB Flash Nvme, 614TB SAS) 24 x 19.2TB 2.5In NVMe FCM 20 x 30.72TB 12 GB SAS 2.5 Inch Flash Drive 1 x 16Gb FC 4 Port Adapter Pair 2 x V5100 64 GB Cache upgrade 1 x 120 GB M.2 Boot drive Pair, Rackmount 2U po1051900001259	1

Send By	Accept By Customer	Accept Date	Tax Invoice Accepted By
Dikirim PT Bhinneka MentariDimensi		3-7-2019	

(Harap Cantumkan Tanggal & Jam Terima)

BHINNEKA.COM

1. Barang HARUS diperiksa dengan baik (tipe, merek, dead pixel, kondisi fisik & kelengkapan) sebelum staff perusahaan kami meninggalkan tempat. Gangguan klaim setelah staff perusahaan kami meninggalkan tempat tidak akan dilayani dan sepenuhnya menjadi tanggungan pembeli.
2. Bila barang yang anda beli tidak berfungsi sebagaimana mestinya, SEGERA hubungi Sales Consultant yang sebelumnya melayani anda dalam 2x24 jam.
3. Klaim kerusakan atas fungsi barang yang diajukan diatas 2x24 jam akan dilayani dalam bentuk service atas barang yang sama dengan syarat dan kondisi yang berlaku. Silahkan menghubungi Technical Support kami di nomor (62-21) 29292828.
4. Penggunaan Software bajakan adalah pelanggaran hukum. Kami hanya menjual software asli dan dengan 'APA ADANYA' serta 'SEGALA KEKURANGANNYA'.

BHINNEKA

#ASLI BIKIN TENANG

Jakarta, 8 Agustus 2019

Nomor : 001/ B2B.sls / BMD / VIII/ 2019
Lampiran : -
Perihal : **Permohonan Pembayaran**

Kepada Yth,

PT. Angkasa Pura I (Persero)
Sultan Hasanuddin International Airport
Jl. Bandara Lama Sultan Hasanuddin
Makassar 90552

Dengan hormat,

Menunjuk Surat Pesanan 4400001731 **Pengadaan Perangkat Pendukung Operasional Kantor Pusat PT.Angkasa Pura I (Persero)** dengan ini kami mengajukan permohonan pembayaran pekerjaan tersebut diatas sebesar **Rp. 10,500,000,000** ditransfer ke :

Nomor Rekening : 020.304.9707
Nama Akun : PT. Bhinneka Mentaridimensi
Nama Bank : BNI cabang Kramat

Demikian surat ini kami buat atas perhatian dan kerjasamanya kami ucapkan terima kasih.

PT .BHINNEKA MENTARIDIMENSI

BHINNEKA.COM
PT Bhinneka MentariDimensi

Desi Saraswati
Finance

PT. Angkasa Pura I (Persero)
Kantor Pusat Jakarta
Kota Baru Bandar Kemayoran Blok B 12 Kav. 2
Jakarta 10610, Indonesia
tel: 021 654 1961 (hunting)
fax: 021 654 1513 / 654 1514
web: www.ap1.co.id

BERITA ACARA PEMERIKSAAN PEKERJAAN PENGADAAN BARANG DAN ATAU JASA	Nomor Tanggal	: BA.788/PL.02/2019/DIT : 1 Agustus 2019
PENGADAAN PERANGKAT PENDUKUNG OPERASIONAL KANTOR PUSAT	RKA Tahun M.A	: 2019 : Investasi

Pada hari ini, Kamis tanggal Satu bulan Agustus tahun Dua Ribu Sembilan Belas kami yang bertanda tangan dibawah ini: ----------

---------- **SARDJONO JHONY TJITROKUSUMO** ----------

Selaku Direktur Pengembangan Usaha PT. Angkasa Pura I dengan ini menyatakan telah mengadakan pemeriksaan pekerjaan:----------

--------**PENGADAAN PERANGKAT PENDUKUNG OPERASIONAL KANTOR PUSAT**----------

Yang dilaksanakan oleh **PT BHINNEKA MENTARIDIMENSI,** berkedudukan di Jakarta berkantor di Jl. Gunung Sahari Raya 73C/5-6 Jakarta Pusat, berdasarkan Purchase Order (PO) Nomor: 4400001731 tanggal 13 Mei 2019, dengan hasil sebagai berikut: ----------

1. Pekerjaan telah dilaksanakan dengan baik ----------
2. Prestasi fisik pekerjaan telah mancapai 100 persen dari seluruh pekerjaan pada tanggal: 1 Agustus 2019----------

Penilaian atas pekerjaan-pekerjaan tersebut sebagaimana tercantum dalam lampiran Berita Acara ini. ----------

Demikian Berita Acara ini dibuat dengan sebenarnya dalam rangkap dua untuk digunakan sebagaimana mestinya.----------

Disetujui
PT. BINNEKA MENTARI DIMENSI

BHINNEKA.COM
PT. Bhinneka MentariDimensi

NICO FAMMARIO

Diketahui oleh,
VICE PRESIDENT INFORMATION TECHNOLOGY

GIDIONTON SARITUA SIAGIAN

Diperiksa oleh,
DIREKTUR PENGEMBANGAN USAHA

SARDJONO JHONY TJITROKUSUMO

PT. Angkasa Pura I (Persero)
Kantor Pusat Jakarta
Kota Baru Bandar Kemayoran Blok B 12 Kav. 2
Jakarta 10610, Indonesia
tel: 021 654 1961 (hunting)
fax: 021 654 1513 / 654 1514
web: www.ap1.co.id

BERITA ACARA PEMERIKSAAN PEKERJAAN PENGADAAN BARANG DAN ATAU JASA	Nomor Tanggal	: BA.788/PL.02/2019/DIT : 1 Agustus 2019
PENGADAAN PERANGKAT PENDUKUNG OPERASIONAL KANTOR PUSAT	RKA Tahun M.A	: 2019 : Investasi

Pada hari ini, Kamis tanggal Satu bulan Agustus tahun Dua Ribu Sembilan Belas kami yang bertanda tangan dibawah ini: ----------

---------- **SARDJONO JHONY TJITROKUSUMO** ----------

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1. Pekerjaan telah dilaksanakan dengan baik ----------
2. Prestasi fisik pekerjaan telah mancapai 100 persen dari seluruh pekerjaan pada tanggal: 1 Agustus 2019----------

Penilaian atas pekerjaan-pekerjaan tersebut sebagaimana tercantum dalam lampiran Berita Acara ini. ----------

Demikian Berita Acara ini dibuat dengan sebenarnya dalam rangkap dua untuk digunakan sebagaimana mestinya.----------

Disetujui
PT. BINNEKA MENTARI DIMENSI

BHINNEKA.COM
PT. Bhinneka MentariDimensi

NICO FAMMARIO

Diketahui oleh,
VICE PRESIDENT INFORMATION TECHNOLOGY

GIDIONTON SARITUA SIAGIAN

Diperiksa oleh,
DIREKTUR PENGEMBANGAN USAHA

SARDJONO JHONY TJITROKUSUMO

PT. Angkasa Pura I (Persero)
Kantor Pusat Jakarta
Kota Baru Bandar Kemayoran Blok B 12 Kav. 2
Jakarta 10610, Indonesia
tel: 021 654 1961 (hunting)
fax: 021 654 1513 / 654 1514
web: www.ap1.co.id

BERITA ACARA SERAH TERIMA PEKERJAAN	Nomor Tanggal	: BA. 789/PL.01/2019/DIT : 1 Agustus 2019
PENGADAAN PERANGKAT PENDUKUNG OPERASIONAL KANTOR PUSAT	RKA Tahun M.A	: 2019 : Investasi 2019

Pada hari ini, Kamis tanggal Satu Bulan Agustus tahun Dua Ribu Sembilan Belas, kami yang bertanda tangan di bawah ini : ----------

I. Nama : Sardjono Jhony Tjitrokusumo
Jabatan : Direktur Pengembangan Usaha

untuk selanjutnya disebut PIHAK PERTAMA

II. Nama : Nico Fammario
Jabatan : Account Manager
Berkedudukan di : Jakarta

untuk selanjutnya disebut PIHAK KEDUA

Berdasarkan Berita Acara Pemeriksaan Pekerjaan Pengadaan Barang dan atau Jasa Nomor : BAPP 788/PL.02/2019/DIT tanggal 1 Agustus 2019
serah terima pekerjaan dilaksanakan sebagai berikut : ----------

Pasal 1

(1) PIHAK KEDUA menyerahkan kepada PIHAK PERTAMA hasil Pekerjaan Pengadaan Perangkat Pendukung Operasional Kantor Pusat

Dilaksanakan oleh : PT. Bhinneka Mentari Dimensi

Berdasarakan : Purchase Order Nomor 4400001731 tanggal 13 Mei 2019

(2) PIHAK PERTAMA menerima hasil pekerjaan dari PIHAK KEDUA yang diselesaikan dengan baik sesuai dengan:

a. Purchase Order Nomor 4400001731 tanggal 13 Mei 2019
b. Berita Acara Pemeriksaan Pekerjaan Nomor: BAPP 788/PL.02/2019/DIT tanggal 1 Agustus 2019

(3) Berita Acara ini Dilampiri dengan daftar yang berisi nama Barang/Jasa, Volume , Harga Satuan, Jumlah Harga ditambah Pajak-Pajak.

PT. Angkasa Pura I (Persero)
Kantor Pusat Jakarta
Kota Baru Bandar Kemayoran Blok B 12 Kav. 2
Jakarta 10610, Indonesia
tel: 021 654 1961 (hunting)
fax: 021 654 1513 / 654 1514
web: www.ap1.co.id

BERITA ACARA SERAH TERIMA PEKERJAAN	Nomor Tanggal	: BA. 789/PL.01/2019/DIT : 1 Agustus 2019
PENGADAAN PERANGKAT PENDUKUNG OPERASIONAL KANTOR PUSAT	RKA Tahun M.A	: 2019 : Investasi 2019

Pada hari ini, Kamis tanggal Satu Bulan Agustus tahun Dua Ribu Sembilan Belas, kami yang bertanda tangan di bawah ini : ----------

I. Nama : Sardjono Jhony Tjitrokusumo
Jabatan : Direktur Pengembangan Usaha

untuk selanjutnya disebut PIHAK PERTAMA

II. Nama : Nico Fammario
Jabatan : Account Manager
Berkedudukan di : Jakarta

untuk selanjutnya disebut PIHAK KEDUA

Berdasarkan Berita Acara Pemeriksaan Pekerjaan Pengadaan Barang dan atau Jasa Nomor : BAPP 788/PL.02/2019/DIT tanggal 1 Agustus 2019
serah terima pekerjaan dilaksanakan sebagai berikut : ----------

Pasal 1

(1) PIHAK KEDUA menyerahkan kepada PIHAK PERTAMA hasil Pekerjaan Pengadaan Perangkat Pendukung Operasional Kantor Pusat

Dilaksanakan oleh : PT. Bhinneka Mentari Dimensi

Berdasarakan : Purchase Order Nomor 4400001731 tanggal 13 Mei 2019

(2) PIHAK PERTAMA menerima hasil pekerjaan dari PIHAK KEDUA yang diselesaikan dengan baik sesuai dengan:

a. Purchase Order Nomor 4400001731 tanggal 13 Mei 2019
b. Berita Acara Pemeriksaan Pekerjaan Nomor: BAPP 788/PL.02/2019/DIT tanggal 1 Agustus 2019

(3) Berita Acara ini Dilampiri dengan daftar yang berisi nama Barang/Jasa, Volume , Harga Satuan, Jumlah Harga ditambah Pajak-Pajak.

Demikian Berita Acara ini dibuat dengan sesungguhnya untuk digunakan sebagaimana mestinya. ----------

Dibuat dan ditandatangani oleh:

PIHAK KEDUA
PT. BHINNEKA MENTARI DIMENSI

BHINNEKA.COM
PT Bhinneka MentariDimensi

NICO FAMMARIO

PIHAK PERTAMA,
VICE PRESIDENT
INFORMATION TECHNOLOGY

METERAI TEMPEL
54B5EAFF880496952
6000
ENAM RIBU RUPIAH

GIDION TON SARITUA SIAGIAN

MENGETAHUI,
DIREKTUR PENGEMBANGAN USAHA

SARDJONO JHONY TJITROKUSUMO

Demikian Berita Acara ini dibuat dengan sesungguhnya untuk digunakan sebagaimana mestinya. ----------

Dibuat dan ditandatangani oleh:

PIHAK KEDUA
PT. BHINNEKA MENTARI DIMENSI

METERAI TEMPEL
TGL
6DD36AFF880496957
6000
ENAM RIBU RUPIAH

NICO FAMMARIO

PIHAK PERTAMA,
VICE PRESIDENT
INFORMATION TECHNOLOGY

GIDIONTON SARITUA SIAGIAN

MENGETAHUI,
DIREKTUR PENGEMBANGAN USAHA

SARDJONO JHONY TJITROKUSUMO

LAPORAN PRESTASI FISIK PEKERJAAN

Pekerjaan: Pengadaan Perangkat Pendukung Operasional Kantor Pusat

PJKP	:	4400001731
Tanggal	:	1 Agustus 2019
Pelaksana	:	PT. Bhinneka Mentari dimensi
Pengawas Pusat	:	Fandy Ardiyan
Prestasi Fisik	:	100%
Per Tanggal	:	1 Agustus 2019

No	Uraian Pekerjaan	Volume Pekerjaan		Jumlah Harga		
		Rencana (RAB) %	Realisasi %	Rencana(RAB) %	Restitusi	Realisasi
1	Storage all Flash	100%	100%	Rp 9,545,454,545		Rp 9,545,454,545

PRESTASI FISIK PEKERJAAN : $\frac{9,545,454,545}{9,545,454,545}$ **x 100 %** = **100%**

Disetujui PT. Bhinneka Mentari Dimensi	Diketahui PT. ANGKASA PURA I (PERSERO)	Dibuat (Pengawas Lapangan)
BHINNEKA.COM PT Bhinneka MentariDimensi		
Nico Pammario Account Manager	Yudi Rahman Aziz Airport Technology & Network Senior Manager	Fandy Ardiyan Airport Technology & Network Officer

LAPORAN PRESTASI FISIK PEKERJAAN

Pekerjaan: Pengadaan Perangkat Pendukung Operasional Kantor Pusat

PJKP	:	4400001731
Tanggal	:	1 Agustus 2019
Pelaksana	:	PT. Bhinneka Mentari dimensi
Pengawas Pusat	:	Fandy Ardiyan
Prestasi Fisik	:	100%
Per Tanggal	:	1 Agustus 2019

No	Uraian Pekerjaan	Volume Pekerjaan		Jumlah Harga		
		Rencana (RAB) %	Realisasi %	Rencana(RAB) %	Restitusi	Realisasi
1	Storage all Flash	100%	100%	Rp 9,545,454,545		Rp 9,545,454,545

PRESTASI FISIK PEKERJAAN : $\frac{9,545,454,545}{9,545,454,545}$ **x 100 %** = **100%**

Disetujui PT. Bhinneka Mentari Dimensi	Diketahui PT. ANGKASA PURA I (PERSERO)	Dibuat (Pengawas Lapangan)
BHINNEKA.COM PT Bhinneka MentariDimensi		
Nico Fammario Account Manager	Yudi Rahman Aziz Airport Technology & Network Senior Manager	Fandy Ardiyan Airport Technology & Network Officer

Document Version Number:	1.0
Release Date:	July 22th,2019
Type:	Documentation

Implementation Document

IBM Storage Solution

Prepared for

Angkasa Pura | AIRPORTS

PT. Angkasa Pura I (Persero)

Prepared by :	Budi Gunawan
Title :	Technical Consultant
Company :	Bhineka.com
Mobile :	+62 811-8808-084

Contents

Introduction....3
1. Infrastructure Plan....4
1.1 Hardware Component....4
1.2 Power Consumption....5
1.2.1 Power Cord....5
1.3 Rack Location....6
2. System Configuration Report....7
2.1 Storage Configuration....7
2.2 Pools Configuration....8
2.3 MDisk Configuration....9
2.4 Host Configuration....10
2.5 Volume Configuration....10
3 Network Configuration....11
3.1 Network Topology....11
3.2 IP Address List....12
3.2 Access to Storage Management....13
5. Project Schedule....15
6. Escalation Support....16

Introduction

The purposes of Project "IBM Storwize Storage Solution" are to prepare the DC infrastructure. The design document includes delivery item, architecture design, implementations plan and project schedule. It is based on discussions between PT. Angkasa Pura I and Bhineka.com in Planning Session or in other formal communication between the project entities.

- Project Planning Session was held to discuss the Implementation Plan focuses on the technical details. It includes the following agenda :
    - BoQ
    - Design
    - Implementation Report
    - Project Schedule

This document will be used as guidelines for the implementation, where the implementation is written in accordance with this document

1. Infrastructure Plan

This section will describe the infrastructure plan to support the hardware deployment.

1.1 Hardware Component

Table Below shows the summary of delivered hardware for this project:

No	Part Number	Description	QTY	Price
1		Opsi No Timeless		
	02PX580	IBM Storwize v5100 Dual Controller 331,9 TiB (24 x 19,2 TB) NVME	1	
	01AC381	IBM Storwize v5000 SFF Expansion 430,7 TiB (20 x 30,72 TB) SAS	1	
2		Services		
		IBM Storwize Storage - [v5100] [1 unit] DC Jakarta		
		Assessment		
		discussion plan		
		design plan		
		physical installation		
		setup and configuration		
		uat		
		integration support		
		implementation report		
		sharing knowledge - 1 day		

Table 1 List Hardware

1.2 Power Consumption

The detail specification of power consumption is summary of delivered hardware for this project:

Data Center						
No	Device	Rack Unit	Power (Watt)	Cooling (BTU/Hr)	PDU Socket	Weight (kg)
1	IBM Storwize v5100 Dual Controller	2 U	2000	6825	2	46,6
2	IBM Storwize v5000 SFF Expansion	2 U	800	2730	2	25,0
	Total	4 U	2800	9555	4	71,6

Table 2 List DC Power Consumption

1.2.1 Power Cord

Following is the power cord specification:

Voltage	: 200-240 V
Grounding	: < 1 V (recommended)
Phase	: 1 phase
Inrush	: 32 A

1.3 Rack Location

Below is the planned placement for each Rack

1. DC-R1 : Will be placed in DC Site placed on front side of the door

Figure 1 Rack Design

2. System Configuration Report

2.1 Storage Configuration

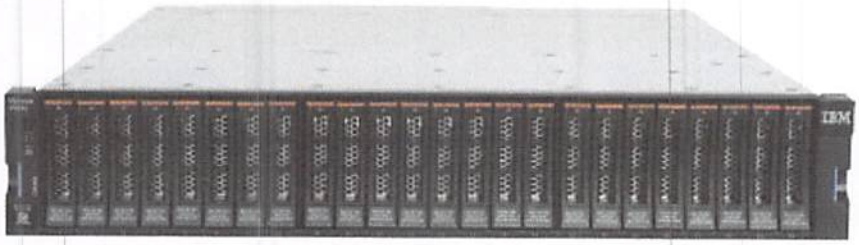


Figure 2 IBM Storwize v5100 Storage

IBM Storwize V5100F models bring NVMe technology into the affordable Storwize V5000 suite. Storwize V5100 combines NVMe-powered IBM FlashCore technology with a rich set of IBM Spectrum Virtualize features, including external virtualization and two-way clustering. Unique high-performance, high-density IBM FlashCore Modules (FCMs) can be mixed with standard NVMe solid-state drives (SSDs) to balance speed and cost-efficiency, while IBM Spectrum Virtualize for Public Cloud enables almost unlimited storage capacity by seamlessly integrating on-premises and cloud resources into one management domain. Storwize V5100 solutions are:

- **NVMe-accelerated flash arrays** with control enclosures that are 100 percent, end-to-end NVMe-enabled and Storage Class Memory (SCM)-capable. The systems offer industry-leading performance and scalability and support physical, virtual and Docker environments.
- **Hybrid Flash array enabled** with multiple expansion enclosure options based on 12 Gb/s SAS that support both SSDs and hard disk drives.
- **AI-enhanced** with the IBM Storage Insights analytics, resource management and support platform. Plus, IBM Spectrum Virtualize functionality includes AI-based data placement for optimal data center performance and zero-downtime data migration.
- **Multicloud ready** and can support private, hybrid or public cloud deployments. The solutions come with ready-to-use, proven, validated "multicloud blueprints" with support for multicloud API automation, replication and secondary data orchestration software.

IBM Storwize V5100 also provides flash-optimized data compression and deduplication, enterprise-grade system availability, and data-security features that include the nondisruptive data migration and remote mirroring using IBM HyperSwap technology that are shared by all IBM Spectrum Virtualize-based systems, plus "six nines" availability, data-at-rest encryption, and a new distributed RAID technology that can reduce disk rebuild times up to 10 times over current RAID solutions. For organizations that need affordable high-performance storage with Fortune 500-level functionality plus a broad spectrum of data services, Storwize V5100 offers enterprise-grade storage solutions that truly are easy to deploy, easy to use and easy to grow.

2.2 Pools Configuration

Below are the pool configuration on IBM Storwize 5100, there is one online pool, **Pool0. Pool0** is consist of 2 MDISKs, mdisk0_controller and mdisk1_expansion. Please find the detail on the captures below.

Pool0	✓ Online	100.18 GiB / 762.76 TiB (0%)		
mdisk1_expansion	✓ Online	431.14 TiB		Distributed RAID 6
mdisk0_controller	✓ Online	762.68 TiB		Distributed RAID 6

View Resources

Pool Pool0

Provisioning Group	MDisk Name	State	Capacity	Free Physical Capacity
0	mdisk0_control...	✓ Online	762.68 TiB	332.04 TiB
	mdisk1_expans...	✓ Online	431.14 TiB	430.62 TiB

Close

2.3 MDisk Configuration

A managed disk (MDisk) is a logical unit of physical storage. MDisks are either arrays (RAID) from internal storage or volumes from external storage systems. Below is the MDisk Configuration that has been implemented

MDisk Configuration

mdisk1_expansion	mdisk1_expansion
Properties for MDisk mdisk1_expansion Name: mdisk1_expansion State: Online ID: 32 Capacity: 431.14 TiB Pool: Pool0 View more details Close	Properties for MDisk mdisk0_controller Name: mdisk0_controller State: Online ID: 0 Capacity: 400.00 MiB Used / 762.68 TiB Total (0%) Pool: Pool0 View more details Close
Properties for MDisk mdisk1_expansion Name: mdisk1_expansion State: Online ID: 32 Capacity: 431.14 TiB Pool: Pool0 Mode: Array Write protected: No Tier: Tier 1 Flash Encryption: Not Encrypted Deduplication: Not Active Fast-Write state: Empty Thin-Provisioned: No Supports unmap: Yes Physical capacity: 430.72 TiB Free physical capacity: 430.62 TiB Provisioning group: - RAID state: Online RAID level: Distributed RAID 6 Redundancy: 2 Rebuild Areas goal: 1 Rebuild Areas Total: 1 Strip size: 256 KiB	Properties for MDisk mdisk0_controller Name: mdisk0_controller State: Online ID: 0 Capacity: 400.00 MiB Used / 762.68 TiB Total (0%) Pool: Pool0 Mode: Array Write protected: No Tier: Tier 0 Flash Encryption: Not Encrypted Deduplication: Not Active Fast-Write state: Empty Thin-Provisioned: Yes Supports unmap: Yes Physical capacity: 332.04 TiB Free physical capacity: 332.04 TiB Drive compression savings: 220.00 MiB Provisioning group: 0 RAID state: Online RAID level: Distributed RAID 6 Redundancy: 2 Rebuild Areas goal: 1 Rebuild Areas Total: 1 Strip size: 256 KiB

2.4 Host Configuration

Below is list of Hosts that have been added to the IBM Storwize v5100.

Name	Status	Host Type	# of Ports	Host Mappings	Host Cluster ID	Host Cluster Name	Protocol Type
ESXi_172.16.220.12_vmhba1	Degraded	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.12_vmhba3	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.13_vmhba1	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.13_vmhba3	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.24_vmhba1	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.24_vmhba2	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.25_vmhba1	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.25_vmhba2	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.26_vmhba1	Degraded	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.26_vmhba2	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.27_vmhba1	Degraded	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.27_vmhba2	Online	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.28_vmhba1	Degraded	Generic	1	Yes	0	VMWare Cluster	SCSI
ESXi_172.16.220.28_vmhba2	Online	Generic	1	Yes	0	VMWare Cluster	SCSI

2.5 Volume Configuration

Below is list of volumes that have been created and mounted to the host.

Create Volumes | Actions | All Volumes | Default | Contains | Filter

Name	State	Synchronized	Pool	Protocol Type	UID	Host Mappings	Capacity
Test	Online		Pool0	SCSI	6008076810828090280000000000000...	Yes	100.00 GiB

3 Network Configuration

3.1 Network Topology

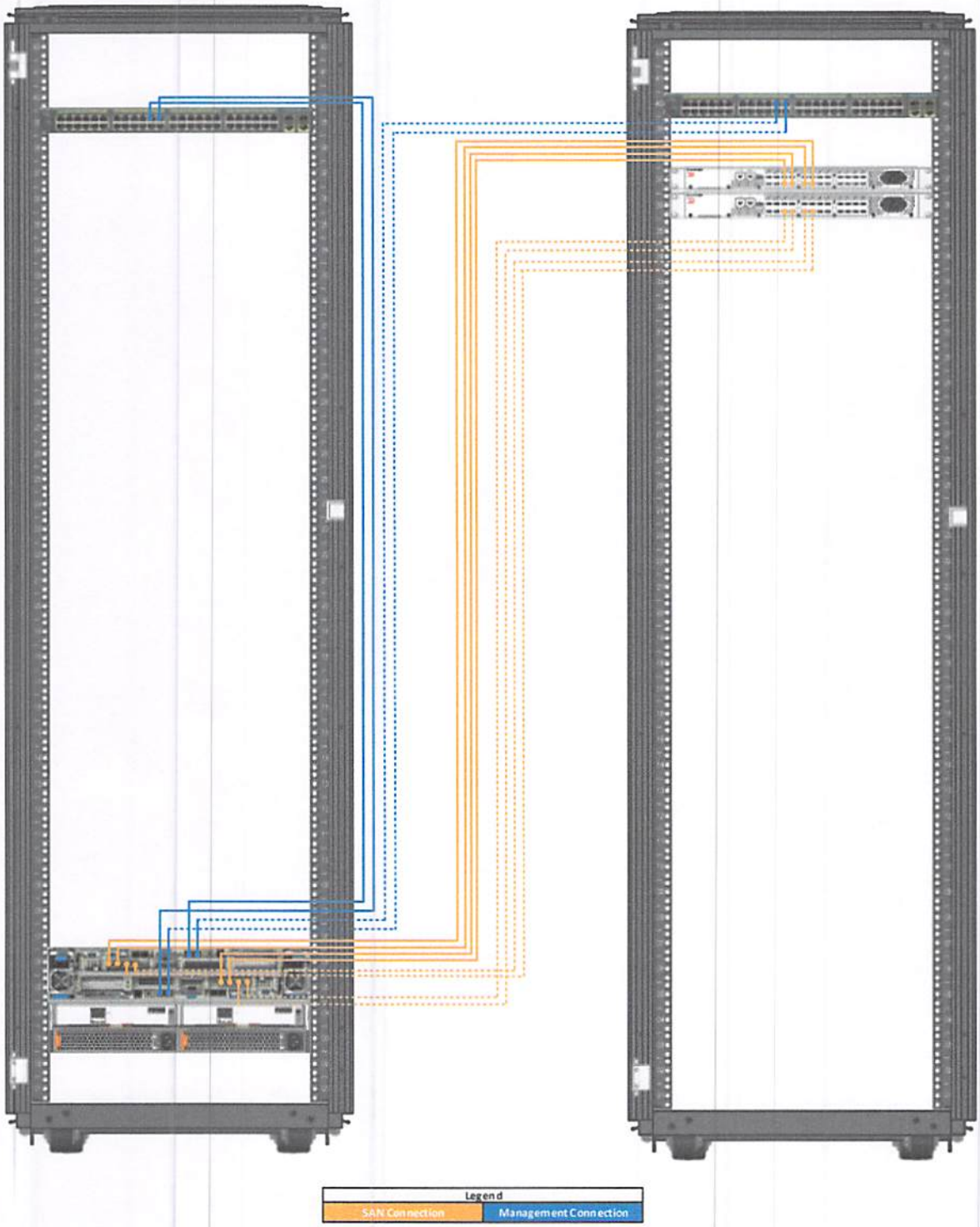


Figure 1 SAN Topology

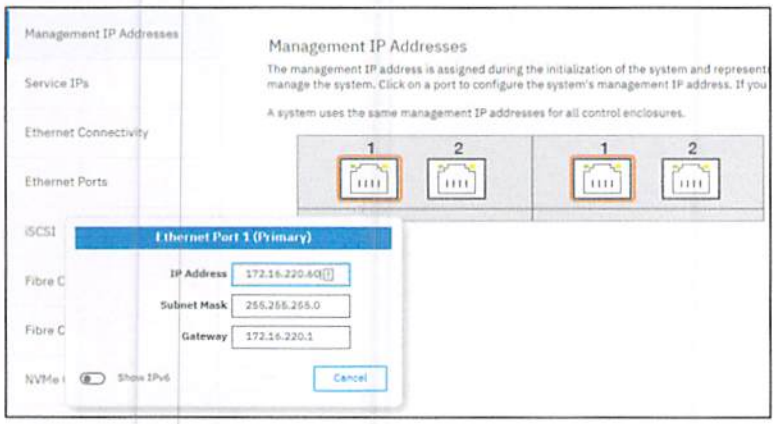
Network topology was design as best practice and concern link redundancy connection. The link network between switch using 1 Gbps connection for management network connection and data connection separately using different Fiber Channel connection 8 Gbps. Then, the controller enclosure connect to expansion using SAS connection 18 Gbps.

3.2 IP Address List

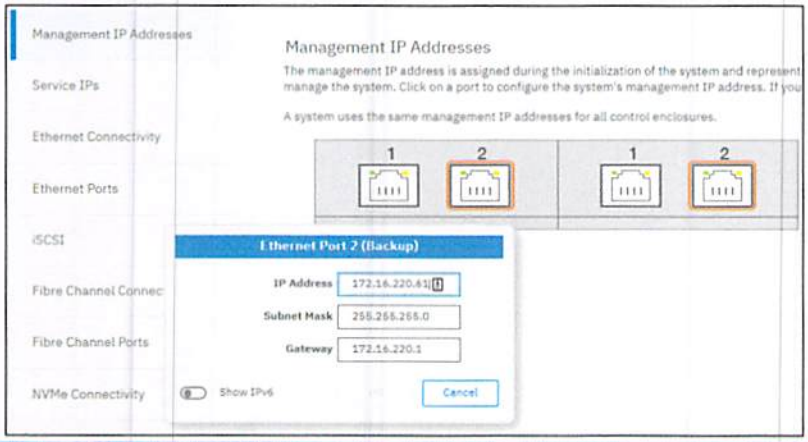
Below is the list of IP address and its purpose:

No	IP Address	Purpose
1	172.16.220.60	Management Primary
2	172.16.220.61	Management Backup
3	172.16.220.62	Service IP Node Canister Left
4	172.16.220.63	Service IP Node Canister Right

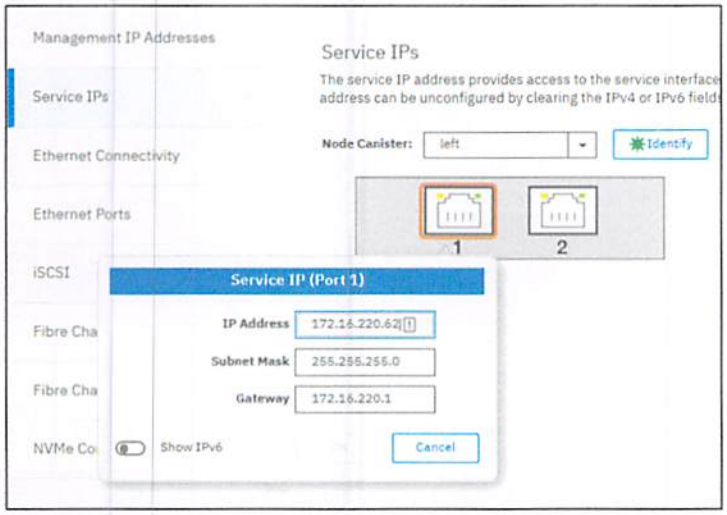
1. Management Primary



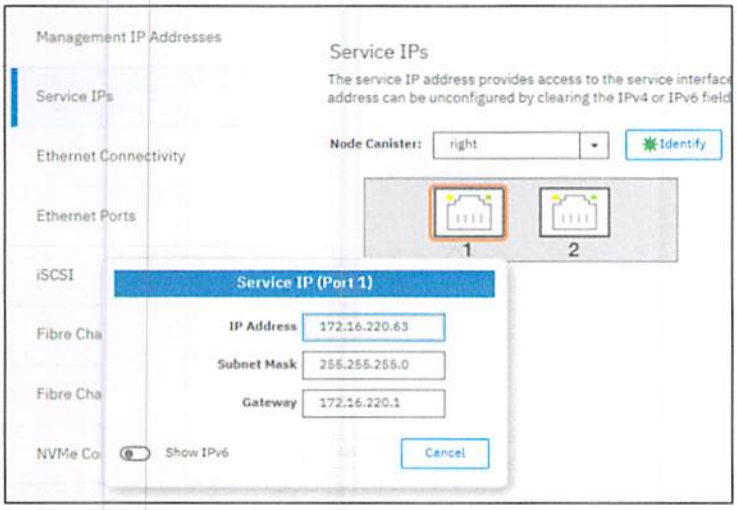
2. Management Backup



3. Service IP Node Canister Left



4. Service IP Node Canister Right



3.2 Access to Storage Management

IBM Storwize v5100 can be accessed thru web browser. To access the Storage Management Dashboard, type the Management IP Address on the web browser and fill the login form with credential below.

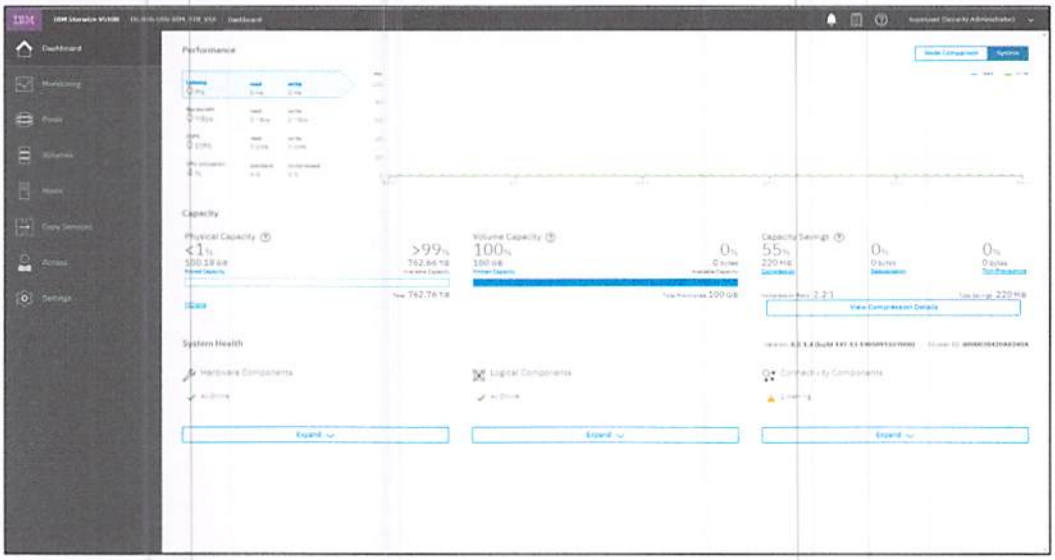
The management GUI supports the following HTML5-compliant browsers:

- Mozilla Firefox 66
- Mozilla Firefox Extended Support Release (ESR) 60
- Microsoft Internet Explorer (IE) 11 and Microsoft Edge 44
- Google Chrome 74

Login Information :

Login Information	
Hostname	DC-R05-U05-IBM_STR_V5K
Management IP Address	172.16.220.60
Username	superuser
Password	passw0rd

Below is the capture of IBM Storwize V5100 Dashboard.



5. Project Schedule

Task Items	Week 1	Week 2	Week 3	Week 4
Site Survey	1 Day			
Installation and UAT		3 Day		
Provision storage to VMware vSphere Servers		1 Day		
Documentation			3 Day	
Knowledge Transfer				1 Day
Project Closure				1 Day

6. Escalation Support

Below flow diagram escalation support for each product:

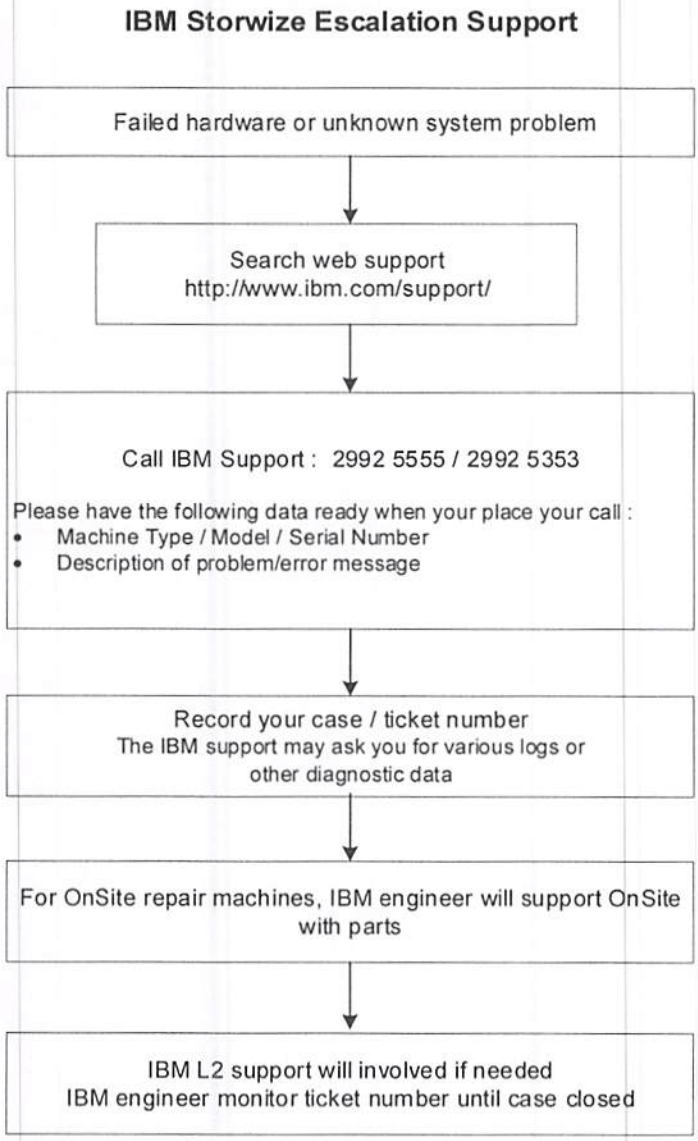


Figure 2 IBM Escalation Support

Version : 1.0
Release Date : July 31th, 2019
Type : Documentation

DAILY OPERATION GUIDE

IBM Storwize v5100 Storage

Prepared for:

AngkasaPura | AIRPORTS
PT. Angkasa Pura I (Persero)

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TABLE OF CONTENT

1. INTRODUCTION 3
2. STORAGE CONFIGURATION 3
3. DAILY OPERATION 5
3.1 ACCESSING THE STORAGE MANAGEMENT SOFTWARE 5
3.2 CREATING STORAGE POOL 6
3.3 CREATING FC HOSTS 8
3.4 CREATING ISCSI HOST 11
3.5 VOLUME CREATION 13
3.6 MAPPING VOLUME TO THE HOST 16
3.7 DEFINING THROTTLE ON A VOLUME 17
3.8 REPLACING DISK PROCEDURE 19

1. INTRODUCTION

Along the time, all operations and offices of PT Angkasa Pura 1 are highly dependent on the Information System. This has led to an increase in the need for information systems infrastructure capacity support from year to year. Increased capacity needs of the information system services include increasing the use of databases and increasing the number of applications used to support all operational activities and offices.

To meet those needs, PT Angkasa Pura 1 needs to improve the performance of applications. IBM Storwize v5100 Storage is a solution, it is a reliable and fast storage, it will be able to handle PT Angkasa Pura 1 datas and applications.

2. STORAGE CONFIGURATION

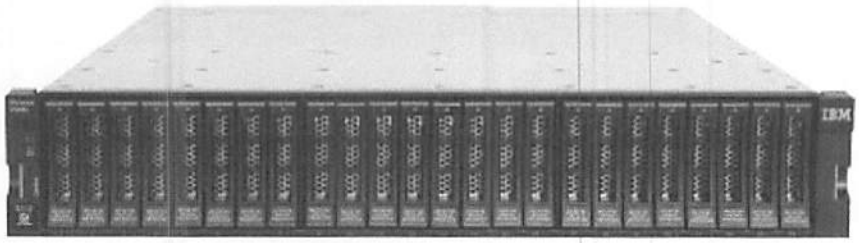

Figure 2 IBM Storwize v5100 Storage

IBM Storwize V5100 models bring NVMe technology into the affordable Storwize V5000 suite. Storwize V5100 combines NVMe-powered IBM FlashCore technology with a rich set of IBM Spectrum Virtualize features, including external virtualization and two-way clustering. Unique high-performance, high-density IBM FlashCore Modules (FCMs) can be mixed with standard NVMe solid-state drives (SSDs) to balance speed and cost-efficiency, while IBM Spectrum Virtualize for Public Cloud enables almost unlimited storage capacity by seamlessly integrating on-premises and cloud resources into one management domain. Storwize V5100 solutions are:

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Hardware Configuration :

Memory	Port
64 GB Cache	8 x 16 Gbps FC
	2 x 10GbE Port

Feature :

Easy Tier	Yes
Flashcopy	Yes
Replication	Yes
Compression	Yes
External Virtualization	Yes, Migration only
Performance Monitoring	No
Warranty	3-Years

Disk Configuration:

FCM	24 x 19.2TB NVME
Usable	331.9 TiB DRAID-6
SSD	20 x 30.72 TB SAS
Usable	430.7 TiB DRAID-6
Total: 762.6 TiB Usable Capacity	

3. DAILY OPERATION

3.1 Accessing the storage management software

IBM Storwize v5100 can be accessed thru web browser. To access the Storage Management Dashboard, type the Management IP Address on the web browser and fill the login form with credential below.

The management GUI supports the following HTML5-compliant browsers:

- Mozilla Firefox 66
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Login Information :

Login Information	
Hostname	DC-R05-U05-IBM_STR_V5K
Management IP Address	172.16.220.60
Username	superuser
Password	passw0rd

Below is the capture of IBM Storwize V5100 Dashboard.

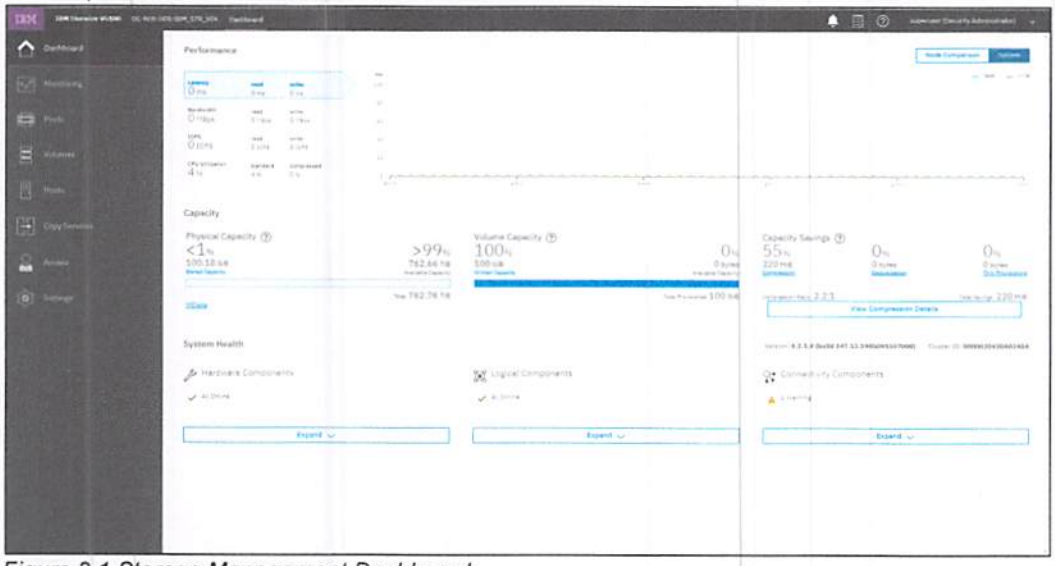

Figure 3.1 Storage Management Dashboard

3.2 Creating Storage Pool

You can access the Pools window in the future through the Pools menu. To create a storage pool, you can use one of the following methods:

➔ Browse to **Pools** → **Pools** and click **Create**, as shown in Figure 3.2.

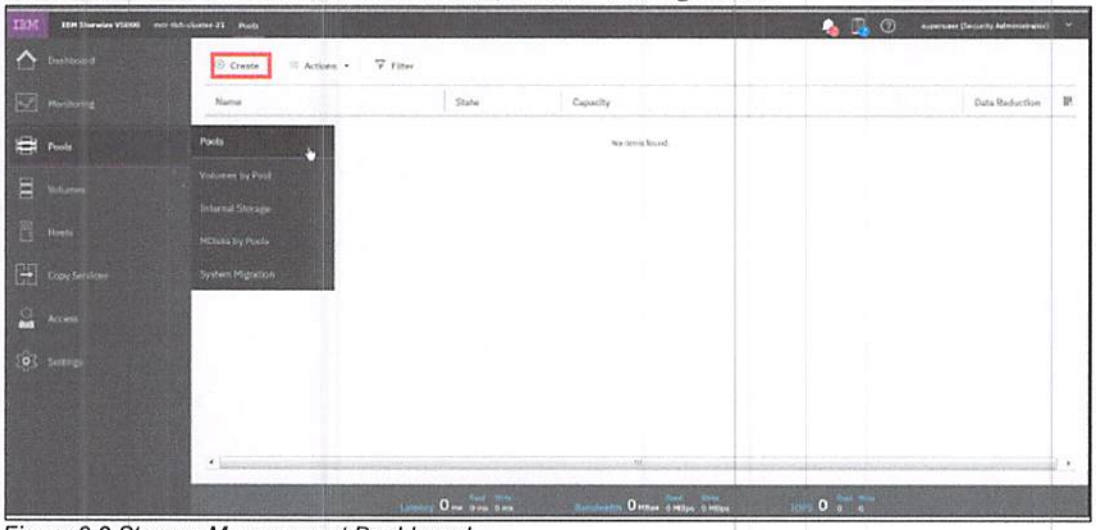

Figure 3.2 Storage Management Dashboard

➔ Browse to **Pools** → **MDisks by Pools** and click **Create Pool**, as shown in Figure 3.3.

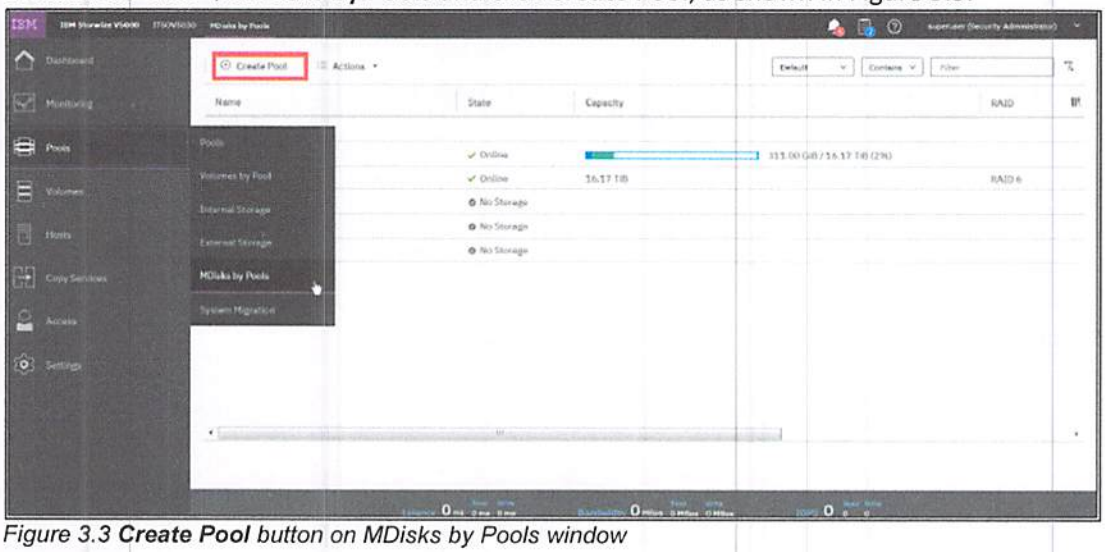

Figure 3.3 ***Create Pool*** *button on MDisks by Pools window*

Both of these alternatives open the dialog box that is shown in Figure 3.4.

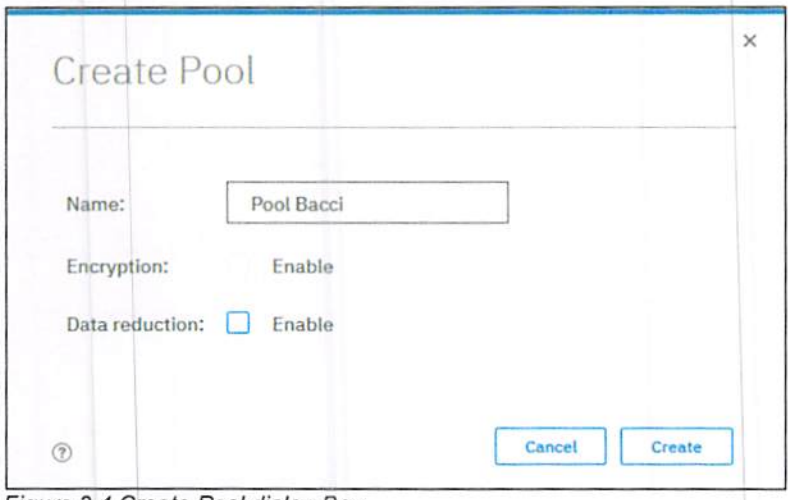

Figure 3.4 Create Pool dialog Box

Encryption: Consider the following points:

- ➔ If encryption is enabled, you also can select whether the storage pool is encrypted. The encryption setting of a storage pool is selected at creation time and cannot be changed later. By default, if encryption is enabled, encryption is selected.
- ➔ Select the Data Reduction option to reclaim capacity from this pool for other uses if hosts that use the pool support Unmap. If the physical capacity usage of a data reduction pool exceeds more than 85%, I/O performance can be affected. The system needs 15% of physical capacity available in data reduction pools to ensure that capacity

3.3 Creating FC Hosts

To create FC hosts, complete the following steps:

1. Click **Fibre Channel** and enter a host name (see Figure 3.5).

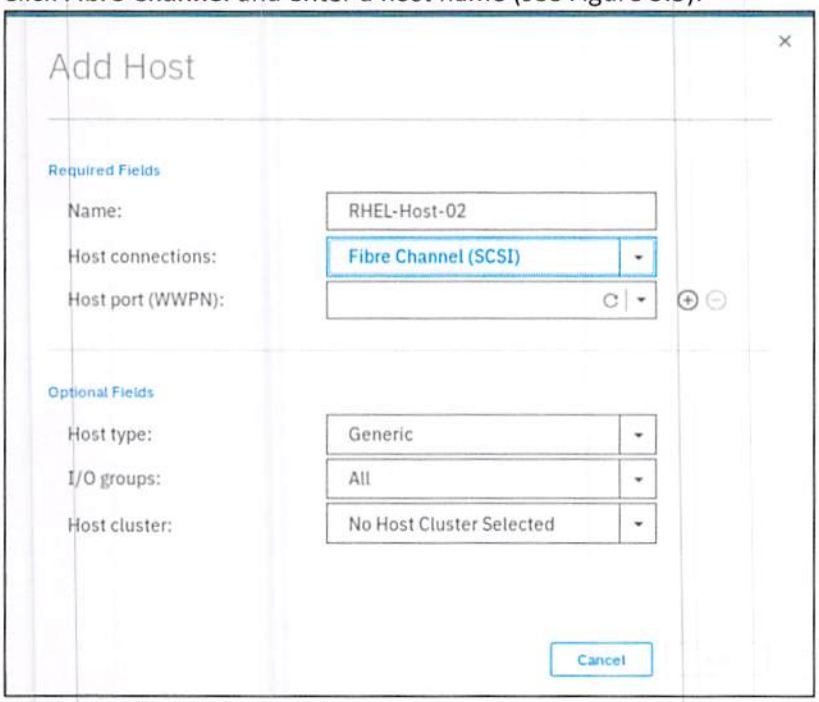

Figure 3.5 Creating an FC Host

2. Enter a host name and click the **Host port** drop-down list to get a list of all known WWPNs (see Figure 3.6).

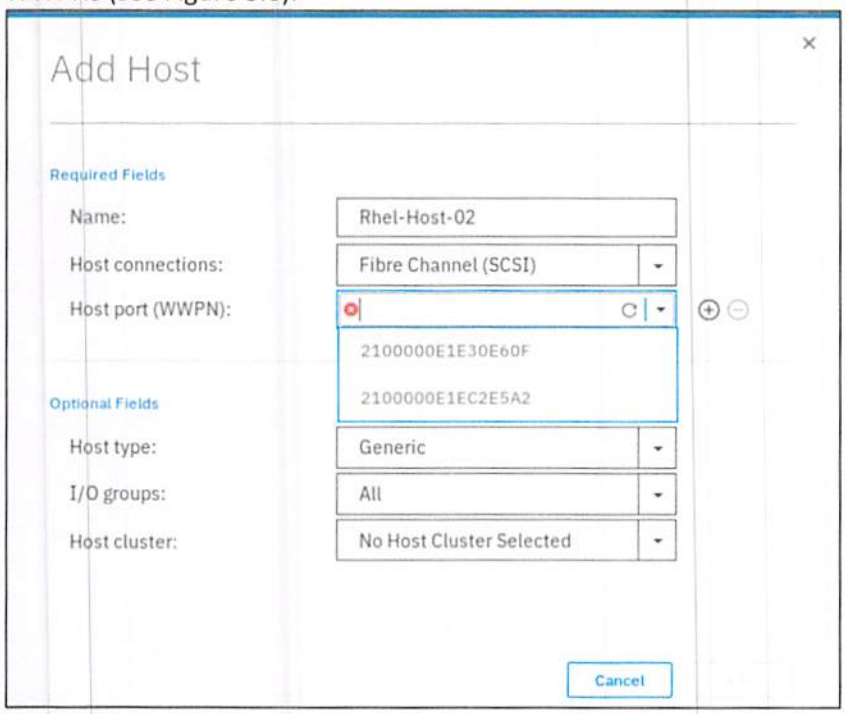

Figure 3.6 Available WWPNs

3. Select the WWPN for your host (see Figure 3.7).

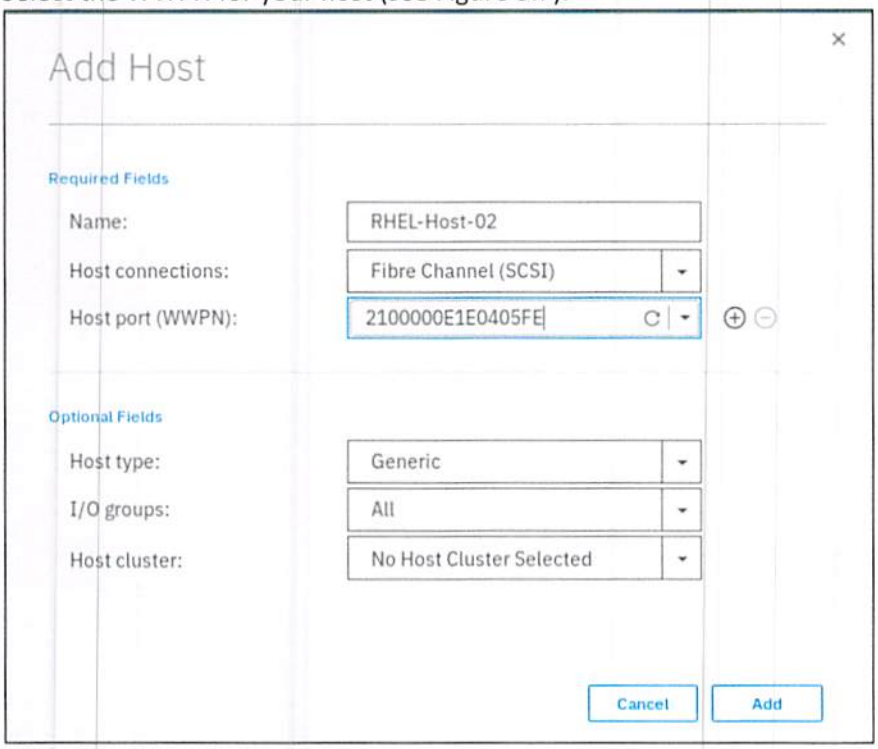

Figure 3.7 Add a port to a lis

4. If you want to add ports to your Host, click the plus sign (+).

5. Add all ports that belong to the host (see Figure 3.8).

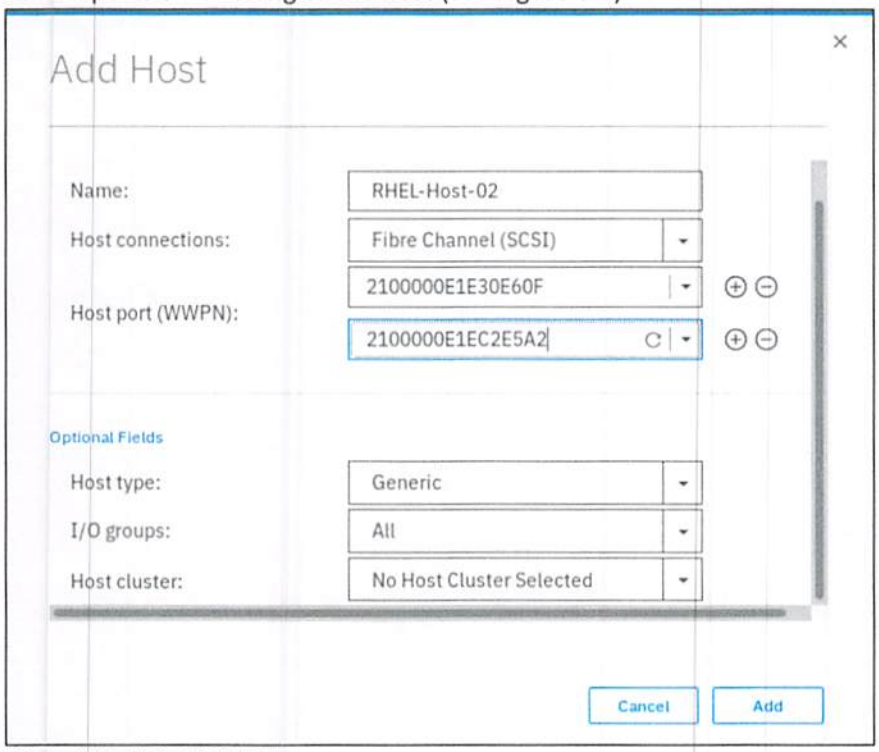

Figure 3.8 Add all WWPNs

6. You can set the **I/O Groups** that your host can access. The host objects must belong to the same I/O groups as the volumes that you want to map. Otherwise, these volumes are not visible to the host (see Figure 3.9).

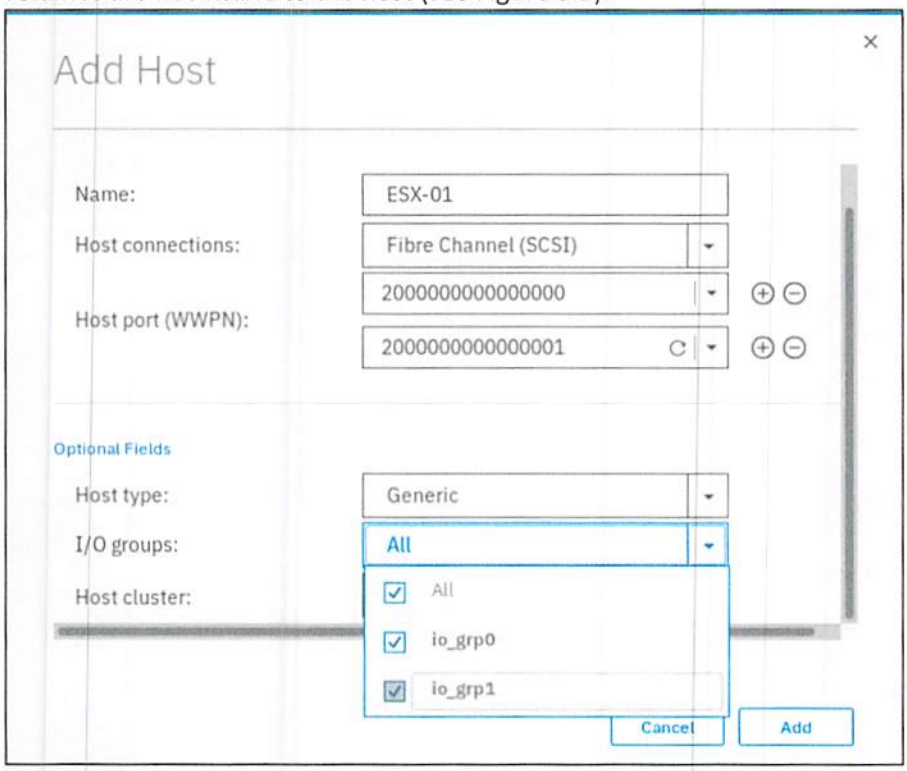

Figure 3.9 Setting I/O Group

7. Select the wanted host cluster (if any), as shown in Figure 3.10.

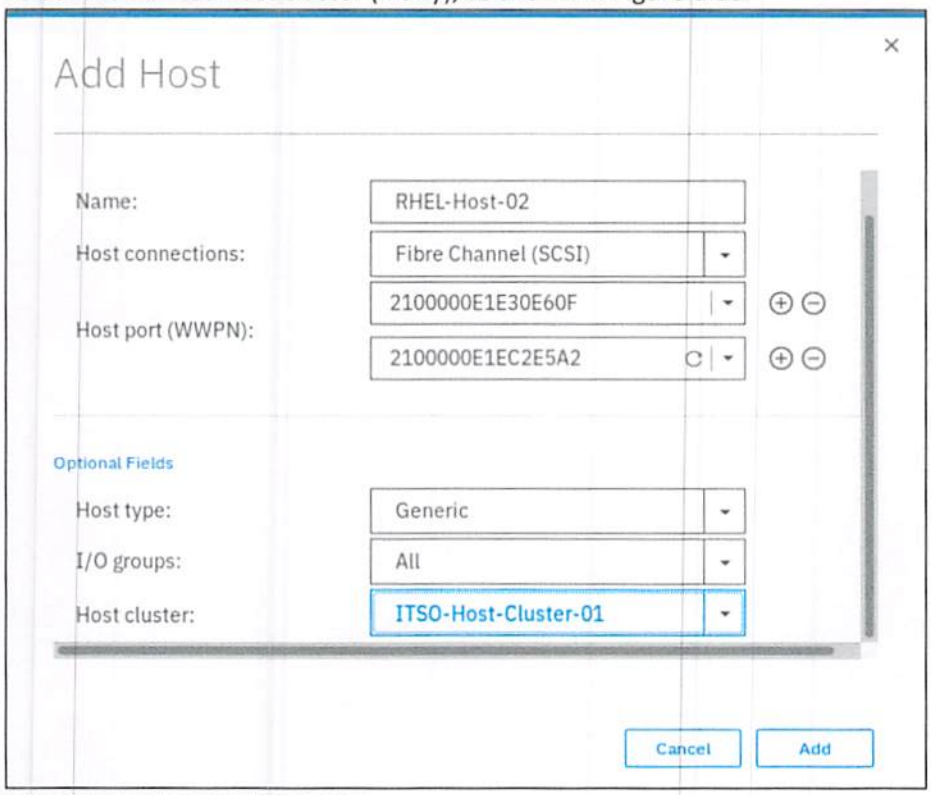

Figure 3.10 Selecting Host cluster

8. Click **Add Host**, and a task completion window is displayed. Click **Close**.

9. On the Hosts window, the host that was created appears, as shown in Figure 3.11.

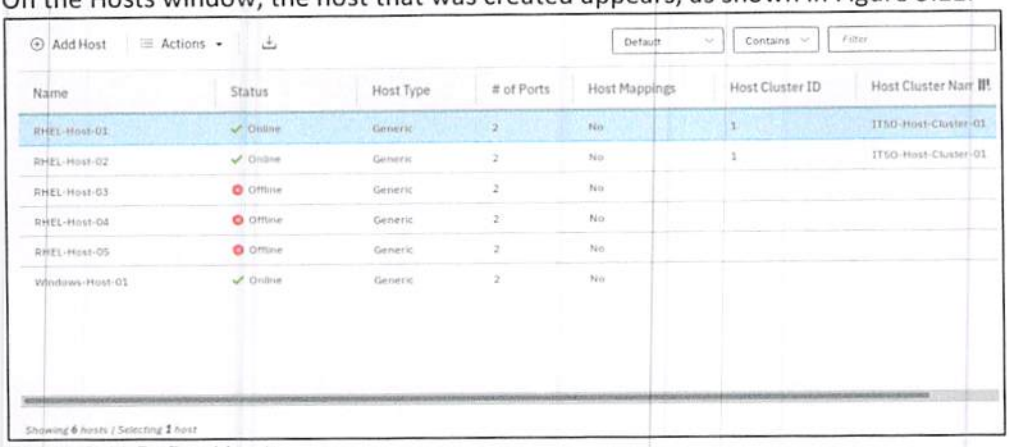

Figure 3.11 Defined hosts

3.4 Creating iSCSI Host

To create iSCSI hosts, complete the following steps:

1. On Hosts window, click **Add Host**. Then, click **iSCSI** and the **iSCSI** configuration wizard opens (see Figure 3.12).

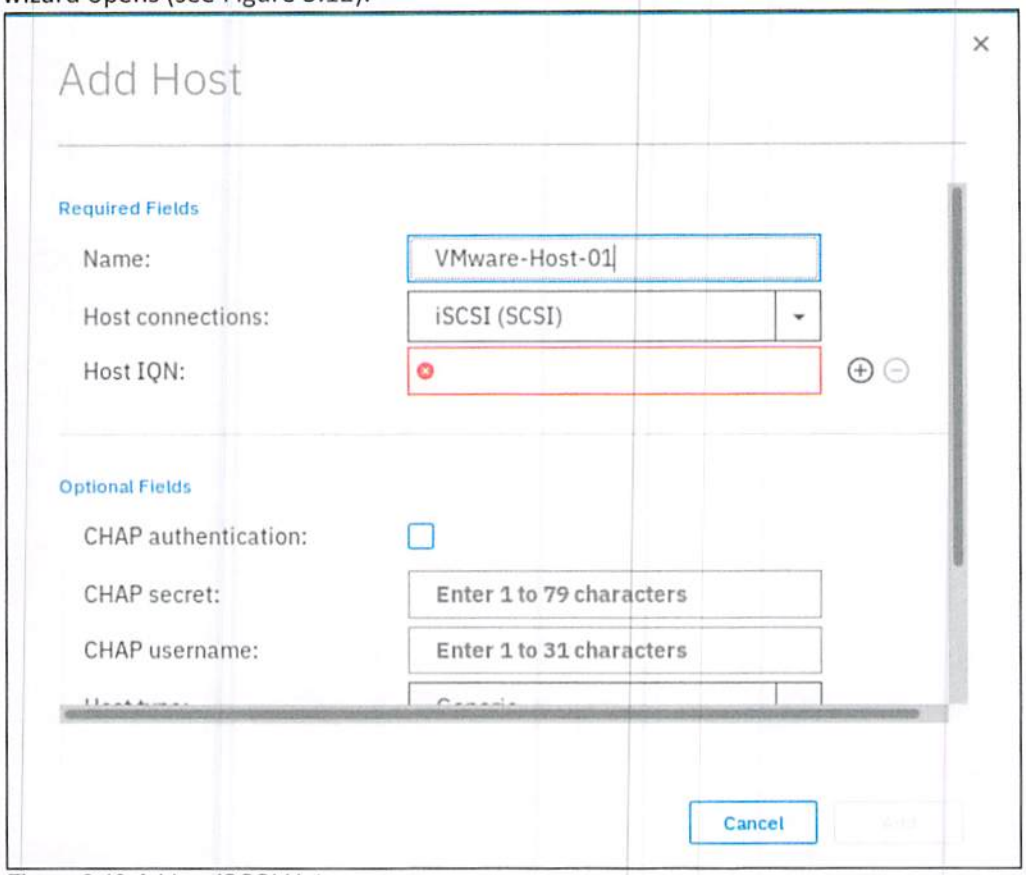

Figure 3.12 Add an iSCSI Hot

2. Enter a descriptive host name (the iSCSI initiator name in the name field). Enter the iSCSI Qualified Name (IQN) information, as shown in Figure 3.13

If you want to add several initiator names to one host, repeat this step by clicking the plus sign (+).

3. If you are connecting an HP-UX or TPGS host, select the **Host type** and select the correct host type (see Figure 3.13). Click **Add**.

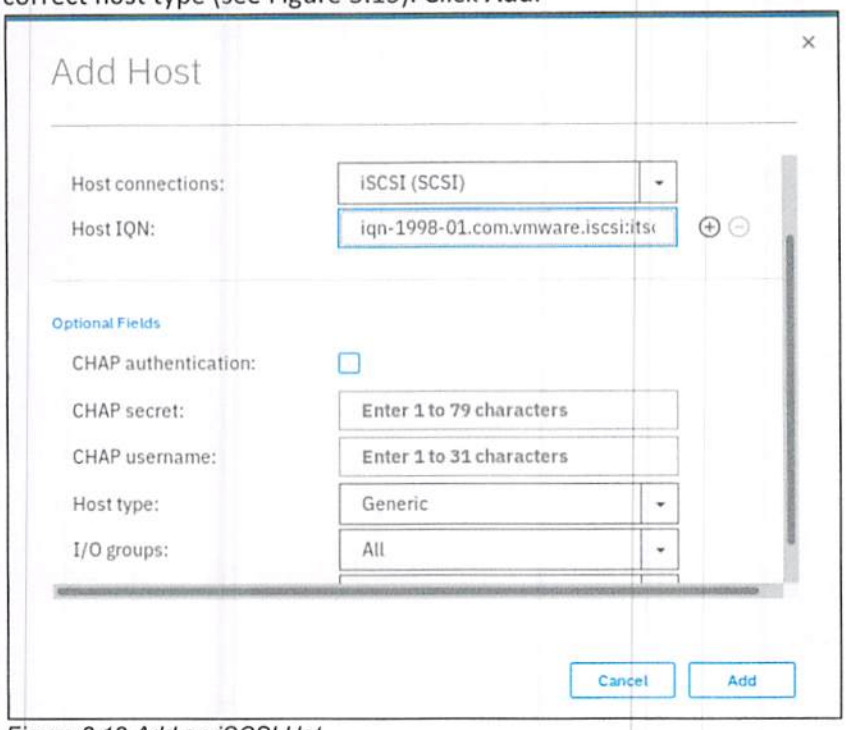

Figure 3.13 Add an iSCSI Hot

4. You can set the I/O groups that your host can access.

5. A task completion window is displayed. Click **Close**.

6. A task completion window is displayed. Click **Close**.

7. Repeat these steps for every iSCSI host that you want to create. Figure 3.18 shows all of the hosts that were created in the system. The host names highlighted were created in this section to illustrate the process.

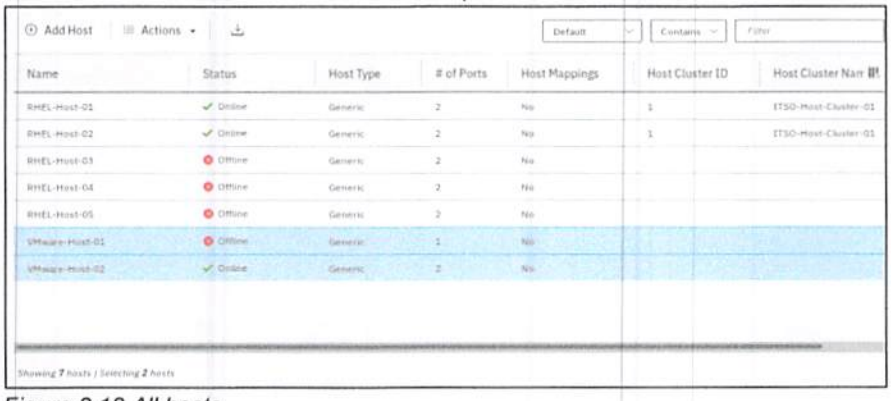

Figure 3.18 All hosts

The iSCSI host is now configured on the IBM Storwize V5000. To provide connectivity, the iSCSI Ethernet ports must also be configured.

3.5 Volume Creation

The GUI is the simplest means of volume creation, and presents different options in the Create Volumes menu depending on the topology of the system. To start the process of creating a volume, complete the following steps:

1. Click the **Volumes** on the main window, as shown in Figure 3.19.

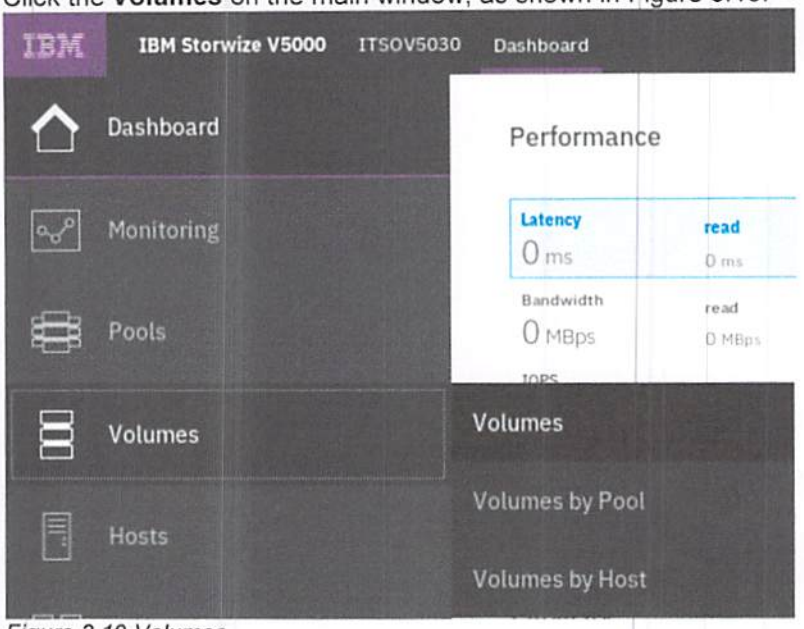

Figure 3.19 Volumes

2. Click **Volumes** in the submenu option. Then, in the pane on the right, you see a list of available volumes, as shown in Figure 3.20.

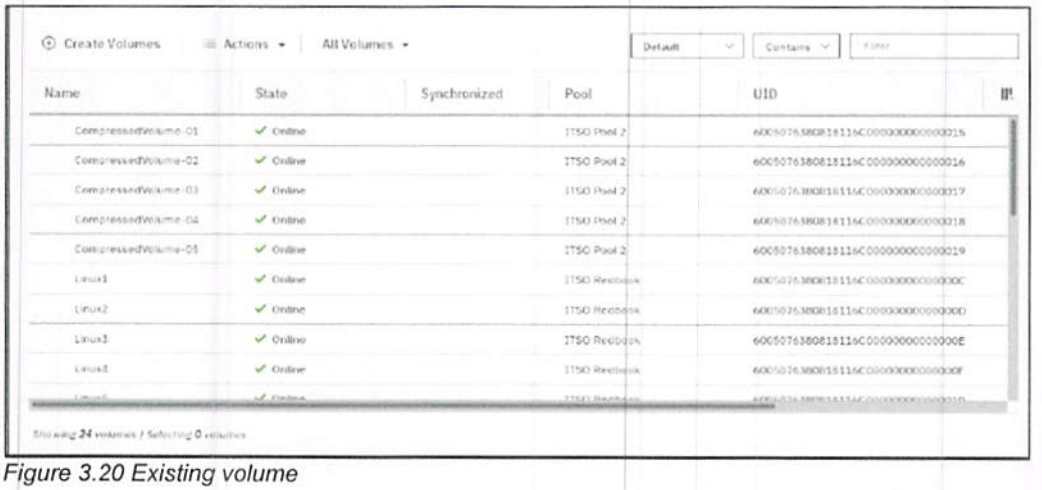

Figure 3.20 Existing volume

3. Click **Create Volumes**, as shown in Figure 3.21.

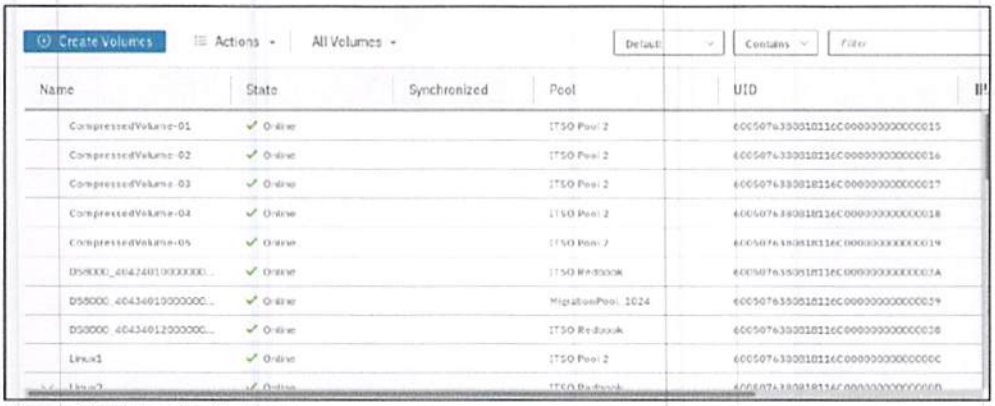

Figure 3.21 Create Volumes

Depending on the topology of the system, clicking Create Volumes provides different options.

For standard topology, Create Volumes provides a pop-up window with options to create basic, mirrored, or custom volumes, as shown in Figure 3.22.

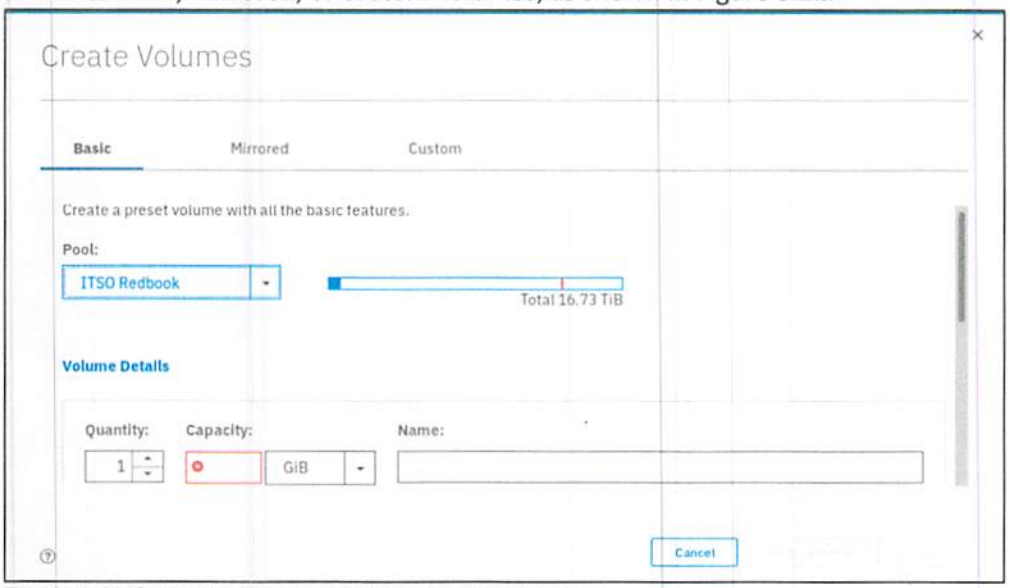

Figure 3.22 Create Volume options for standard topology

4. For HyperSwap topology, the Create Volumes option provides pop-up window with options to create basic, HyperSwap, or custom volumes, as shown in Figure 3.23.

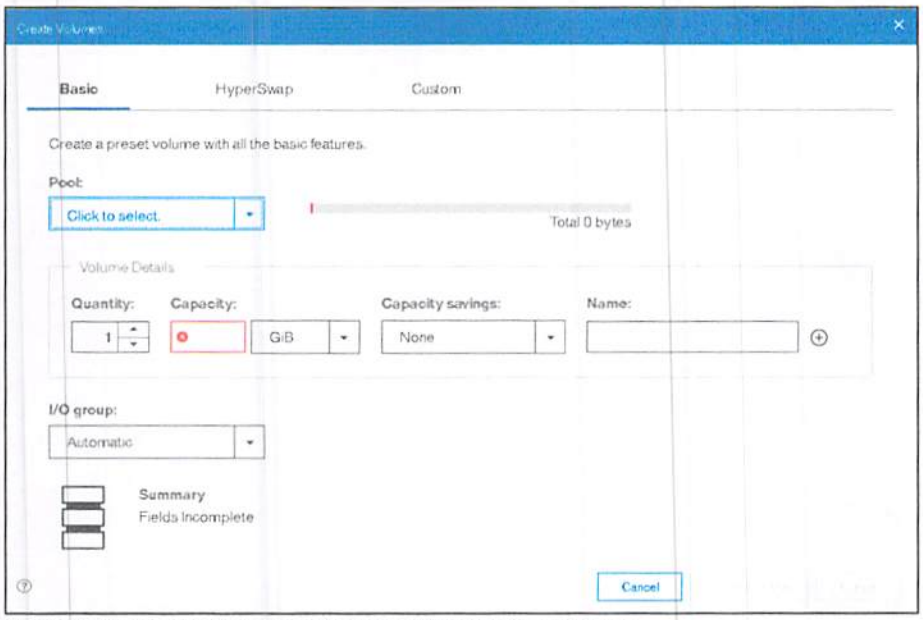

Figure 3.23 Create Volume options for HyperSwap topology

Clicking any of the three choices in the Create Volumes window opens a drop-down window in which volume details can be entered. The example that is shown in Figure 3.24 shows a Basic volume to demonstrate this view.

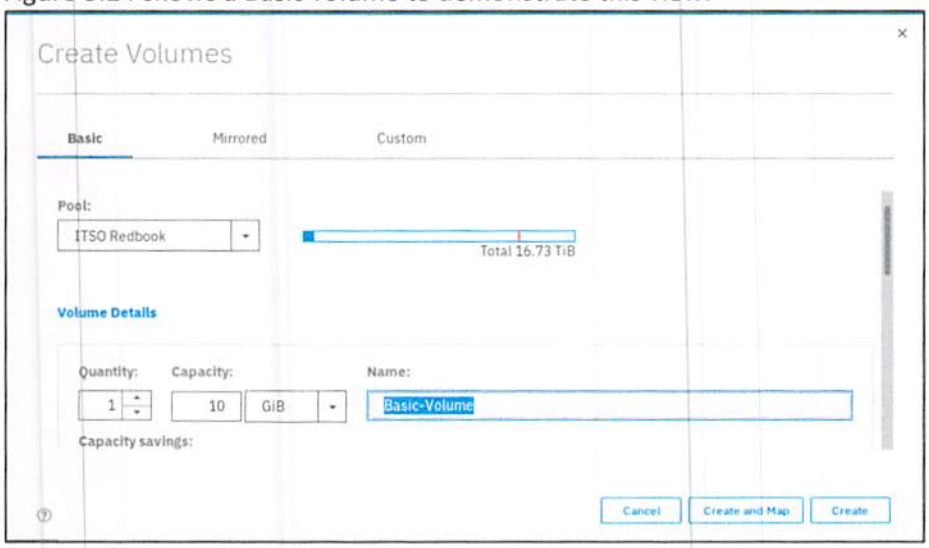

Figure 3.24 Basic Volume

Notes: Consider the following points:

- ➔ A Basic volume is a volume whose data is striped across all available managed disks
- ➔ (MDisks) in one storage pool.
- ➔ A Mirrored volume is a volume with two physical copies, where each volume copy can
- ➔ belong to a different storage pool.
- ➔ In the context of this menu, a Custom volume is a Basic or Mirrored volume with
- ➔ customization from the default parameters.

3.6 Mapping Volume to The Host

After a volume is created, it can be mapped to a host. Complete the following steps:

1. From the Volumes menu, highlight the volume that you want to create a mapping for and select Actions from the menu bar.

2. From the Actions menu, select Map to Host or Host Cluster, as shown in Figure 3.25.

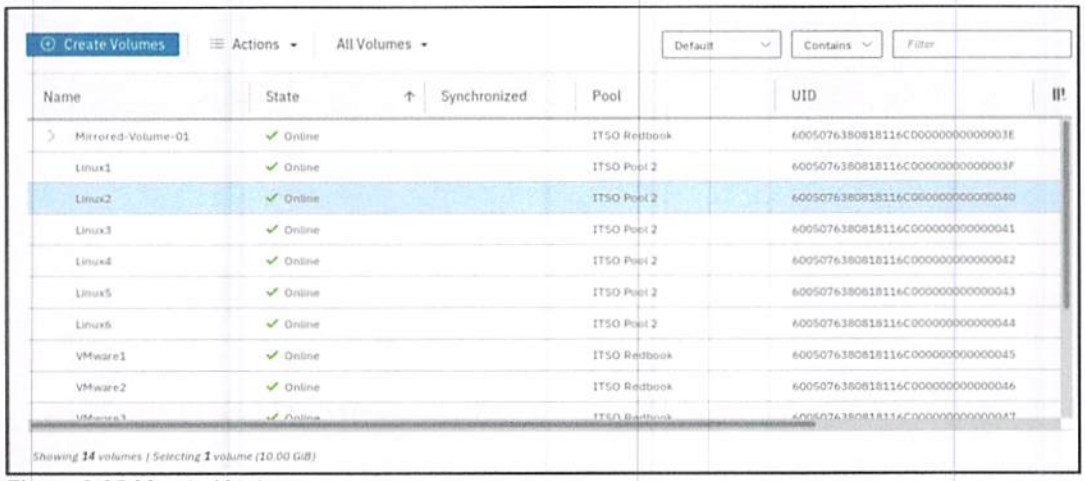

Figure 3.25 Map to Host

3. A Create Mapping window opens. In this window, indicate whether the volume needs to be mapped to a host or host cluster, select the wanted host or host cluster, and whether you want system assigned SCSI ID or self-assigned, as shown in Figure 3.26.

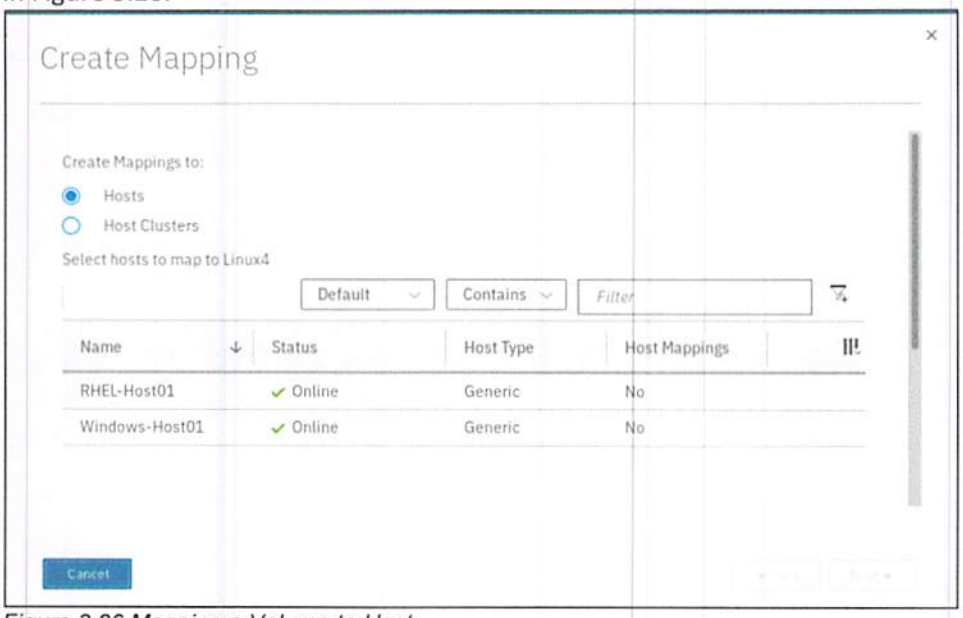

Figure 3.26 Mapping a Volume to Host

4. Click **Next**. A window opens in which mapped volumes to that host are listed along with the new volume to be mapped, as shown in Figure 3.27.

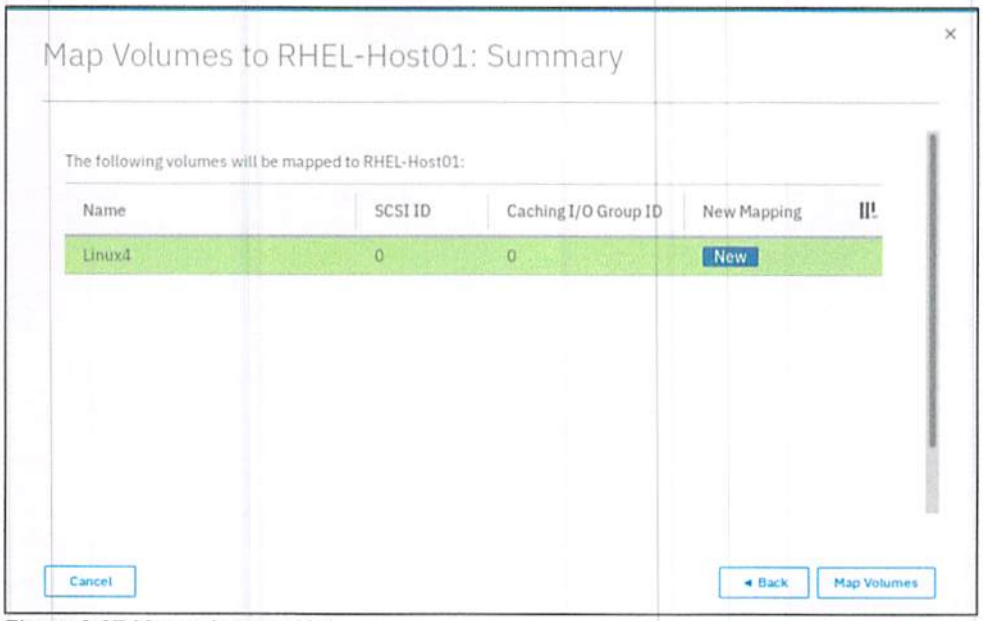

Figure 3.27 Map volume to Hot

5. Click **Map Volumes** and the Modify Mappings window shows the command details. Then, a Task completed message is displayed.

3.7 Defining Throttle on a Volume

To define a throttle on a volume, complete the following steps:

1. From the Volumes window, select the wanted volume to throttle, as shown in Figure 3.28.

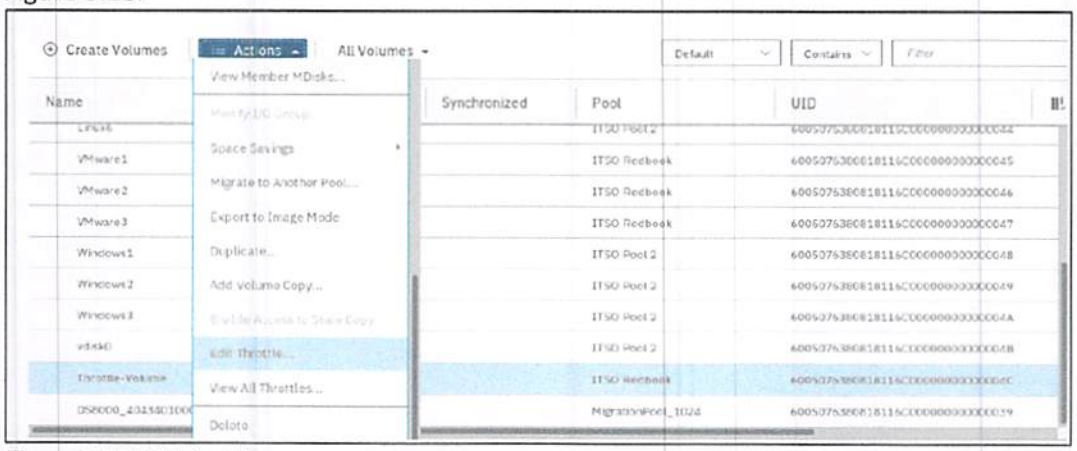

Figure 3.28 Edit Throttle

2. A window opens in which you can set the throttle in terms of IOPS or bandwidth (MBps) or both. In our example, we set the throttle on IOPS, as shown in Figure 3.29.

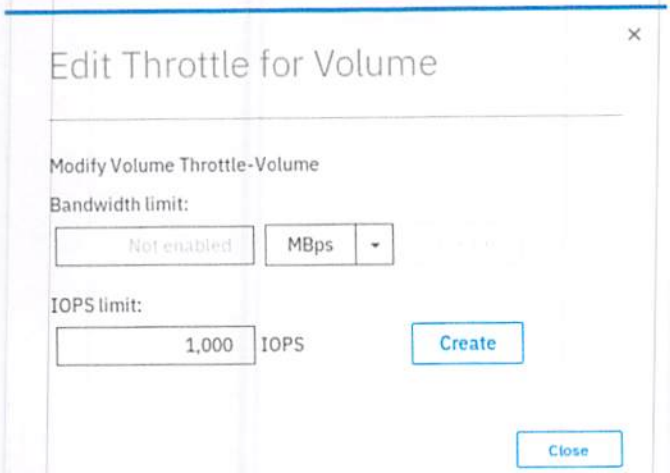

Figure 3.29 IOPS throttle on a volume

3. Click **Create** and a task completion window opens. Click **Close**.

3.8 Replacing Disk Procedure

To prepare to replace a drive assembly, complete the following steps.

1. Locate the slot that contains the drive assembly that you want to replace.
   a. The drive slots on the front are numbered 1 - 24, starting from the far left slot in the enclosure.
   b. If the drive in the slot is faulty, the amber fault LED on the drive is lit

2. For more help to identify the drive assembly, go to the management GUI to **Pools > Internal Storage**, select the drive to replace, and click **Actions > Identify**. Verify that the correct drive fault LED flashes.

To remove a drive assembly, complete the following steps.

1. Gently slide the orange release latch up to unlock the handle.

2. Pull out the tray handle to the open position

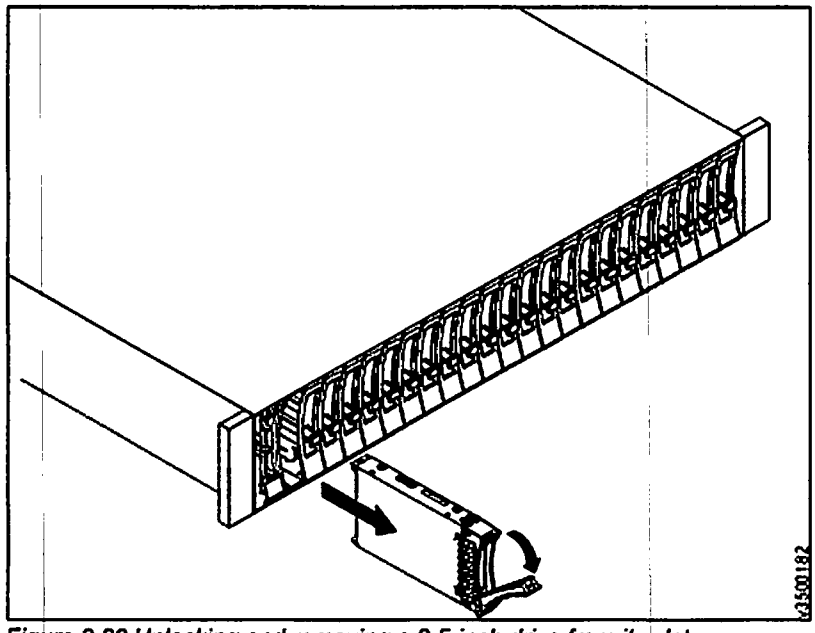

Figure 3.30 Unlocking and removing a 2.5-inch drive from its slot

3. Grasp its handle and pull the drive partially out of the bay.

4. Wait at least 20 seconds before you remove the drive assembly from the enclosure to enable the drive to spin down and avoid possible damage.

5. Gently slide the drive out of the enclosure.

6. Make sure that there is proper identification (such as a label) on the drive assembly. If the drive failed, record that information on the label.

To install a drive assembly, complete the following steps.

1. Touch the static-protective package that contains the drive assembly to any unpainted surface on the outside of the enclosure.

2. Remove the drive assembly from its package.

3. Make sure that its drive-tray handle is in the open (unlocked) position.

4. Align the drive assembly with the guide rails in the bay (see Figure 3.31).

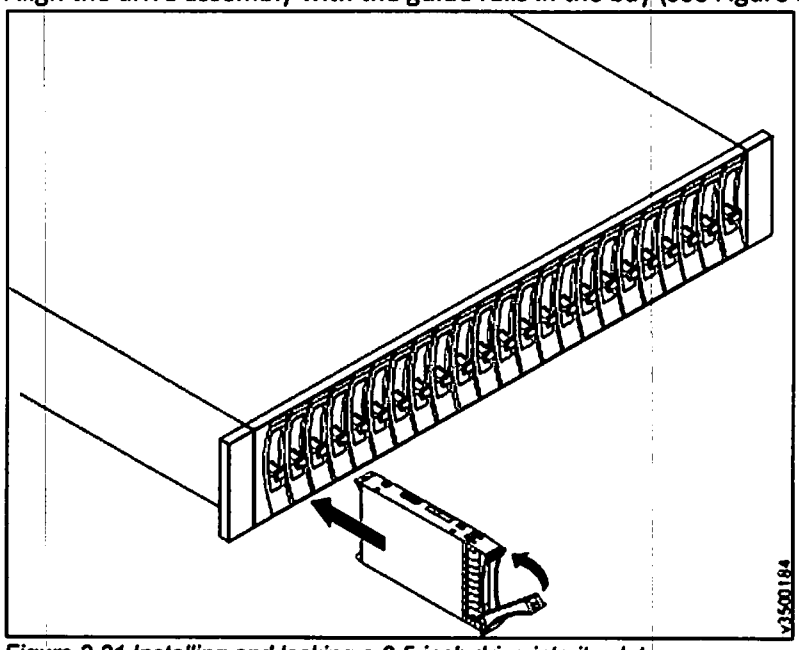

Figure 3.31 Installing and locking a 2.5-inch drive into its slot

IBM Storwize v5100 SAN Storage UAT Test Plan

Version 1.0
Status: Final

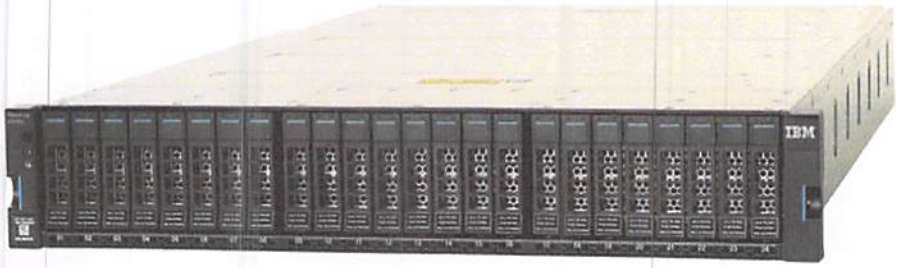

Table of Contents

1 Document Information 3
1.1 Contact Information 3
1.2 Document Version Control 3
2 Introduction 4
2.1 Purpose 4
2.2 Intended Audiences 4
3 UAT Test Case 5

1 Document Information

The following represents information about this document and includes review and approval, version control and history.

1.1 Contact Information

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Customer Details			
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Bhineka Details			
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Budi Gunawan	Technical Consutant	0811-8808-084	

1.2 Document Version Control

Document Version Information

Date	Version	Description	Author	Reviewer

Distribution List Sign Off

To	Action*	Date	Signature

** Action Types: Approve, Review, Inform, File, Action Required, Attend Meeting, Other (please specify)*

2 Introduction

2.1 Purpose

The purpose of this document is to describe the UAT test cases for the IBM Storwize, Storage setup in Angkasa Pura 1. These test cases will ensure that the IBM Storwize Storage has been setup and configured for production use.

2.2 Intended Audiences

This document is intended to be used by Bhineka Professional Services and Angkasa Pura 1 IT staff as a UAT document to ensure the proper and valid setup of the IBM Storwize Storage.

An understanding of IBM technologies and concepts is assumed.

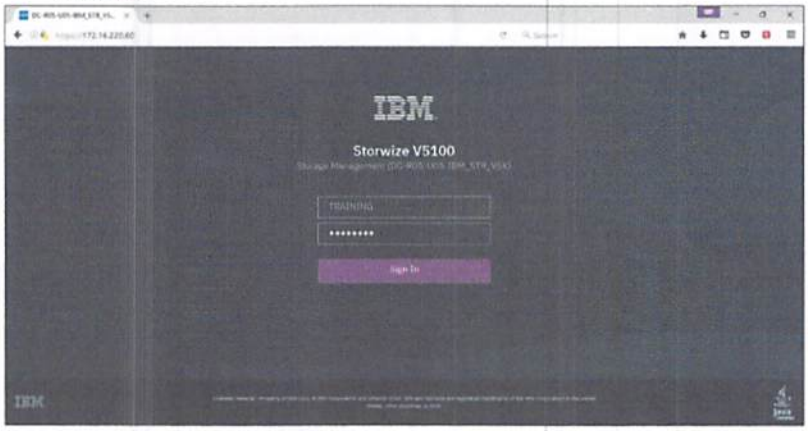
3 UAT Test Case

No	Test Case	Test Case Procedure	Status	Note
1	Test **Power On** Storage ➢ Storage is in **Power On** Status and can be Accessible from Browser	• Login to: *https://172.16.220.60* • Username & Password • Access IBM Storwize Web UI	OK: ☒ NOK: ☐	***OK***
2	Show **Storage Node & Drive** ➢ Show Total Storage Node and Drive	• Login to IBM Storwize Web UI • Go to *Monitoring -- > System -- > Drive*	OK: ☒ NOK: ☐	***OK***
3	Show **Fiber Channel Interface** ➢ Show Total Port 8Gbps per Canister	• Login to IBM Storwize Web UI • Go to *Monitoring -- > System -- > Adapter*	OK: ☒ NOK: ☐	***OK***
4	Test **Create Volume, Volume Access Group** and **Assign to Host**	• Login to IBM Storwize Web UI • Go to *Pools -- > Volume by Pools*	OK: ☒ NOK: ☐	***OK***
5	Test **Create Pools**	• Login to IBM Storwize Web UI • Go to *Pools -- > Pools*	OK: ☒ NOK: ☐	***OK***
6	Test Create **Host**	• Login to IBM Storwize *Web UI* • Go to *Hosts -- > Hosts*	OK: ☒ NOK: ☐	***OK***
7	Test **Backup** & **Restore Capability**	• Login to IBM Storwize *Web UI* • Go to *Copy Services -- > Flash Copy* • Create Volume Snapshot	OK: ☒ NOK: ☐	***OK***
8	Test **User Access**	• Login to IBM Storwize *Web UI* • Go to *Access -- > User*	OK: ☒ NOK: ☐	***OK***

1. Test **Power On**
   a) Login to https://172.16.220.00/
   b) Username & Password
   c) Access IBM Storwize Web UI

Login Interface

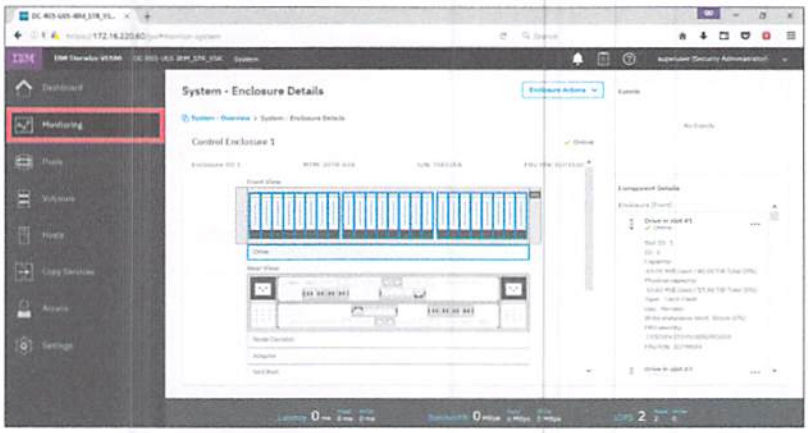
- IP Address : https://172.16.220.60/
- User : TRAINING
- Pass : TRAINING



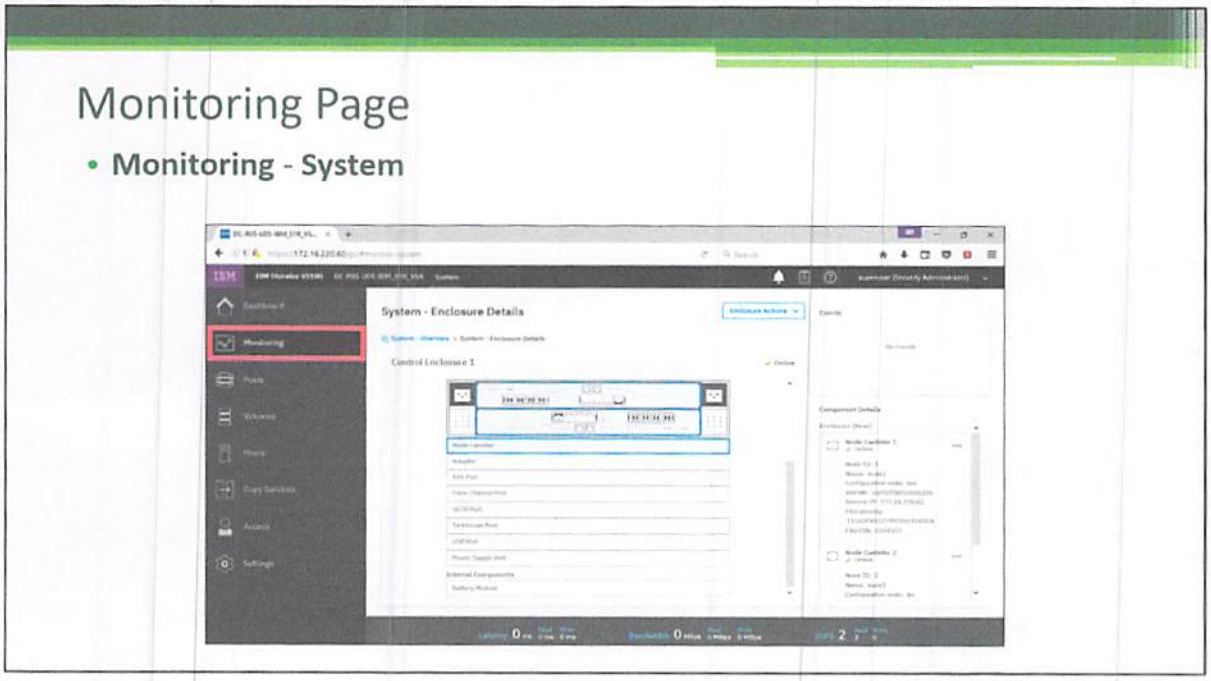
2. Show **Storage Canister & Drive**
   a) Login to IBM Storwize Web UI
   b) Go to *Monitoring -- > System -- > Drive*

Monitoring Page

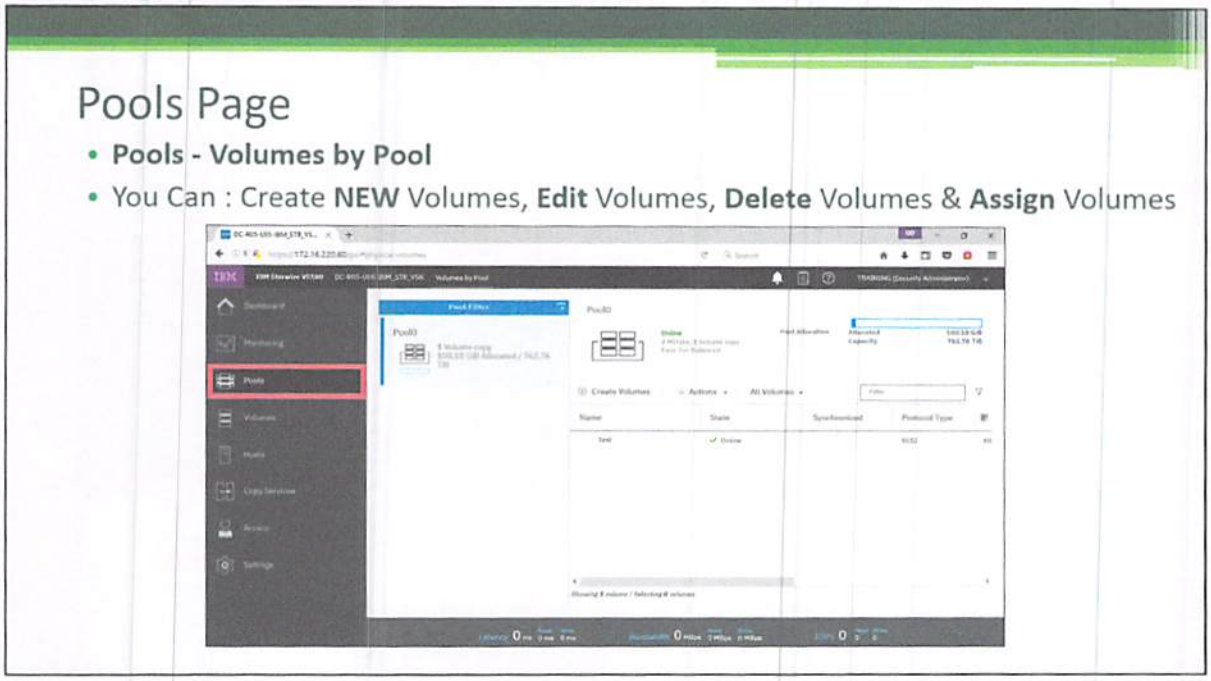
- **Monitoring - System**



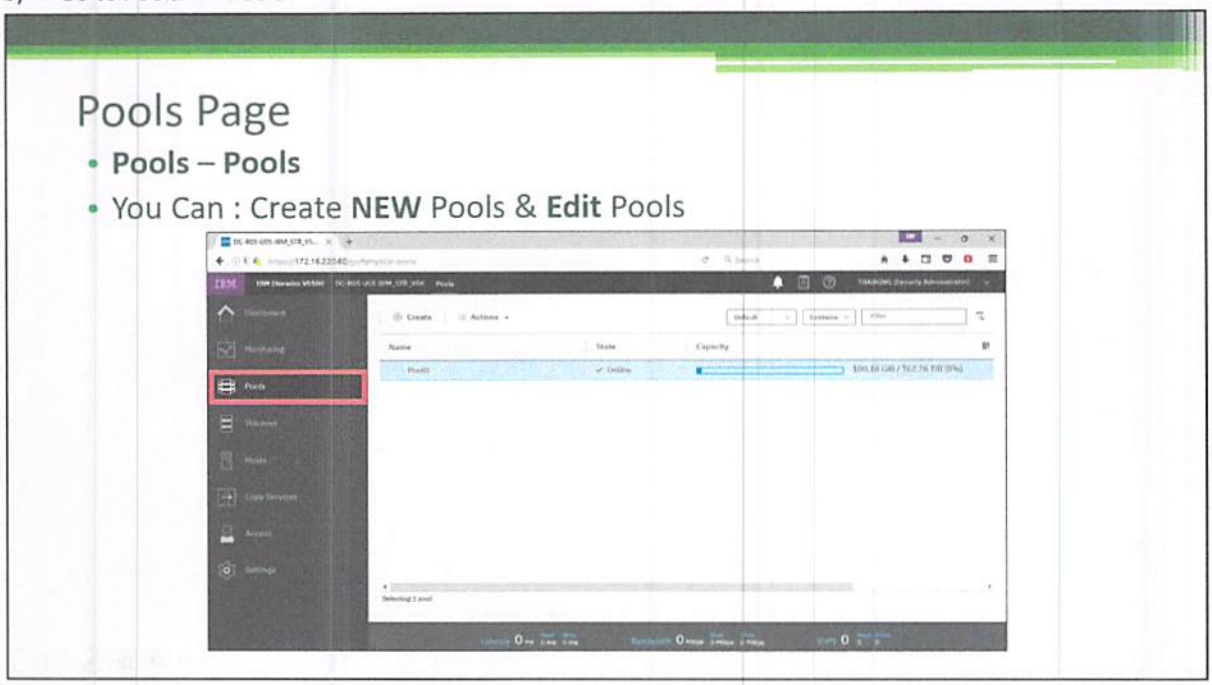
3. Show **Network iSCSI Interface**
   a) Login to IBM Storwize Web UI
   b) Go to *Monitoring -- > System -- > Adapter*



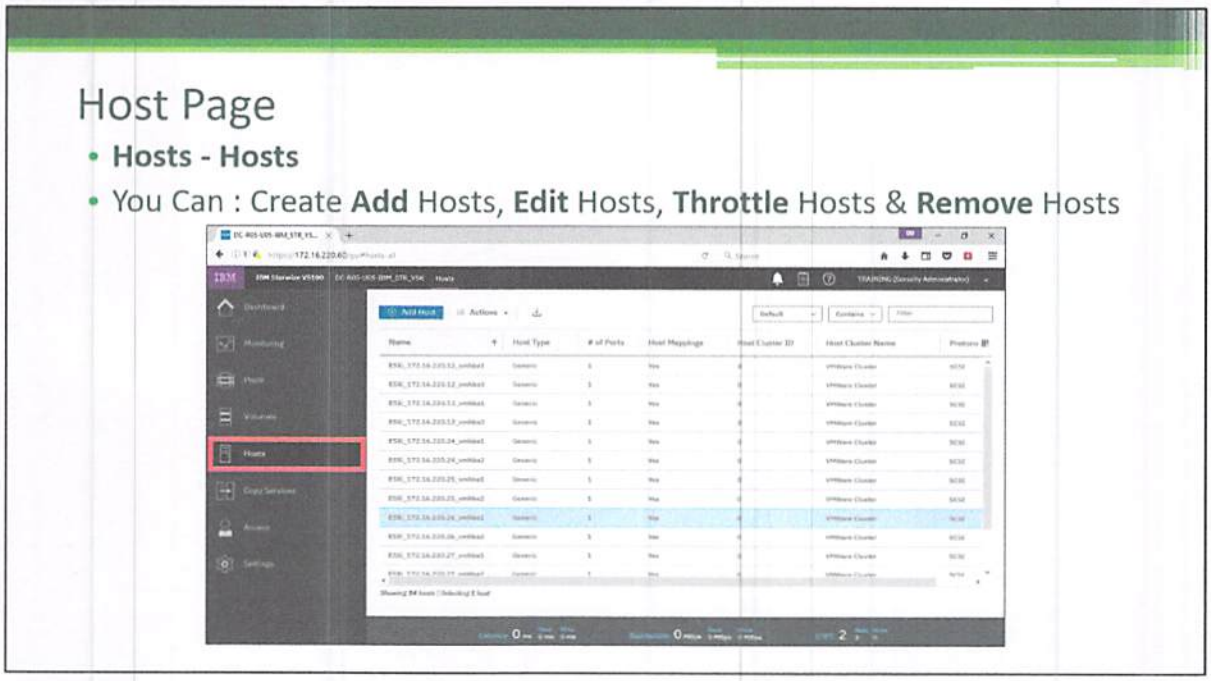
4. Test **Create Volume, Volume Access Group** and **Assign to Host**
   a) Login to IBM Storwize Web UI
   b) Go to *Pools -- > Volume by Pools*



5. Test **Create Pools**
   a) Login to IBM Storwize Web UI
   b) Go to *Pools -- > Pools*



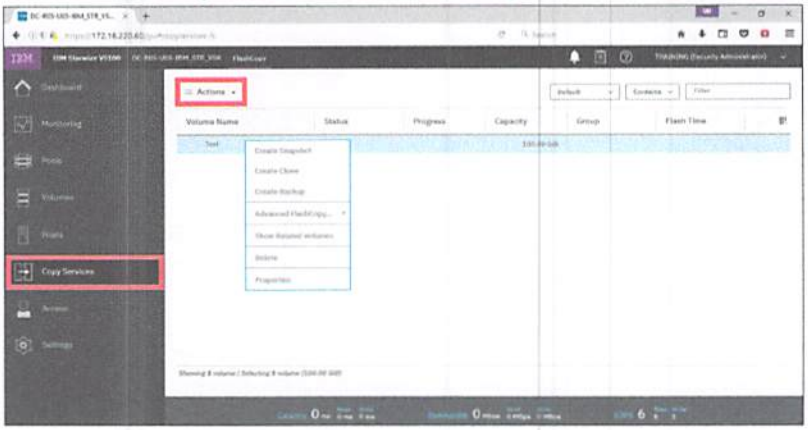
6. Test Create **Host**
   a) Login to IBM Storwize *Web UI*
   b) Go to *Hosts -- > Hosts*



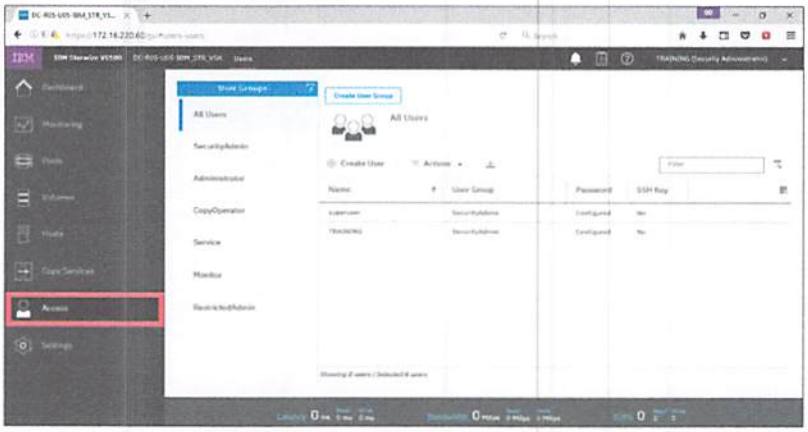
7. Test **Backup** & **Restore Capability**
   a) Login to IBM Storwize *Web UI*
   b) Go to *Copy Services -- > Flash Copy*
   c) Create Volume Snapshot

Copy Services Page

- **Copy Services - FlashCopy**
- You Can : Create **Snapshot, Clone & Backup** Volumes for Protection



8. Test **User Access**
   a) Login to IBM Storwize *Web UI*
   b) Go to *Access -- > User*

Access Page

- **Access - Users**
- You Can : **Create, Edit & Delete** Users