



# Data Domain Technical Workshop

## How to measure Data Domain capacity?

**The most fresh version of this document, you will find at:**

<https://inside.emc.com/docs/DOC-187329>

**Wszystkie materiały o Data Domain po polsku:**

<http://backuprecoveryman.blogspot.com/2016/02/przegląd-materiaow-po-polsku.html#DataDomain>

**Data Domain Virtual Edition:**

<http://backuprecoveryman.blogspot.com/2016/02/przegląd-materiaow-po-polsku.html#DataDomainVirtualEdition>

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Data Protection Systems*

Enabling  
physical capacity  
measurement

# Enable physical capacity measurement

Log-in into Data Domain

EMC DD System Manager Login

dd57b.labd.local/ddem/login/

EMC<sup>2</sup>  
where information lives

**Data Domain  
System Manager**

Username:

Password:

[Secure Login](#)

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# Enable physical capacity measurement

EMC Data Domain System Manager

HOME

HEALTH

**DATA MANAGEMENT**

File System

File System

State **Enabled and running: 1 week, 2 days, 1 hour, 53 minutes**

Clean Status **Cleaning finished at 2015/12/29 06:08:07**

Physical Capacity Measurement Status **Disabled**

Summary Configuration Encryption Space Usage Consumption Daily Written

**Space Usage**

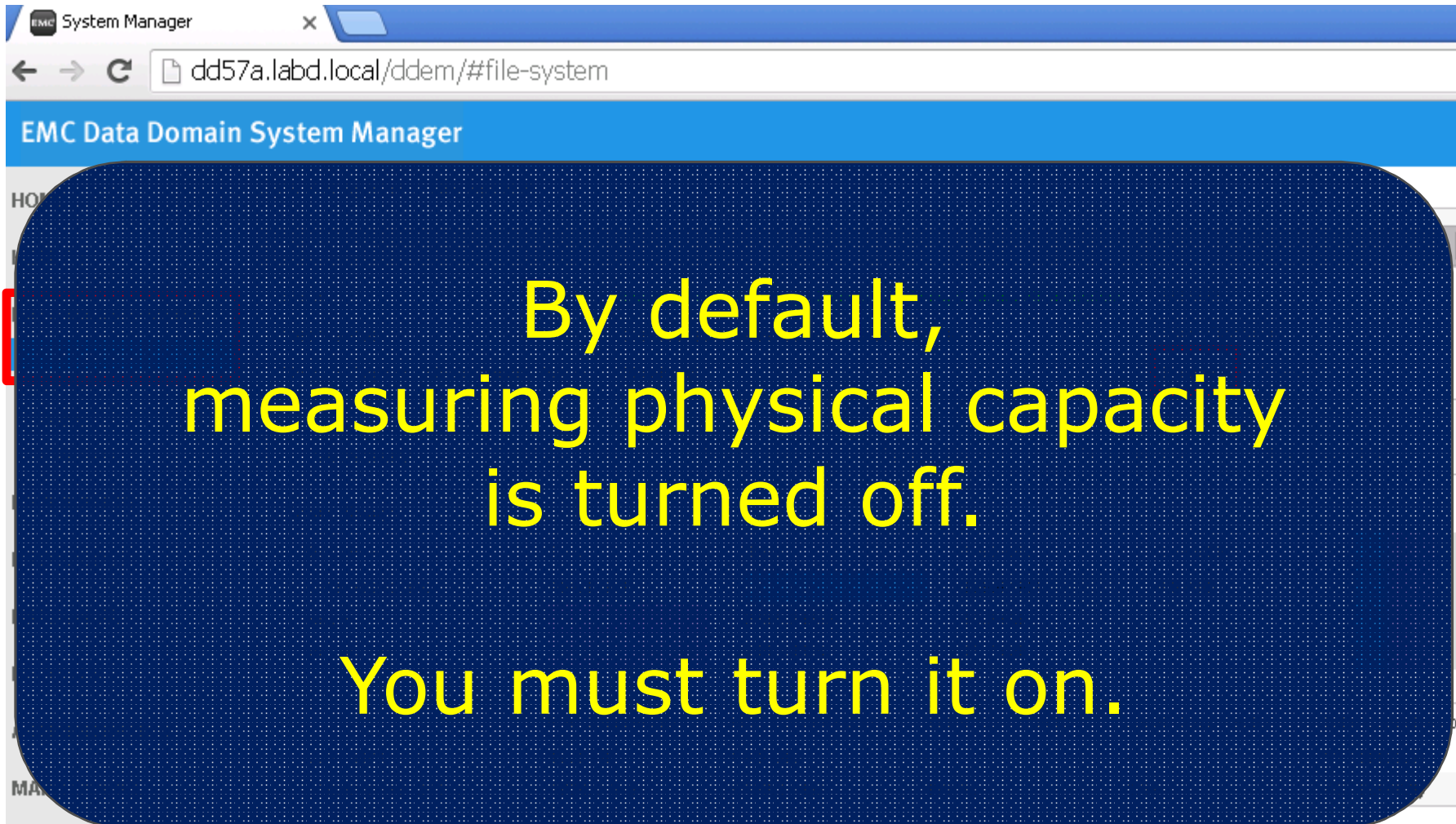
Resource	Size	Used	Available	Cleanable
/data:post-comp	404.1 GiB	64.5 GiB	339.6 GiB	0.0 MiB
/ddvar	49.2 GiB	2795.2 MiB	44.0 GiB	-
/ddvar/core	46.3 GiB	180.0 MiB	43.7 GiB	-

	Pre-Compression:	Post-Compression:	Global-Comp Factor:	Local-Comp Factor:	Total Comp Factor:
Currently Used	12.2 TiB	64.5 GiB	-	-	193.5x(99.5)
Written in last 24 hrs	4030.0 GiB	5483.3 MiB	466.4x	1.6x	752.6x(99.9)

Command line:

compression physical-capacity-measurement enable

# Enable physical capacity measurement



The image shows a screenshot of the EMC Data Domain System Manager web interface. The browser address bar displays "dd57a.labd.local/ddem/#file-system". The page title is "EMC Data Domain System Manager". A large blue rounded rectangle is overlaid on the page, containing the following text in yellow:

By default,  
measuring physical capacity  
is turned off.

You must turn it on.

Command line:

```
compression physical-capacity-measurement enable
```

# Enable physical capacity measurement

The screenshot shows the EMC Data Domain System Manager interface. The left sidebar contains navigation menus for HOME, HEALTH, DATA MANAGEMENT, REPLICATION, PROTOCOLS, HARDWARE, REPORTS, ADMINISTRATION, and MAINTENANCE. The 'File System' menu item is selected. The main content area displays the 'File System' configuration page. The 'Physical Capacity Measurement Status' is highlighted with a red box, showing it is 'Enabled with 0 measurements running'. Below this, there are tabs for Summary, Configuration, Encryption, Space Usage, Consumption, and Daily v. The 'Space Usage' section contains a table with columns for Resource, Size, Used, Available, and Cleanable. The 'Summary' section contains a table with columns for Pre-Compression, Post-Compression, Global-Comp Factor, and Local-Comp Factor.

EMC Data Domain System Manager

dd57a.labd.local/ddem/#file-system

EMC Data Domain System Manager

Data Management File System

File System

State **Enabled and running: 1 week, 2 days, 2 hours, 6 minutes**

Clean Status **Cleaning finished at 2015/12/29 06:08:07**

**Physical Capacity Measurement Status Enabled with 0 measurements running**

Summary Configuration Encryption Space Usage Consumption Daily v

Space Usage

Resource	Size	Used	Available	Cleanable
/data:post-comp	404.1 GiB	65.0 GiB	339.1 GiB	0.0 MiB
/ddvar	49.2 GiB	2796.1 MiB	44.0 GiB	-
/ddvar/core	46.3 GiB	180.0 MiB	43.7 GiB	-

	Pre-Compression:	Post-Compression:	Global-Comp Factor:	Local-Comp Factor:
Currently Used	12.3 TiB	65.0 GiB	-	-
Written in last 24 hrs	4030.0 GiB	5483.3 MiB	466.4x	1.6x

Ad hoc  
Data Domain  
physical capacity  
measurement

## EMC Data Domain System Manager

HOME

HEALTH

DATA MANAGEMENT

File System

MTree

Quota

Snapshots

REPLICATION

PROTOCOLS

HARDWARE

REPORTS

ADMINISTRATION

MAINTENANCE

## Data Management MTree

## MTree

More Ta

Create

Delete

Manage Schedules

Filter by MTree Name:

Update

<input type="checkbox"/>	MTree Name ▲	Quota Hard Limit ◆	Last 24hr Pre-Comp ◆	Last 24hr Post-Comp ◆	Last 24hr Comp Ratio ◆	Weekly Avg Post Comp ◆	Last Week Post-Comp ◆	Weekly Avg Comp Ratio ◆
<input type="checkbox"/>	/data/col1/avamar-1450355275	Disabled	3000.0 GiB	0.9 GiB	3285.3x	1.4 GiB	7.2 GiB(400.0%)	1626.8x
<input type="checkbox"/>	/data/col1/avamar-1451310290	Disabled	820.0 GiB	0.0 GiB	29988.3x	3.7 GiB	18.4 GiB(400.0%)	66.7x
<input type="checkbox"/>	/data/col1/backup	Disabled	0.0 GiB	0.0 GiB	0.0x	0.0 GiB	0.0 GiB(0.0%)	0.0x
<input checked="" type="checkbox"/>	/data/col1/cifs1	Disabled	0.9 GiB	0.0 GiB	73.7x	0.0 GiB	0.0 GiB(400.0%)	73.7x

Items Selected: 1

Items 1-4 of 4

Summary

Space Usage

Daily Written

## Detailed Information

## Physical Capacity Measurements

Used (Post-Comp): N/A

Compression: N/A

Last Measurement Time: N/A

Schedules: 1

Assign

Submitted Measurements: 0

Measure Now



EMC Data Domain System Manager

dd57a.labd.local/ddem/#mtree

EMC Data Domain System Manager

HOME

HEALTH

**DATA MANAGEMENT**

File System

**MTree**

Quota

Snapshots

REPLICATION

PROTOCOLS

HARDWARE

REP

ADM

MAI

Data Management MTree

MTree More Ta

Create Delete Manage Schedules

Filter by MTree Name:  Update

<input type="checkbox"/>	MTree Name ▲	Quota Hard Limit ◆	Last 24hr Pre-Comp ◆	Last 24hr Post-Comp ◆	Last 24hr Comp Ratio ◆	Weekly Avg Post Comp ◆	Last Week Post-Comp ◆	Weekly Avg Comp Ratio ◆
<input type="checkbox"/>	/data/col1/avamar-1450355275	Disabled	3000.0 GiB	0.9 GiB	3285.3x	1.4 GiB	7.2 GiB(400.0%)	1626.8x
<input type="checkbox"/>	/data/col1/avamar-1451310290	Disabled	820.0 GiB	0.0 GiB	29988.3x	3.7 GiB	18.4 GiB(400.0%)	66.7x
<input type="checkbox"/>	/data/col1/backup	Disabled	0.0 GiB	0.0 GiB	0.0x	0.0 GiB	0.0 GiB(0.0%)	0.0x
<input checked="" type="checkbox"/>	/data/col1/cifs1	Disabled	0.9 GiB	0.0 GiB	73.7x	0.0 GiB	0.0 GiB(400.0%)	73.7x

In my case names of logical Data Domains (mtrees) are very technical (avamar, cifs1)

Usually you name mtrees

- Marketing, Washington, London, ... (name of departments if you use DD as single customer)
- Customer1, Customer2, Customer3 (name of your customers if you are Service Provider)

However you name the mtrees (logical Data Domains), you can measure how much physical capacity each mtree occupies.

EMC System Manager

dd57a.labd.local/ddem/#mtree

### EMC Data Domain System Manager

HOME

HEALTH

**DATA MANAGEMENT**

File System

**MTree**

Quota

Snapshots

REPLICATION

PROTOCOLS

HARDWARE

REPORTS

ADMINISTRATION

MAINTENANCE

#### Data Management MTree

MTree More Ta...

Create Delete Manage Schedules

Filter by MTree Name:  Update

<input type="checkbox"/>	MTree Name ^	Quota Hard Limit	Last 24hr Pre-Comp	Last 24hr Post-Comp	Last 24hr Comp Ratio	Weekly Avg Post Comp	Last Week Post-Comp	Weekly Avg Comp Ratio
<input type="checkbox"/>	/data/col1/avamar-1450355275	Disabled	3000.0 GiB	0.9 GiB	3285.3x	1.4 GiB	7.2 GiB(400.0%)	1626.8x
<input type="checkbox"/>	/data/col1/avamar-1451310290	Disabled	820.0 GiB	0.0 GiB	29988.3x	3.7 GiB	18.4 GiB(400.0%)	66.7x
<input type="checkbox"/>	/data/col1/backup	Disabled	0.0 GiB	0.0 GiB	0.0x	0.0 GiB	0.0 GiB(0.0%)	0.0x
<input checked="" type="checkbox"/>	/data/col1/cifs1	Disabled	0.9 GiB	0.0 GiB	73.7x	0.0 GiB	0.0 GiB(400.0%)	73.7x

Items Selected: 1 Items 1-4 of 4

Summary Space Usage Daily Written

#### Detailed Information

**Physical Capacity Measurements**

Used (Post-Comp): N/A

Compression: N/A

Last Measurement Time: N/A

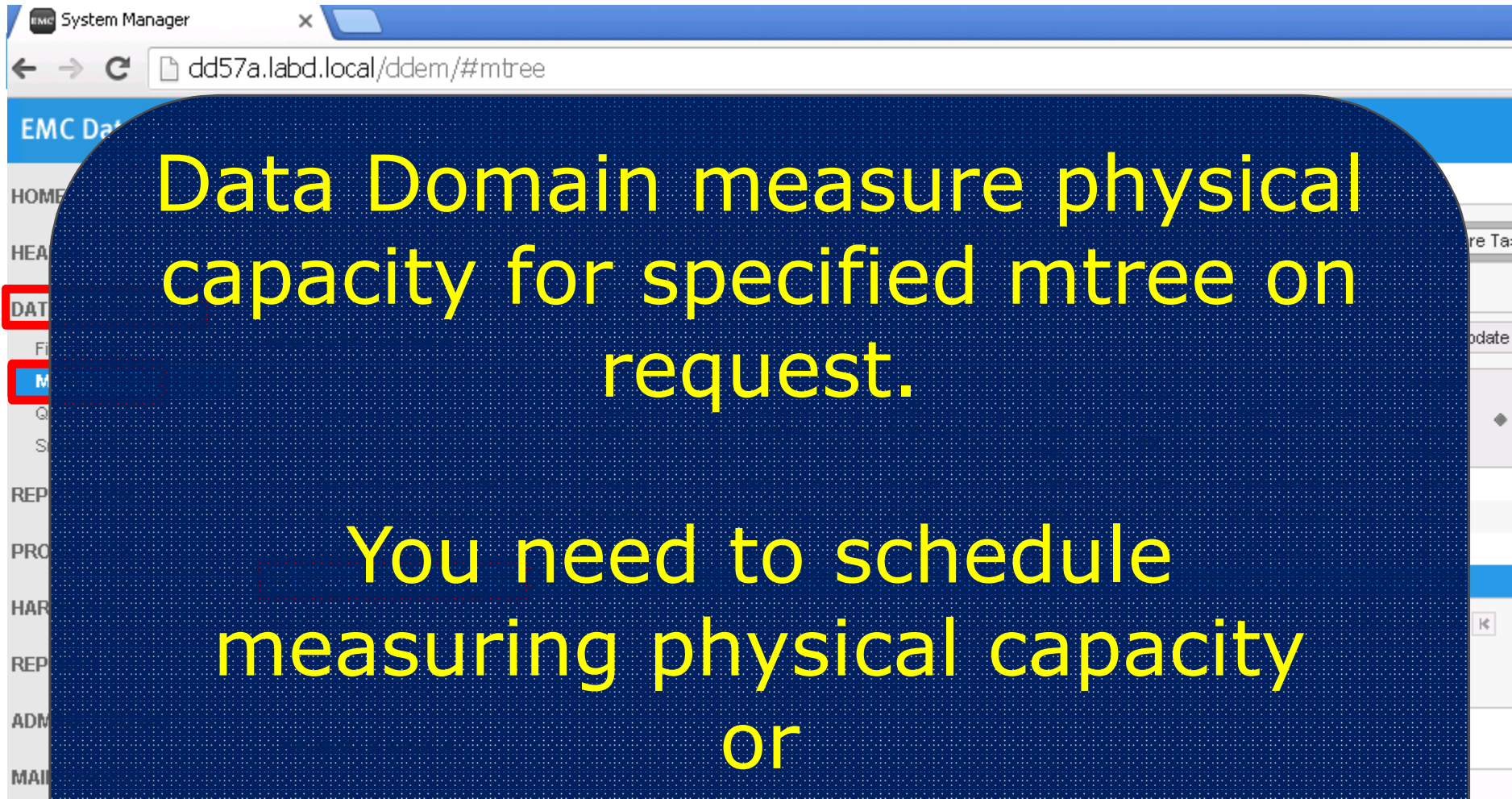
Schedules: 1

Submitted Measurements: 0

Assign

Measure Now

We measure how much data (after de-duplication), DD keeps to restore data for this mtree



Data Domain measure physical capacity for specified mtree on request.

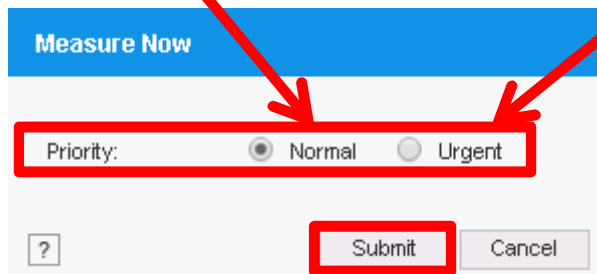
You need to schedule measuring physical capacity or like here - you can measure physical capacity for any mtree on demands

# Physical capacity measurement

Measure physical data ad hoc

The job will be in the last position in the queue

The job will be in the first position in the queue



The image shows a screenshot of a software interface titled "Measure Now". The interface has a blue header bar with the text "Measure Now". Below the header, there is a section labeled "Priority:" with two radio button options: "Normal" (which is selected) and "Urgent". Below the priority options, there are three buttons: a help button with a question mark icon, a "Submit" button, and a "Cancel" button. Red arrows point from the text annotations to the "Normal" and "Urgent" radio buttons. A red box highlights the "Submit" button.

# Physical capacity measurement

Observing that capacity measurement job is running

The screenshot shows the EMC Data Domain System Manager interface. The browser address bar displays `dd57a.labd.local/ddem/#mtree`. The left sidebar contains a navigation menu with the following items: HOME, HEALTH, DATA MANAGEMENT (highlighted with a red box), File System, MTree (highlighted with a red box), Quota, Snapshots, REPLICATION, PROTOCOLS, HARDWARE, REPORTS, ADMINISTRATION, and MAINTENANCE. The main content area is titled "Detailed Information" and displays the following details for the file system `/data/col1/cifs1`:

- Full Path: `/data/col1/cifs1` (with a "Rename" button)
- Status: `RW (Read Write)`
- Pre-Comp Used: `2116 MiB` (highlighted with a red box)

Below this, there are two sections: "Quota" and "Physical Capacity Measurements".

**Quota**

Quota Enforcement:	Disabled
Pre-Comp Soft Limit:	None <input type="button" value="Configure"/>
Pre-Comp Hard Limit:	None
Quota Summary:	None

**Physical Capacity Measurements**

Used (Post-Comp):	N/A
Compression:	N/A
Last Measurement Time:	N/A
Schedules:	1 <input type="button" value="Assign"/>
Submitted Measurements:	1 <input type="button" value="Measure Now"/>

The "Submitted Measurements" value of 1 is highlighted with a red box.

# Physical capacity measurement

Observing that capacity measurement job is running

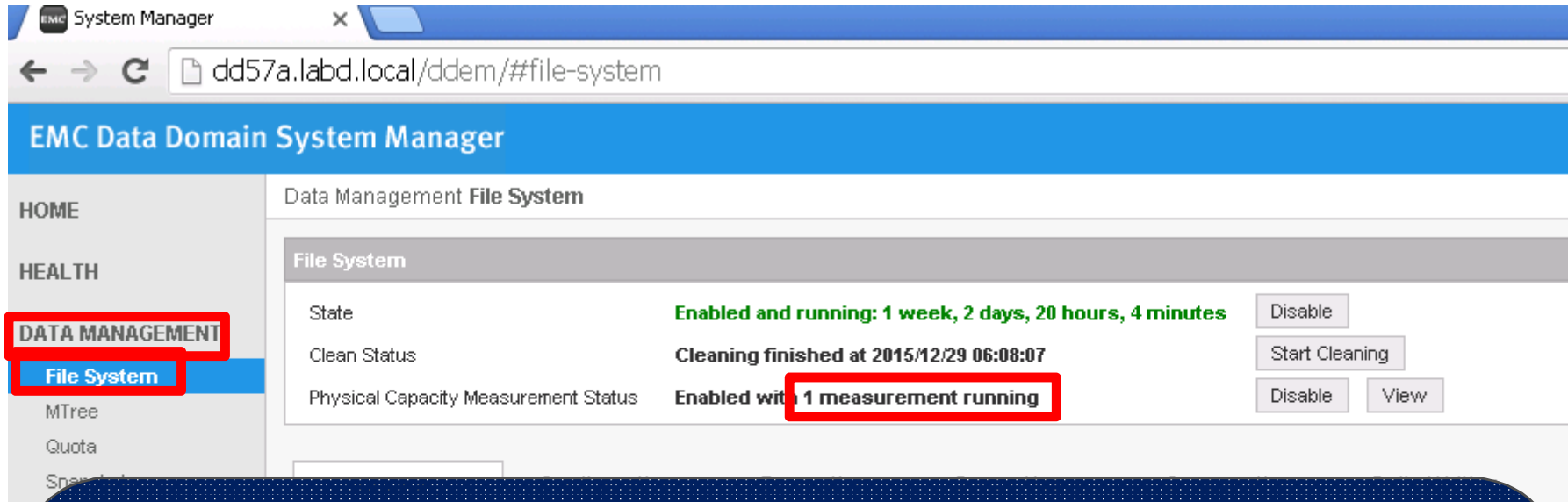
The screenshot shows the EMC Data Domain System Manager web interface. The left sidebar contains navigation menus: HOME, HEALTH, DATA MANAGEMENT (highlighted in red), File System (highlighted in blue), MTree, Quota, Snapshots, REPLICATION, PROTOCOLS, HARDWARE, REPORTS, ADMINISTRATION, and MAINTENANCE. The main content area displays the 'Data Management File System' page. The 'File System' section shows the state as 'Enabled and running: 1 week, 2 days, 20 hours, 4 minutes', the clean status as 'Cleaning finished at 2015/12/29 06:08:07', and the physical capacity measurement status as 'Enabled with 1 measurement running' (highlighted in red). Below this, there are tabs for Summary, Configuration, Encryption, Space Usage, Consumption, and Daily Written. The 'Space Usage' section contains a table with columns for Resource, Size, Used, Available, and Cleanable. A bar chart to the right of the table shows the usage levels for each resource. At the bottom, there is a table with columns for Pre-Compression, Post-Compression, Global-Comp Factor, Local-Comp Factor, and Total Comp Factor.

Resource	Size	Used	Available	Cleanable
/data:post-comp	404.1 GiB	89.4 GiB	314.7 GiB	0.0 MiB
/ddvar	49.2 GiB	2872.3 MiB	43.9 GiB	-
/ddvar/core	46.3 GiB	180.0 MiB	43.7 GiB	-

	Pre-Compression:	Post-Compression:	Global-Comp Factor:	Local-Comp Factor:	Total Comp Factor:
Currently Used	14.9 TiB	89.4 GiB	-	-	170.7x(99.4)
Written in last 24 hrs	3412.1 GiB	882.0 MiB	1226.6x	3.2x	3961.4x(100.0)

# Physical capacity measurement

Observing that capacity measurement job is running



You need to wait some time to allow measuring physical job to finish

# Physical capacity measurement

Measure physical data ad hoc

After some time...

You can see how much data DD keeps to restore all information from specific mtree

The screenshot shows the EMC Data Domain System Manager web interface. The browser address bar displays 'dd57a.labd.local/ddem/#mtree'. The left sidebar contains a navigation menu with categories: HOME, HEALTH, DATA MANAGEMENT (highlighted with a red box), REPLICATION, PROTOCOLS, HARDWARE, REPORTS, ADMINISTRATION, and MAINTENANCE. Under DATA MANAGEMENT, 'MTree' is selected and highlighted with a blue bar and a red box. The main content area is titled 'EMC Data Domain System Manager' and is divided into sections: 'Quota' and 'Physical Capacity Measurements'. The 'Quota' section shows 'Quota Enforcement: Disabled', 'Pre-Comp Soft Limit: None', 'Pre-Comp Hard Limit: None', and 'Quota Summary: None'. The 'Physical Capacity Measurements' section shows 'Used (Post-Comp): 40.2 MiB', 'Compression: 52.3x', and 'Last Measurement Time: 12/30/2015 06:54:04 PST'. Below this, it shows 'Schedules: 1' and 'Submitted Measurements: 0'. There are 'Assign' and 'Measure Now' buttons at the bottom right of the Physical Capacity Measurements section.

Quota	
Quota Enforcement:	Disabled
Pre-Comp Soft Limit:	None <input type="button" value="Configure"/>
Pre-Comp Hard Limit:	None
Quota Summary:	None

Physical Capacity Measurements	
Used (Post-Comp):	40.2 MiB
Compression:	52.3x
Last Measurement Time:	12/30/2015 06:54:04 PST
Schedules:	1 <input type="button" value="Assign"/>
Submitted Measurements:	0 <input type="button" value="Measure Now"/>



# EMC Data Domain System Manager

- HOME
- HEALTH
- DATA MANAGEMENT
  - File System
  - MTree**
  - Quota
  - Snapshots
- REPLICATION
- PROTOCOLS
- HARDWARE
- REPORTS
- ADMINISTRATION
- MAINTENANCE

## Data Management MTree

### MTree

Create Delete Manage Schedules

Filter by MTree Name:

<input type="checkbox"/>	MTree Name ▲	Quota Hard Limit ◆	Last 24hr Pre-Comp ◆	Last 24hr Post-Comp ◆	Last 24hr Comp Ratio ◆	Weekly Avg Post Comp ◆	Last Week Post-Comp ◆
<input type="checkbox"/>	/data/col1/avamar...	Disabled	3000.0 GiB	0.8 GiB	3606.6x	1.5 GiB	7.7 GiB(400.0%)
<input type="checkbox"/>	/data/col1/avamar...	Disabled	410.0 GiB	0.0 GiB	1331658.1x	3.7 GiB	18.4 GiB(400.0%)
<input type="checkbox"/>	/data/col1/backup	Disabled	0.0 GiB	0.0 GiB	0.0x	0.0 GiB	0.0 GiB(0.0%)
<input checked="" type="checkbox"/>	<b>/data/col1/cifs1</b>	Disabled	2.1 GiB	0.0 GiB	70.7x	0.0 GiB	0.0 GiB(400.0%)

Items Selected: 1

Items

### Summary

### Space Usage

#### Detailed Information

Full Path: /data/col1/cifs1  
Status: RW (Read-Write)  
Pre-Comp Used: 2116 MiB

#### Physical Capacity Measurements

Used (Post-Comp): 40.2 MiB  
Compression: 52.3x  
Last Measurement Time: 12/30/2015 02:00:02 PST  
Schedules: 1  
Submitted Measurements: 0

If you divide for particular mtree **pre-compression** data (data that DD can restore) by used (post compression) data (data that DD keeps) you get compression rate for this particular mtree

Assign

Measure Now

Define schedule for  
Data Domain  
physical capacity  
measurement

# Physical capacity measurement

Defying schedule to measure mtree occupancy

The screenshot shows the EMC Data Domain System Manager interface. The left sidebar contains navigation menus: HOME, HEALTH, DATA MANAGEMENT (highlighted with a red box), File System, MTree (highlighted with a red box), Quota, Snapshots, REPLICATION, PROTOCOLS, HARDWARE, REPORTS, ADMINISTRATION, and MAINTENANCE. The main content area is titled "Data Management MTree" and includes buttons for "Create", "Delete", and "Manage Schedules" (highlighted with a red box). Below these is a "Filter by MTree Name:" input field. A table lists MTree entries with columns for selection, name, quota, and various performance metrics. The first row is selected. Below the table, it says "Items Selected: 1". At the bottom, there are tabs for "Summary", "Space Usage", and "Daily Written". The "Summary" tab is active, showing "Detailed Information" for the selected MTree: Full Path: /data/col1/avamar-1450355275 (with a "Rename" button), Status: RW (Read Write), and Pre-Comp Used: 11904012 MiB.




<input type="checkbox"/>	MTree Name ^	Quota Hard Limit	Last 24hr Pre-Comp	Last 24hr Post-Comp	Last 24hr Comp Ratio	Weekly Avg Post Comp	Last Week Comp
<input checked="" type="checkbox"/>	/data/col1/avamar...	Disabled	3000.0 GiB	0.9 GiB	3285.3x	1.4 GiB	7.2 GiB(400
<input type="checkbox"/>	/data/col1/avamar...	Disabled	820.0 GiB	0.0 GiB	29988.3x	3.7 GiB	18.4 GiB(40
<input type="checkbox"/>	/data/col1/backup	Disabled	0.0 GiB	0.0 GiB	0.0x	0.0 GiB	0.0 GiB(0.0
<input type="checkbox"/>	/data/col1/cifs1	Disabled	0.9 GiB	0.0 GiB	73.7x	0.0 GiB	0.0 GiB(400

# Physical capacity measurement


## Defying schedule to measure mtree occupancy

**Manage Schedules**

You can manage your physical capacity measurement schedules.

Name ◆	Status ▲	Priority ◆	Schedule ◆	MTree Assignments ◆
No schedules have been configured.				

 Close

# Physical capacity measurement

Defying schedule to measure mtree occupancy

**Create a New Schedule**

Name:

Status:

Priority:  Normal  Urgent

Every:

At:  :

MTree Assignments:

<input checked="" type="checkbox"/>	MTrees ^
<input checked="" type="checkbox"/>	/data/col1 /avamar-1450355275
<input checked="" type="checkbox"/>	/data/col1 /avamar-1451310290
<input checked="" type="checkbox"/>	/data/col1 /backup
<input checked="" type="checkbox"/>	/data/col1 /cifs1

Items 1-4 of 4

From GUI, you can measure only physical capacity of the whole mtree.

You can measure physical capacity for any

- mtree
- directory
- File




from command line  
See later slides

# Physical capacity measurement


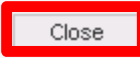
## Defying schedule to measure mtree occupancy

**Manage Schedules**

You can manage your physical capacity measurement schedules.

Name ◆	Status ▲	Priority ◆	Schedule ◆	MTree Assignments ◆
▶ MtreeAllPhysicalCapacity	Enabled	Normal	Every day at 2:00 PM	4

## EMC Data Domain System Manager

HOME

HEALTH

DATA MANAGEMENT

File System

MTree

Quota

Snapshots

REPLICATION

PROTOCOLS

HARDWARE

REPORTS

ADMINISTRATION

MAINTENANCE

## Data Management MTree

## MTree

More Ta

Filter by MTree Name:

<input type="checkbox"/>	MTree Name ▲	Quota Hard Limit ◆	Last 24hr Pre-Comp ◆	Last 24hr Post-Comp ◆	Last 24hr Comp Ratio ◆	Weekly Avg Post Comp ◆	Last Week Post-Comp ◆	Weekly Avg Comp Ratio ◆
<input type="checkbox"/>	/data/col1/avamar-1450355275	Disabled	3000.0 GiB	0.9 GiB	3285.3x	1.4 GiB	7.2 GiB(400.0%)	1626.8x
<input type="checkbox"/>	/data/col1/avamar-1451310290	Disabled	820.0 GiB	0.0 GiB	29988.3x	3.7 GiB	18.4 GiB(400.0%)	66.7x
<input type="checkbox"/>	/data/col1/backup	Disabled	0.0 GiB	0.0 GiB	0.0x	0.0 GiB	0.0 GiB(0.0%)	0.0x
<input checked="" type="checkbox"/>	/data/col1/cifs1	Disabled	0.9 GiB	0.0 GiB	73.7x	0.0 GiB	0.0 GiB(400.0%)	73.7x

Items Selected: 1

Items 1-4 of 4 

Summary

Space Usage

Daily Written

## Detailed Information

## Physical Capacity Measurements

Used (Post-Comp): N/A

Compression: N/A

Last Measurement Time: N/A

Schedules: 1

Submitted Measurements: 0

# Physical capacity measurement

Defying schedule to measure mtree occupancy

**Assign Schedules**

You can assign multiple physical capacity measurement schedules to this MTree.

<input checked="" type="checkbox"/>	Name ▲	Status ◆	Priority ◆	Schedule ◆	MTree Assignments ◆
<input checked="" type="checkbox"/>	▶ MtreeAllPhysicalCapacity	Enabled	Normal	Every day at 2:00 PM	4

?

Assign Cancel



Reporting  
physical capacity  
from **DDMCS**

*(Data Domain Management Center)*

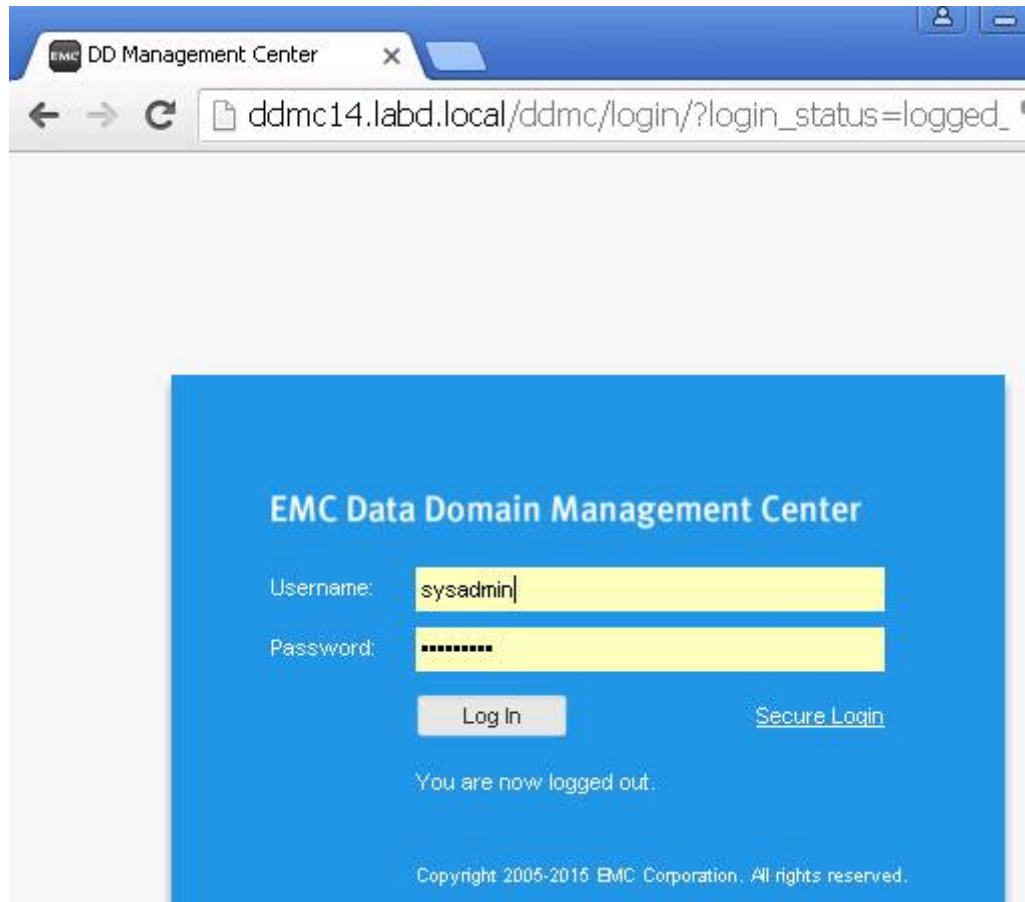
# Reporting physical capacity from DDMC

Login into DDMCS

FQDN or IP of your DDMC  
Data Domain Management Center



http://ddmc14.labd.local



# Reporting physical capacity from DDMC

## Utilization information

The screenshot displays the EMC Data Domain Management Center interface. The browser address bar shows the URL `ddmc14.labd.local/ddmc/#capacity-utilization`. The page title is "EMC Data Domain Management Center".

The main content area is titled "Capacity Utilization (2)" and includes a "System" tab highlighted with a red box. Below the title are links for "System Details", "Launch DD System Manager", and "Export CSV File".

A table displays the following data:

System	Space Usage (Post-Comp)				Pre-Comp Used	Compression Factor
	Total	Used	Available	Used %		
dd57a.labd.local	404.12 GiB	178.40 GiB	225.72 GiB	44.14%	25.63 TiB	147.14x
dd57b.labd.local	404.12 GiB	77.44 GiB	326.68 GiB	19.16%	22.71 TiB	300.25x
<b>Total:</b>	<b>808.24 GiB</b>	<b>255.84 GiB</b>	<b>552.40 GiB</b>	<b>31.65%</b>	<b>48.34 TiB</b>	<b>193.48 x</b>

Summary statistics for the last 24 hours:

- Compression factor: **147.14x**
- Cleanable: **1.57 KiB**
- Pre-comp written: **3.33 TiB**
- Post-comp written: **835.06 MiB**
- Compression factor: **4181.55x**

A line graph shows "Data (TiB)" on the left y-axis (0 to 30) and "Comp Factor (x)" on the right y-axis (0 to 300) over time from Dec 6 to Jan 3. The data shows a sharp increase in both metrics starting around Dec 27, peaking around Dec 29, and then gradually declining.

The left sidebar contains navigation menus for HOME, HEALTH, CAPACITY (with "Utilization" highlighted in a red box), REPLICATION, and REPORTS.

The footer shows "User: sysadmin Role: Administrator 01-03-2016".

# Reporting physical capacity from DDMC

## Utilization information

You have physical capacity measurement from all mtree and from Data Domains registered in DDMCS

Data Domain dd57b does not have turned on physical capacity measurement on any mtree

Capacity Utilization (6) System MTree

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree	System	Logical Capacity (Current Pre-Comp)					Physical Capacity (Last Measured Post-Comp)			
			Used	Quota	Quota	Quota	Quota Used %	Job State	Used	Compression	Snapshot Timestamp
	/data/col1/avamar-145035...	dd57a.labd.local	22.83 TiB	Disabled	N/A	N/A	N/A	Completed	66.21 GiB	326.60x	Sat Jan 02 23:00:02 GMT+100 2016
	/data/col1/avamar-145090...	dd57b.labd.local	22.71 TiB	Disabled	N/A	N/A	N/A	None	None	None	None
	/data/col1/avamar-145131...	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	N/A	Completed	31.27 GiB	91.79x	Sat Jan 02 23:00:02 GMT+100 2016
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 Bytes	0.00x	Sat Jan 02 23:00:02 GMT+100 2016
	/data/col1/backup	dd57b.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	None	None	None	None
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	Completed	58.43 MiB	85.64x	Sat Jan 02 23:00:02 GMT+100 2016

# Reporting physical capacity from DDMC

## Filtering by Data Domain system

The screenshot shows the EMC Data Domain Management Center interface. The browser address bar displays `ddmc14.labd.local/ddmc/#capacity-utilization`. The main header is "EMC Data Domain Management Center". On the left, a navigation sidebar includes "HOME" (Dashboard), "HEALTH" (Status, Alerts, Jobs), and "CAPACITY" (Utilization, Projected). The "Utilization" section is active, showing "Capacity Utilization (6)".

Below the header, there are action buttons: "System Details", "Launch DD System Manager", "Export CSV File", and "Physical Capacity Measurement". A filter menu is open on the right, with "Filter by system" highlighted in a red box. Other options include "Filter by group", "Filter by property", and "Filter by rule".

Type	MTree	System	Logical Capacity (Current Pre-Comp)					Physical Capacity (Last Measur)			
			Used	Quota	Quota	Quota	Quota Used %	Job State	Used	Compression	Snapshot Timestamp
📁	/data/col1/avamar-145035...	dd57a.labd.local	22.83 TiB	Disabled	N/A	N/A	N/A	🟢 Completed	66.21 GiB	326.60x	Sat Jan 02 23:00:02 GMT+100 201
📁	/data/col1/avamar-145090...	dd57b.labd.local	22.71 TiB	Disabled	N/A	N/A	N/A	None	None	None	None
📁	/data/col1/avamar-145131...	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	N/A	🟢 Completed	31.27 GiB	91.79x	Sat Jan 02 23:00:02 GMT+100 201
📁	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	🟢 Completed	0.00 Bytes	0.00x	Sat Jan 02 23:00:02 GMT+100 201
📁	/data/col1/backup	dd57b.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	None	None	None	None
📁	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	🟢 Completed	58.43 MiB	85.64x	Sat Jan 02 23:00:02 GMT+100 201

# Reporting physical capacity from DDMC

## Filtering by Data Domain system

Management Center

Capacity Utilization (4) System MTree

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree ▲	System	Logical Capacity (Current Pre-Comp)					Physical Capacity (Last Measured Post-Comp)			
			Used	Quota	Quota	Quota	Quota Used %	Job State	Used	Compression	Snapshot Timestamp
	/data/col1/avamar-145035...	dd57a.labd.local	22.95 TiB	Disabled	N/A	N/A	N/A	Completed	66.21 GiB	326.60x	Sat Jan 02 23:00:02 GMT+100 :
	/data/col1/avamar-145131 ...	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	N/A	Completed	31.27 GiB	91.79x	Sat Jan 02 23:00:02 GMT+100 :
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 Bytes	0.00x	Sat Jan 02 23:00:02 GMT+100 :
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	Completed	58.43 MiB	85.64x	Sat Jan 02 23:00:02 GMT+100 :

# Reporting physical capacity from DDMC

## Filtering by Data Domain system

Management Center

Capacity Utilization (4)

System MTree

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree	System	Logical Capacity (Current Pre-Comp)					Job State	Physical Capacity (Last Measured Post-Comp)		
			Used	Quota	Quota	Quota	Quota Used %		Used	Compression	Snapshot Timestamp
	/data/col1/avamar-145035...	dd57a.labd.local	22.95 TiB	Disabled	N/A	N/A	N/A	Completed	66.21 GiB	326.60x	Sat Jan 02 23:00:02 GMT+100 :
	/data/col1/avamar-145131 ...	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	N/A	Completed	31.27 GiB	91.79x	Sat Jan 02 23:00:02 GMT+100 :
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 Bytes	0.00x	Sat Jan 02 23:00:02 GMT+100 :
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	Complete	58.43 MiB	85.64x	Sat Jan 02 23:00:02 GMT+100 :

Management Center (DDMC)  
shows  
physical capacity occupancy  
for each mtree  
in nice tabular form

# Reporting physical capacity from DDMC

Choose columns to show

Capacity Utilization (4) System MTree

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree	System	Logical Capacity (Current Pre-Comp)					Physical Capacity (Last Measured Post-Comp)		
			Used	Quota	Quota Avail	Quota	Quota Us	Job State	Used	
	/data/col1/avamar-1450355275	dd57a.labd.local	23.56 TiB	Disabled	N/A	N/A	N/A	In-progress	...	<input checked="" type="checkbox"/> Type
	/data/col1/avamar-1451310290	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	N/A	Completed	31.27 GiB	<input checked="" type="checkbox"/> System
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 Bytes	<b>Logical Capacity (Current Pre-Comp)</b>
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	Completed	58.43 MiB	<input checked="" type="checkbox"/> Used
Tot			26.36 TiB	N/A	N/A	26.36	N/A			<input checked="" type="checkbox"/> Quota
										<input checked="" type="checkbox"/> Quota Available
										<input checked="" type="checkbox"/> Quota Used
										<input checked="" type="checkbox"/> Quota Used %

**dd57a.labd.local | /data/col1/avamar-1450355275**

Space Usage Charts

**Current**

Pre-comp used: **23.56 TiB**

**Space Usage** Data Written

Data Interval: 1h **1d** 1w Date Range: **1m** 3m 1y All

- Job State
- Used
- Compression
- Snapshot Timestamp



# Reporting physical capacity from DDMC

## Sorting information / filtering

Capacity Utilization (4) System

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree	System	Logical Capacity (Current Pre-Comp)					Job State	Physical Capacity (Last Measured Post-C		
			Used	Quota	Quota Avail	Quota	Quota Us		Used	Compression	Snapshc
	/data/col1/avamar-1450355275	dd57a.labd.local	23.56 TiB	Disabled	N/A	N/A	N/A	Completed	66.21 GiB	Sort Ascending	
	/data/col1/avamar-1451310290	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	N/A	Completed	31.27 GiB	Sort Descending	
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A			Filters	
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A		85.64x	Sat Jan 1	
Tot			26.36 TiB	N/A	N/A	26.36	N/A				

Red boxes highlight the 'Used' column header, the 'Sort Ascending' and 'Sort Descending' options, the 'Filters' button, and the filter input fields.

# Reporting physical capacity from DDMC

## What does it mean?

Data Domain keeps 22,95 TB source data (Pre-Comp) on the mtree.

It means that different sources sent to this mtree 22.95 TB data, that Data Domain can restore any time

To restore this 22,95 TB data, Data Domain needs only 66,21GB.

So Data Domain de-duplicated 22.95 TB that it received. After de-duplication, this 22.95TB occupies only 66,21GB on Data Domain.

If you divide 22.95TB by 66,21GB you achieve de-duplication ratio for this particular mtree (1:326.6)

Type	MTree	System	Logical Capacity (Current Pre-Comp)				Job State	Physical Capacity (Last Measured Post-Comp)		Snapshot Timestamp
			Used	Quota	Quota	Quota		Used	Compression	
	/data/col1/avamar-145035...	dd57a.labd.local	22.95 TiB	Disabled	N/A	N/A	Completed	66.21 GiB	326.60x	Sat Jan 02 23:00:02 GMT+1000
	/data/col1/avamar-145131...	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	Completed	31.27 GiB	91.79x	Sat Jan 02 23:00:02 GMT+1000
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	Completed	0.00 Bytes	0.00x	Sat Jan 02 23:00:02 GMT+1000
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	Completed	58.43 MiB	85.64x	Sat Jan 02 23:00:02 GMT+1000

# Comparing physical capacity occupation DD stored data vs mtree stored data

Capacity Utilization (4) System **MTree**

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree ▲	System	Logical Capacity (Current Pre-Comp)					Job State	Physical Capacity (Last Measured Post-Comp)		
			Used	Quota	Quota Avail	Quota	Quota Us		Used	Compression	Snapshot Timestamp
	/data/col1/avamar-1450355275	dd57a.labd.local	23.56 TiB	Disabled	N/A	N/A	N/A	Completed	66.21 GiB	326.60x	Sat Jan 02 23:00:02 GMT+100
	/data/col1/avamar-1451310290	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	N/A	Completed	31.27 GiB	91.79x	Sat Jan 02 23:00:02 GMT+100
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 Bytes	0.00x	Sat Jan 02 23:00:02 GMT+100
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	Completed	58.43 MiB	85.64x	Sat Jan 02 23:00:02 GMT+100

Capacity Utilization (1) **System** MTree

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File

System ▲	Space Usage (Post-Comp)				Pre-Comp Used	Compression Fact
	Total	Used	Available	Used %		
dd57a.labd.local	404.12 GiB	182.97 GiB	221.15 GiB	45.28%	26.37 TiB	147.57x

# Understanding physical capacity

# Understanding physical capacity

Login into DDMCS

FQDN or IP of your DDMC  
Data Domain Management Center



http://ddmc14.labd.local

A screenshot of a web browser window showing the login page for the EMC Data Domain Management Center. The browser's address bar displays 'ddmc14.labd.local/ddmc/login/?login\_status=logged\_'. The page has a blue background with the title 'EMC Data Domain Management Center'. Below the title, there are two input fields: 'Username:' with 'sysadmin' entered and 'Password:' with '\*\*\*\*\*' entered. There are two buttons: 'Log In' and 'Secure Login'. Below the buttons, it says 'You are now logged out.' and at the bottom, 'Copyright 2005-2015 EMC Corporation. All rights reserved.'

# Understanding physical capacity

DDMC – going into section with physical capacity

The screenshot shows the EMC Data Domain Management Center interface. The browser address bar displays `ddmc14.labd.local/ddmc/#capacity-utilization`. The page title is "EMC Data Domain Management Center". The left sidebar contains navigation options: HOME (Dashboard), HEALTH (Status, Alerts, Jobs), CAPACITY (Utilization, Projected), and a red box highlights the "Utilization" link. The main content area shows "Capacity Utilization (4)" with a "System" filter and an "MTree" filter highlighted with a red box. Below the filters are action buttons: System Details, Launch DD System Manager, Export CSV File, and Physical Capacity Measurement. A table displays capacity utilization data for four MTree entries.

Type	MTree	System	Logical Capacity (Current Pre-Comp)					Physical Capacity (Last Measured Post-Comp)		
			Used	Quota	Quota Avail	Quota U	Quota Used	Job State	Used	Compression
	/data/col1/avamar-1450355275	dd57a.labd.local	26.98 TiB	Disabled	N/A	N/A	N/A	Completed	78.08 GiB	329.79x
	/data/col1/avamar-1451310290	dd57a.labd.local	3.60 TiB	Disabled	N/A	N/A	N/A	Completed	33.36 GiB	110.60x
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 Bytes	0.00x
	/data/col1/cifs1	dd57a.labd.local	6.61 GiB	Disabled	N/A	N/A	N/A	Completed	242.41 MiB	27.93x

# Understanding physical capacity

## Data stored on whole DD vs mtree stored data

Capacity Utilization (4)

System **MTree**

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree	System	Logical Capacity (Current Pre-Comp)					Physical Capacity (Last Measured Post-Comp)			
			Used	Quota	Quota Avail	Quota	Quota Us	Job State	Used	Compression	Snapshot Timestamp
	/data/col1/avamar-1450355275	dd57a.labd.local	23.56 TiB	Disabled	N/A	N/A	N/A	Completed	66.21 GiB	326.60x	Sat Jan 02 23:00:02 GMT+10
	/data/col1/avamar-1451310290	dd57a.labd.local	2.80 TiB	Disabled	N/A	N/A	N/A	Completed	31.27 GiB	91.79x	Sat Jan 02 23:00:02 GMT+10
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 Bytes	0.00x	Sat Jan 02 23:00:02 GMT+10
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	Completed	58.43 MiB	85.64x	Sat Jan 02 23:00:02 GMT+10

Capacity Utilization (1)

**System** MTree

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File

System	Space Usage (Post-Comp)				Pre-Comp Used	Compression Fact
	Total	Used	Available	Used %		
dd57a.labd.local	404.12 GiB	182.97 GiB	221.15 GiB	45.28%	26.37 TiB	147.57x

# Understanding physical capacity

Data stored on whole DD vs mtree stored data

Summary of all mtree occupation (data kept by DD on each mtree) is 91.47 GB (66.21 + 31.27 + 0.05843).

This is less than all data sitting on Data Domain, which is 182,97GB.

How is it possible?

		Physical Capacity (Last Measured Post-Comp)		
Job State	Used	Compression	Snapshot Timestamp	
Completed	66.21 GiB	326.60x	Sat Jan 02 23:00:02 GMT+100	
Completed	31.27 GiB	91.79x	Sat Jan 02 23:00:02 GMT+100	
Completed	0.00 Bytes	0.00x	Sat Jan 02 23:00:02 GMT+100	
Completed	58.43 MiB	85.64x	Sat Jan 02 23:00:02 GMT+100	

System	Space Usage (Post-Comp)				Pre-Comp Used	Compression Fact
	Total	Used	Available	Used %		
dd57a.labd.local	404.12 GiB	182.97 GiB	221.15 GiB	45.28%	26.37 TiB	147.57x



# Understanding physical capacity

Data stored on whole DD vs mtree stored data

The issue is cleaning.

Here you see all data on Data Domain. So you can see here

- Backups, copies, archive, production data
- But also data who are no longer valid (for example deleted by backup application), but take place on Data Domain and will be cleaned during next garbage collection.

So, production data is less than you can see here.

See next page that will prove,

Next slide shows garbage collection that will increase available data and - by logical consequence - decrease used data.

System ▲	Space Usage (Post-Comp)				Pre-Comp Used	Compression Fact
	Total	Used	Available	Used %		
dd57a.labd.local	404.12 GiB	182.97 GiB	221.15 GiB	45.28%	26.37 TiB	147.57x

# Understanding physical capacity

## Cleaning can save lots of space!!!

```
sysadmin@dd57a# filesystem clean start
Cleaning started. Use 'filesystem clean watch' to monitor progress.
sysadmin@dd57a# filesystem clean watch
Beginning 'filesystem clean' monitoring. Use Control-C to stop monitoring.

Cleaning: phase 1 of 12 (pre-merge)
100.0% complete, 222 GiB free; time: phase 0:00:39, total 0:00:39

Cleaning: phase 2 of 12 (pre-analysis)
100.0% complete, 222 GiB free; time: phase 0:00:28, total 0:01:07

Cleaning: phase 3 of 12 (pre-enumeration)
100.0% complete, 222 GiB free; time: phase 0:01:10, total 0:02:18

Cleaning: phase 4 of 12 (pre-filter)
100.0% complete, 222 GiB free; time: phase 0:00:28, total 0:02:46

Cleaning: phase 5 of 12 (pre-select)
100.0% complete, 222 GiB free; time: phase 0:02:28, total 0:05:15

Cleaning: phase 6 of 12 (merge)
100.0% complete, 222 GiB free; time: phase 0:00:02, total 0:05:17

Cleaning: phase 8 of 12 (candidate)
100.0% complete, 222 GiB free; time: phase 0:00:00, total 0:05:19

Cleaning: phase 9 of 12 (enumeration)
100.0% complete, 222 GiB free; time: phase 0:00:00, total 0:05:21

Cleaning: phase 10 of 12 (filter)
100.0% complete, 222 GiB free; time: phase 0:00:01, total 0:05:24

Cleaning: phase 11 of 12 (copy)
100.0% complete, 356 GiB free; time: phase 0:05:12, total 0:10:37

Cleaning: phase 12 of 12 (summary)
100.0% complete, 356 GiB free; time: phase 0:00:50, total 0:11:28
sysadmin@dd57a#
```

Cleaning process increased available space on Data Domain by 134GB

- From 222GB free space
- To 356GB free space

Data Domain during garbage collection removes almost all no longer valid data, but this is usually not removing 100% of expired data.

# Understanding physical capacity

Data stored on whole DD vs mtree stored data

After  
garbage collection  
process

# Understanding physical capacity

## Starting ad hoc data measuring (after cleaning)

After cleaning has finished, we start physical capacity measurement to have exact data after de-duplication for each mtree

The screenshot shows the EMC Data Domain Management Center interface. The left sidebar has 'Utilization' highlighted under the 'CAPACITY' section. The main content area shows a table of Capacity Utilization for system 'dd57a.labd.local'. The table has columns for Type, MTree, System, Used, Physical Capacity (Last Measured), and Job State. A context menu is open over the first row, with 'Physical Capacity Measurement' and 'Measure Now' highlighted. The 'Measure Now' button is also highlighted in a red box.

Type	MTree	System	Used	Physical Capacity (Last Measured)	Job State
/data/col1/avamar-1450355275	dd57a.labd.local	23.5	73.15 GiB	Completed	
/data/col1/avamar-1451310290	dd57a.labd.local	3.20	32.32 GiB	Completed	
/data/col1/backup	dd57a.labd.local	0.00 Bytes	0.00 Bytes	Completed	
/data/col1/cifs1	dd57a.labd.local	4.89 GiB	58.43 MiB	Completed	

Measure Now

Job submitted successfully

The measurement job has been queued for execution.

Close

# Understanding physical capacity

Waiting for job measuring physical capacity to finish

Job that measures physical capacity is in progress

Capacity Utilization (4)

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree ▲	System	Logical Capacity (Current Pre-Comp)					Physical Capacity (Last Me	
			Used	Quota	Quota Availab	Quota	Quota Used	Job St	Used
	/data/col1/avamar-1450355275	dd57a.labd.local	23.56 TiB	Disabled	N/A	N/A	N/A	In-progress	...
	/data/col1/avamar-1451310290	dd57a.labd.local	3.20 TiB	Disabled	N/A	N/A	N/A	Completed	32.32 GiB
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 Bytes
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	Completed	58.43 MiB

# Understanding physical capacity

## Data stored on whole DD vs mtree stored data

After

- cleaning is finished
- performing another measuring capacity

you can compare

- sum of physical capacity of all mtrees

vs

- total Data Domain capacity utilization

Capacity Utilization (4) System **MTre**

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File Physical Capacity Measurement

Type	MTree	System	Logical Capacity (Current Pre-Comp)					Job State	Physical Capacity (Last Measured Post-Comp)		
			Used	Quota	Quota A	Quota	Quota Us		Used	Compression	Snapshot Timestamp
	/data/col1/avamar-1450...	dd57a.labd.local	23.56 TiB	Disabled	N/A	N/A	N/A	Completed	73.15 GiB	329.79x	Sun Jan 03 23:00:02 GMT+100 2016
	/data/col1/avamar-1451...	dd57a.labd.local	3.20 TiB	Disabled	N/A	N/A	N/A	Completed	32.32 GiB	101.50x	Sun Jan 03 23:00:01 GMT+100 2016
	/data/col1/backup	dd57a.labd.local	0.00 Bytes	Disabled	N/A	N/A	N/A	Completed	0.00 By...	0.00x	Sun Jan 03 23:00:02 GMT+100 2016
	/data/col1/cifs1	dd57a.labd.local	4.89 GiB	Disabled	N/A	N/A	N/A	Completed	58.43 MiB	85.64x	Sun Jan 03 23:00:02 GMT+100 2016

Totally: 105.52 GiB

Capacity Utilization (1) System

Filtered by dd57a.labd.local

System Details Launch DD System Manager Export CSV File

System	Space Usage (Post-Comp)				Pre-Comp Used	Compression Factor
	Total	Used	Available	Used %		
dd57a.labd.local	404.12 GiB	31.09 GiB	373.03 GiB	7.69%	26.77 TiB	881.59x

Sum of de-duplicated data per mtree is bigger than all data stored on Data Domain.

Data Domain has global de-duplication. Also between mtrees. Anyhow here, in physical capacity measurement, the same block, that is shared between mtrees, it is calculated several times. Physical capacity measurement is separate calculation for each mtree. So if the single block belongs to many mtrees, it is calculated here many times (for every mtree that the block belongs to) even though this is single block on Data Domain system.

So, in this sum, the single block that belongs to 3 mtrees is calculated 3 times (though it occupies space on Data Domain just once).

But here (for whole Data domain is calculated just once

		Physical Capacity	
Job State	Used	Compression	
Completed	73.15 GiB	329.79x	
Completed	32.32 GiB	101.50x	
Completed	0.00 By...	0.00x	
Completed	58.43 MiB	85.64x	
Totally			105.52 GiB

System	Space Usage (Post-Comp)			
	Total	Used	Available	Used %
dd57a.labd.local	404.12 GiB	31.09 GiB	373.03 GiB	7.69%

Here you have information about whole occupation of data at Data Domain, so each block is calculated just once. Thus, this value is smaller than this one.

Anyhow, this value includes both data that can be restored, and also data that has expired and not cleaned yet! So real data is even smaller!!!

Reporting  
physical capacity  
measurements  
from CLI



# Physical capacity measurement

## Showing all measurements

The below command shows for each mtree how the physical capacity has changed historically (shows all measurements)

compression physical-capacity-measurement sample show history

```
sysadmin@dd57a# compression physical-capacity-measurement sample show history
```

```
MTree: /data/col1/avamar-1450355275
```

Measurement Time	Logical Used (Pre-Comp) (GiB)	Physical Used (Post-Comp) (GiB)	Global-Comp Factor	Local-Comp Factor	Total-Comp Factor (Reduction %)
2015/12/30 14:00:02	12625.0	40.9	117.93x	2.62x	308.63x (99.68%)
2015/12/31 14:00:01	15625.0	49.3	121.14x	2.62x	317.14x (99.68%)
2016/01/01 14:00:02	18625.0	57.7	123.03x	2.62x	322.59x (99.69%)
2016/01/02 14:00:02	21625.0	66.2	124.32x	2.63x	326.60x (99.69%)
2016/01/03 09:52:01	24125.0	73.2	125.44x	2.63x	329.79x (99.70%)
2016/01/03 14:00:02	24125.0	73.2	125.44x	2.63x	329.79x (99.70%)

```
MTree: /data/col1/avamar-1451310290
```

Measurement Time	Logical Used (Pre-Comp) (GiB)	Physical Used (Post-Comp) (GiB)	Global-Comp Factor	Local-Comp Factor	Total-Comp Factor (Reduction %)
2015/12/30 14:00:02	1640.0	28.1	43.51x	1.34x	58.30x (98.28%)
2015/12/31 14:00:02	2050.0	29.2	52.43x	1.34x	70.25x (98.58%)
2016/01/01 14:00:02	2460.0	30.2	60.74x	1.34x	81.39x (98.77%)
2016/01/02 14:00:02	2870.0	31.3	68.50x	1.34x	91.79x (98.91%)
2016/01/03 14:00:01	3280.0	32.3	75.74x	1.34x	101.50x (99.01%)

Ph  
e  
The best  
changed historical  
compression physical capacity

From command line you can  
see results of all historical  
„physical capacity  
measurements“ for any mtree

From GUI  
(Data Domain or Management Center)  
you see just last physical  
capacity measurements for  
each mtree

# Physical capacity measurement

## Showing all measurements

The below command shows for mtree  
/data/col1/cifs1

how the physical capacity has changed historically (shows all results of  
„physical capacity measurements“)

compression physical-capacity-measurement sample show history  
mtrees /data/col1/cifs1

```
sysadmin@dd57a# compression physical-capacity-measurement sample show history mtrees /data/col1/cifs1
```

```
MTree: /data/col1/cifs1
```

Measurement Time	Logical Used (Pre-Comp) (GiB)	Physical Used (Post-Comp) (GiB)	Global-Comp Factor	Local-Comp Factor	Total-Comp Factor (Reduction %)
2015/12/30 06:54:04	2.1	0.0	52.32x	1.01x	52.64x (98.10%)
2015/12/30 14:00:02	2.1	0.0	52.32x	1.01x	52.64x (98.10%)
2015/12/30 21:49:17	2.1	0.0	52.32x	1.01x	52.64x (98.10%)
2015/12/31 14:00:02	4.9	0.1	85.13x	1.01x	85.64x (98.83%)
2016/01/01 14:00:02	4.9	0.1	85.13x	1.01x	85.64x (98.83%)
2016/01/02 14:00:02	4.9	0.1	85.13x	1.01x	85.64x (98.83%)
2016/01/03 14:00:02	4.9	0.1	85.13x	1.01x	85.64x (98.83%)

```
Total number of measurements retrieved = 7.
```

```
sysadmin@dd57a# █
```

# Physical capacity measurement

Showing all measurements **detailed**

The below command shows for each mtree all historical physical capacity measurements **in detailed form**

compression physical-capacity-measurement sample show detailed-history

Here are additional columns comparing to non detailed version



```
sysadmin@dd57a# compression physical-capacity-measurement sample show detailed-history
```

```
MTree: /data/col1/avamar-1450355275
```

Measurement Time	Logical Used (Pre-Comp) (GiB)	Physical Used (Post-Comp) (GiB)	Global-Comp Factor	Local-Comp Factor	Total-Comp Factor (Reduction %)
2015/12/30 14:00:02	12625.0	40.9	117.93x	2.62x	308.63x (99.68%)
2015/12/31 14:00:01	15625.0	49.3	121.14x	2.62x	317.14x (99.68%)
2016/01/01 14:00:02	18625.0	57.7	123.03x	2.62x	322.59x (99.69%)
2016/01/02 14:00:02	21625.0	66.2	124.32x	2.63x	326.60x (99.69%)
2016/01/03 09:52:01	24125.0	73.2	125.44x	2.63x	329.79x (99.70%)
2016/01/03 14:00:02	24125.0	73.2	125.44x	2.63x	329.79x (99.70%)

Task ID	Task Start Time	Task End Time
8589934593	2015/12/30 14:02:38	2015/12/30 14:09:20
21474836481	2015/12/31 14:04:24	2015/12/31 14:06:02
25769803777	2016/01/01 14:01:36	2016/01/01 14:03:43
30064771073	2016/01/02 14:03:44	2016/01/02 14:05:57
34359738369	2016/01/03 09:55:59	2016/01/03 09:57:20
38654705665	2016/01/03 14:05:06	2016/01/03 14:06:12

```
MTree: /data/col1/avamar-1451310290
```

Measurement Time	Logical Used (Pre-Comp) (GiB)	Physical Used (Post-Comp) (GiB)	Global-Comp Factor	Local-Comp Factor	Total-Comp Factor (Reduction %)
2015/12/30 14:00:02	1640.0	28.1	43.51x	1.34x	58.30x (98.28%)
2015/12/31 14:00:02	2050.0	29.2	52.43x	1.34x	70.25x (98.58%)
2016/01/01 14:00:02	2460.0	30.2	60.74x	1.34x	81.39x (98.77%)
2016/01/02 14:00:02	2870.0	31.3	68.50x	1.34x	91.79x (98.91%)
2016/01/03 14:00:01	3280.0	32.3	75.74x	1.34x	101.50x (99.01%)

Task ID	Task Start Time	Task End Time
8589934594	2015/12/30 14:02:38	2015/12/30 14:03:42
21474836482	2015/12/31 14:04:25	2015/12/31 14:06:35
25769803778	2016/01/01 14:01:36	2016/01/01 14:02:10
30064771074	2016/01/02 14:03:44	2016/01/02 14:04:19
38654705666	2016/01/03 14:05:05	2016/01/03 14:06:10

# Physical capacity measurement


Showing all measurements **detailed**

The below command shows for each mtree all historical physical capacity measurements **in detailed form** for just one mtree:

`/data/col1/cifs1`

compression physical-capacity-measurement sample show detailed-history mtree `/data/col1/cifs1`

Here are additional columns comparing to non detailed version



```
sysadmin@dd57a# compression physical-capacity-measurement sample show detailed-history mtree /data/col1/cifs1
```

Measurement Time	Logical Used (Pre-Comp) (GiB)	Physical Used (Post-Comp) (GiB)	Global-Comp Factor	Local-Comp Factor	Total-Comp Factor (Reduction %)	Task ID	Task Start Time	Task End Time
2015/12/30 06:54:04	2.1	0.0	52.32x	1.01x	52.64x (98.10%)	4294967297	2015/12/30 06:57:36	2015/12/30 06:57:37
2015/12/30 14:00:02	2.1	0.0	52.32x	1.01x	52.64x (98.10%)	8589934596	2015/12/30 14:02:38	2015/12/30 14:09:20
2015/12/30 21:49:17	2.1	0.0	52.32x	1.01x	52.64x (98.10%)	12884901889	2015/12/30 21:49:21	2015/12/30 21:49:22
2015/12/31 14:00:02	4.9	0.1	85.13x	1.01x	85.64x (98.83%)	21474836484	2015/12/31 14:04:25	2015/12/31 14:06:36
2016/01/01 14:00:02	4.9	0.1	85.13x	1.01x	85.64x (98.83%)	25769803780	2016/01/01 14:01:35	2016/01/01 14:03:43
2016/01/02 14:00:02	4.9	0.1	85.13x	1.01x	85.64x (98.83%)	30064771076	2016/01/02 14:03:44	2016/01/02 14:05:58
2016/01/03 14:00:02	4.9	0.1	85.13x	1.01x	85.64x (98.83%)	38654705668	2016/01/03 14:05:06	2016/01/03 14:06:13

Total number of measurements retrieved = 7.

```
sysadmin@dd57a# █
```

Measuring  
physical capacity  
for directories / files  
from CLI

# Physical capacity measurement

Defining path for which we want to measure physical capacity

We create measurement definition (path) called

ps1

that measures physical capacity in directory

/data/col1/cifs1/backup5/files

(part of mtree /data/col1/cifs1/)

compression physical-capacity-measurement pathset create ps1 paths  
/data/col1/cifs1/backup5/files

```
sysadmin@dd57a#  
sysadmin@dd57a# compression physical-capacity-measurement pathset create ps1 paths /data/col1/cifs1/backup5/files  
Pathset "ps1" created.  
sysadmin@dd57a#
```

Ph

Command line allows you to measure  
physical capacity for  
**any directory or even file**  
on Data Domain

You can not achieve it from GUI  
(Data Domain or Management Center)

From GUI you see measure only  
physical capacity of the whole mtree



# Physical capacity measurement

Checking path for which we want to measure physical capacity

Checking that our measurement pathset was setup correctly

compression physical-capacity-measurement pathset show list

```
sysadmin@dd57a# compression physical-capacity-measurement pathset show list
Pathset    Number of paths    Measurement-retention (days)
-----
ps1        1                   180
-----
1 pathset(s) found.
```

compression physical-capacity-measurement pathset show detailed all

```
sysadmin@dd57a#
sysadmin@dd57a# compression physical-capacity-measurement pathset show detailed all
Pathset: ps1
  Number of paths: 1
  Measurement-retention: 180 day(s)
  Paths:
    /data/coll/cifs1/backup5/files
sysadmin@dd57a#
```

# Physical capacity measurement

Starting physical capacity measurement for our pathset

We start our measurement for directory:

/data/col1/cifs1/backup5/files

which is pathset

ps1

compression physical-capacity-measurement sample start pathset ps1

```
sysadmin@dd57a# compression physical-capacity-measurement sample start pathset ps1
```

```
Measurement task(s) submitted and will begin as soon as resources are available.
```

```
sysadmin@dd57a#
```

# Physical capacity measurement

Checking status of our physical capacity measurement

We need to wait until measurement is finished  
or  
which means that our measurement task is no longer on the current tasks

compression physical-capacity-measurement sample show current all

```
sysadmin@dd57a# compression physical-capacity-measurement sample show current all
```

Task ID	Type	Name	User	State	Creation Time	Measurement Time (Submitted Time)	Start Time	Priority	Percent Done
51539607553	PS	ps1	sysadmin	Scheduled	2016/01/04 13:30:09	2016/01/04 13:30:09	--	Normal	0

```
sysadmin@dd57a# █
```

```
sysadmin@dd57a# compression physical-capacity-measurement sample show current all
```

No measurement tasks found.

```
sysadmin@dd57a# █
```

# Physical capacity measurement

## Checking status of our physical capacity measurement

Now you can see how much data Data Domainis keeps to restore all data in directory:

`/data/col1/cifs1/backup5/files`

You can see all historical measurements of physical occupancy of above directory

compression physical-capacity-measurement sample show history pathset `ps1`

```
sysadmin@dd57a#  
sysadmin@dd57a# compression physical-capacity-measurement sample show history pathset ps1  
  
Pathset: ps1  
Measurement Time      Logical Used          Physical Used         Global-Comp          Local-Comp          Total-Comp  
                      (Pre-Comp)           (Post-Comp)          Factor               Factor              Factor  
                      (GiB)                (GiB)                (Reduction %)  
-----  
2016/01/04 13:42:56   1.5                   0.0                   70.33x              1.01x              70.75x (98.59%)  
2016/01/04 13:54:46   1.7                   0.2                   8.59x               1.06x              9.13x (89.05%)  
-----  
  
Total number of measurements retrieved = 2.  
sysadmin@dd57a# █
```

# Physical capacity measurement

Checking status of our physical capacity measurement

```
sysadmin@dd57a#  
sysadmin@dd57a# compression physical-capacity-measurement sample show history pathset ps1  
  
Pathset: ps1  
Measurement Time      Logical Used      Physical Used     Global-Comp      Local-Comp      Total-Comp  
                      (Pre-Comp)      (Post-Comp)      Factor           Factor          Factor  
                      (GiB)           (GiB)              
-----  
2016/01/04 13:42:56   1.5              0.0              70.33x          1.01x          70.75x (98.59%)  
2016/01/04 13:54:46   1.7              0.2              8.59x           1.06x          9.13x (89.05%)  
-----  
  
Total number of measurements retrieved = 2.  
sysadmin@dd57a# █
```

1.7 GB data that we can use in directory  
/data/col1/cifs1/backup5/files  
occupies after de-duplication just only 0.2 GB on Data Domain.

This give de-duplication factor:  
1:9.13

# Questions...

The screenshot displays the EMC Data Domain management interface. At the top, the logo 'EMC<sup>2</sup> DATA DOMAIN' is visible. Below it, system information includes 'OS: 5.5.1.4-464376' and 'Model: DD2500'. The main navigation bar has tabs for 'Status', 'Data Management', 'Replication', 'Hardware', and 'System S...'. Under 'Status', there are sub-tabs for 'Summary', 'Alerts', 'Active Users', and 'Stats'. The 'Alerts' section is expanded, showing a table of alerts:

Count	Type	Most recent Alerts
3	Hardware	SCSI Target FibreChannel Port 1b is offline.
0	Replication	No Alerts
0	File System	No Alerts
1	Others	Error communicating with mail server.

Below the alerts, there are three panels: 'File System' (Status: Running, with a value of 1988.7x), 'Services' (Replication and VTL), and 'Hardware' (Enclosures: 2).

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