Technical Report

Easily Create Flexible, Custom Chargeback or Showback Reports for Storage and Resource Usage Using OnCommand™ Insight

Dave Collins, NetApp Technical Marketing Engineer
July 2012
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>COST AWARENESS AND CHARGEBACK (OR SHOWBACK)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>TERMINOLOGY</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>WHAT ARE ACCOUNTABILITY, COST AWARENESS, SHOWBACK AND CHARGEBACK?</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>WHAT CAN I CHARGEBACK?</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>CHARGEBACK AND CLOUD/SERVICE PROVIDERS</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>CHARGEBACK MODELS</strong></td>
<td>7</td>
</tr>
<tr>
<td><strong>SIMPLE CHARGEBACK MODEL</strong></td>
<td>7</td>
</tr>
<tr>
<td><strong>LOADED CHARGEBACK MODEL (FULLY BURDENED)</strong></td>
<td>7</td>
</tr>
<tr>
<td><strong>WHAT’S THE PROCESS?</strong></td>
<td>7</td>
</tr>
<tr>
<td><strong>ALIGNING COSTS WITH USAGE LEVELS</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>CHARGEBACK USING ONCOMMAND INSIGHT</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>ADDING ANNOTATIONS FOR APPLICATIONS AND BUSINESS ENTITIES</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>IMPORTING ANNOTATIONS FOR APPLICATIONS, BUSINESS ENTITIES, AND DATA CENTER</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>MAINTAINING AND APPLYING ANNOTATIONS FOR APPLICATIONS AND BUSINESS ENTITY RESIDING ON SERVERS AND VMS</strong></td>
<td>11</td>
</tr>
<tr>
<td><strong>ACCOUNTABILITY AND CHARGEBACK REPORTING</strong></td>
<td>12</td>
</tr>
<tr>
<td><strong>STANDARD REPORTS: COST ACCOUNTING BY TIERS, APPLICATION AND BUSINESS UNIT/CUSTOMER</strong></td>
<td>12</td>
</tr>
<tr>
<td><strong>AUTOMATED CHARGEBACK REPORTING</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>CUSTOM REPORTING USING BUSINESS INSIGHT ADVANCED</strong></td>
<td>16</td>
</tr>
<tr>
<td><strong>CREATE NEW REPORT USING REPORT STUDIO</strong></td>
<td>18</td>
</tr>
<tr>
<td><strong>TO CREATE A NEW REPORT USING REPORT STUDIO, PERFORM THE FOLLOWING</strong></td>
<td>18</td>
</tr>
<tr>
<td><strong>SELECT REPORT STUDIO</strong></td>
<td>18</td>
</tr>
<tr>
<td><strong>SELECT CAPACITY FOLDER</strong></td>
<td>19</td>
</tr>
<tr>
<td><strong>SELECT CREATE A NEW REPORT OR TEMPLATE</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>SELECT REPORT TEMPLATE</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>CUSTOM REPORTING USING OPEN SCHEMA DATABASE</strong></td>
<td>21</td>
</tr>
<tr>
<td><strong>SUMMARY</strong></td>
<td>22</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

Not all IT organizations want to or can do chargebacks. It can be a difficult thing to implement depending on the organization hierarchy, budgets, politics and other factors. However, most companies need to at least understand and have a mechanism to generate cost accounting and cost awareness around how much storage and VM resources are being used by each application and business unit. More so, Cloud or Service Providers need a mechanism to gather usage information from applications associated with their external multi-tenant customers and generate chargeback reports around this usage or feed this storage and VM usage information to other billing systems.

To provide more automated, accurate and timely cost awareness and chargeback reporting you need tools such as OnCommand Insight (formerly SANscreen®). OnCommand Insight automates and standardizes the collection, calculation, and accurate reporting of costs associated with the usage of storage, VMs and infrastructure which enables IT to report accountability and provide showback or chargeback their internal consumer/owner, or in the case of Service and Cloud Providers, charge their individual multi-tenant external customers for their usage by application, tenant, line of business (LOB), business unit and project.

In this article, we’ll provide you a very high level overview of what Chargeback is, how it’s defined and configured and how OnCommand Insight helps you create robust chargeback reporting. You can view this short 11 minute video showing you how to easily create a robust “drag and drop” Chargeback/showback report without knowing SQL using OnCommand Insight. You can also reference this full report to find complete details on how to approach chargeback and showback methodologies by downloading the Chargeback/Showback Technical Report.

In this report, we’ll provide detailed methodology and technical examples on how OnCommand Insight standardizes, collects, dissects and reports on the costs of storage, infrastructure and Virtual Machine usage by application, tenant, LOB, business unit, project, tiers and datacenters from your heterogeneous environments including NetApp, EMC, IBM, HP, HDS, Cisco, Brocade, VMware, HyperV and others. We’ll also discuss how this information is rolled up and reported by business entities/consumers, internal and external multi-tenant customers. Additionally, there are embedded links to videos showing you how to easily create custom drag and drop reports using OnCommand Insight Data Warehouse tools.

2 COST AWARENESS AND CHARGEBACK (OR SHOWBACK)

2.1 TERMINOLOGY

The target audience of this document are IT management, Cx level, business managers, administrators from of internal IT, external Service Providers and Cloud Providers. Because the focus and logistics are slightly different between the two, the terminology needs to be clarified. I will use industry standard and OnCommand Insight terminology and define it here.

- Application – customer application that uses storage, infrastructure and server or virtual servers
- Business entity (BE) – consumer and owner of the data consuming resources.
  - For Internal IT, it can include internal departments, codes, business units, missions, etc.
  - For Cloud and Service Providers, it can include customers and their tenant, LOB, business units, projects and other consumers within their customers
  - For USPS, it can include missions, divisions, units and other consumers within public sector
  - Also can include secure multi-tenancy environment structures
- Consumer – usually owner of the data. Can be any of the BE definitions.

OnCommand Insight supports 4 levels of business entity reporting including

- Tenant
- Line of Business (LOB)
- Business Unit (BU)
• Project
• Add Applications to any of these levels to further dissect the resource usage by application and owner/consumer.

• Customer – intended to mean “External Customer” of Service and Cloud Providers
In this document, I will use business entities, consumers and customer interchangeably.

• Tier – specific quality of storage. Tiers (discussed below) can include tiers the way the customer defines them at multiple levels.

• Datacenter – grouping of IT infrastructure. Can be physical location at floor, building, room level or can be virtual across region or larger. In the case of Service and Cloud Providers, datacenter can be at the customer resource infrastructure level even if within a physically larger IT environment.

• VM – Virtual Machine or Server – OnCommand Insight supports VMware and Hyper-V environments

• Service or Cloud Provider – companies that provide IT services to external customers

• SMT – Secure Multi-Tenancy reporting – The customer can securely access their own data and they cannot see any other customer's information

• Storage Service Levels – although we won’t discuss much about storage service levels here, you can also establish and report on costs associated with Service levels. This is discussed in other documents.

2.2 WHAT ARE ACCOUNTABILITY, COST AWARENESS, SHOWBACK AND CHARGEBACK?

Simply put, accountability, cost awareness, showback and chargeback are methods of defining and computing which applications are using resources and how much it cost for the resources used by each application owned by each customer/business entity (consumer).

Figure 2.2
Showback and chargeback provides you with a mechanism to collect process and pass the cost onto the application owner or business entity.

This can help your customers understand the costs of the resources their applications are consuming. This enables you and the application owner to make business level decisions on how storage and other
resources should be allocated based on how much capacity their applications are using and the cost per application compared to how much margin the application is making. In other words, is it cost effective?

Even if you don’t do chargeback or showback, accountability and cost awareness can be used for budgetary reasons to justify your IT budget and requests for new purchases.

2.3 WHAT CAN I CHARGEBACK?

Depending on the environment and customer needs, cost awareness and chargeback can include several types of costs such as those related to storage, infrastructure, servers, databases, VMs, and even “overhead costs” (helpdesk, support staff, heat, lights, and space) and other resources used to support business applications. We’ll limit our discussion to storage, infrastructure, some VM usage metrics and some loading. But realize that the other costs I mentioned can be rolled into standard cost per GB, cost per application, host or cost per resource to provide a fully loaded cost charge. We’ll discuss some examples of this later in the paper.

### Multi-Tenancy Monthly Chargeback Report Summary

Charge by Application by Tenant, LOB, BU and Tier.

<table>
<thead>
<tr>
<th>Tenant</th>
<th>Line of Business</th>
<th>Business Unit</th>
<th>Application</th>
<th>Tier</th>
<th>Provisioned Capacity GB</th>
<th>Used Capacity GB</th>
<th>Monthly Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Inc</td>
<td>Air Lines</td>
<td>Bus App</td>
<td>Onur. App 1</td>
<td>Silver</td>
<td>487.05</td>
<td>487.05</td>
<td>$34,093.77</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bus App</td>
<td></td>
<td></td>
<td>487.05</td>
<td>487.05</td>
<td>$34,093.77</td>
</tr>
<tr>
<td></td>
<td>Air Lines</td>
<td>ERP</td>
<td>Active</td>
<td>Gold-Fast</td>
<td>8,850.20</td>
<td>8,850.20</td>
<td>$1,770,039.84</td>
</tr>
<tr>
<td></td>
<td>Travel Agency</td>
<td>ERP</td>
<td>Active</td>
<td>Gold-Fast</td>
<td>8,850.20</td>
<td>8,850.20</td>
<td>$1,770,039.84</td>
</tr>
<tr>
<td></td>
<td>Infra</td>
<td>TIBCO</td>
<td>Gold</td>
<td></td>
<td>372,368.00</td>
<td>389,498.02</td>
<td>$37,235,800.00</td>
</tr>
<tr>
<td></td>
<td>Infra</td>
<td>TIBCO</td>
<td>Gold-Fast</td>
<td></td>
<td>49,922.00</td>
<td>27,988.57</td>
<td>$11,984,400.00</td>
</tr>
<tr>
<td></td>
<td>Infra</td>
<td>TIBCO</td>
<td>Silver</td>
<td></td>
<td>129,150.00</td>
<td>92,787.83</td>
<td>$5,602,600.00</td>
</tr>
<tr>
<td></td>
<td>Travel Agency</td>
<td>Infra</td>
<td></td>
<td></td>
<td>571,460.00</td>
<td>310,184.47</td>
<td>$60,262,800.00</td>
</tr>
<tr>
<td></td>
<td>Travel Agency</td>
<td>Blue Inc</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>580,310.20</td>
<td>319,034.57</td>
<td>$62,032,839.84</td>
</tr>
<tr>
<td>Green Corp</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>Admin host</td>
<td>Silver</td>
<td>52.00</td>
<td>2.00</td>
<td>$3,640.14</td>
</tr>
<tr>
<td>Green Corp</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>Enterprise Vault</td>
<td>Silver</td>
<td>366.04</td>
<td>386.04</td>
<td>$27,022.53</td>
</tr>
<tr>
<td>Green Corp</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>Exchange</td>
<td>Silver</td>
<td>2,338.23</td>
<td>2,338.23</td>
<td>$153,667.01</td>
</tr>
<tr>
<td>Green Corp</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>SOX</td>
<td>Gold-Fast</td>
<td>168.01</td>
<td>168.01</td>
<td>$31,602.34</td>
</tr>
<tr>
<td>Green Corp</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>SAP</td>
<td>Gold-Fast</td>
<td>4,554.25</td>
<td>4,554.25</td>
<td>$192,850.94</td>
</tr>
<tr>
<td>Green Corp</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>SAP</td>
<td>Silver</td>
<td>3,822.21</td>
<td>3,822.21</td>
<td>$267,554.55</td>
</tr>
<tr>
<td>Green Corp</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>N/A</td>
<td></td>
<td>8,386.46</td>
<td>8,386.46</td>
<td>$1,180,405.49</td>
</tr>
<tr>
<td>Summary</td>
<td></td>
<td>Blue Inc</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>11,330.74</td>
<td>11,330.74</td>
<td>$1,408,346.50</td>
</tr>
<tr>
<td>Summary</td>
<td></td>
<td>Green Corp</td>
<td>Alternate Energy</td>
<td>IT Ops</td>
<td>11,330.74</td>
<td>11,330.74</td>
<td>$1,408,346.50</td>
</tr>
<tr>
<td>Summary</td>
<td></td>
<td></td>
<td>Summery</td>
<td></td>
<td>592,127.99</td>
<td>330,852.47</td>
<td>$63,475,280.11</td>
</tr>
</tbody>
</table>

Figure 2.3 Example of chargeback report by Tenant, Line of Business, Business Unit, Application and Tier
3 CHARGEBACK AND CLOUD/SERVICE PROVIDERS

In a cloud, services are provided to the customers and their applications. These services include providing and supporting the storage, network, and server resources to their customers and business entities within those customers. Cost accounting at the cloud level is a culmination of all the services provided to the customer’s applications. Chargeback calculations and reporting must cover the full end-to-end usage by each application owned by the customer and then summed up for chargeback with other calculations from other IT services like database, server, customer support, etc.

Virtual Server utilization such as VMware and Hyper-V are also a cost factor in chargebacks. Customer applications run on VMs connected to the storage network and ultimately storage. The combination of all these elements can be reflected in chargeback calculations. Because of the proliferation and ease of provisioning VMs, chargeback calculations need to also include temporary VMs, development and test VMs, labs and other non-production elements as well as the production servers. These need to be detailed in the chargeback reporting so customers can understand the full cost of services and make business decisions based on ALL the usage, not just their production environment. Rule of thumb, if it’s connected to storage, you charge for it.

Below is an example report on chargeback for storage usage by Tenant, Application, Storage Tier, plus variable charges for each VM based on number of Processors and Memory used by each VM, plus fixed costs for overhead associated with that usage for each application.

As you can see, there are lots of options here.
4 CHARGEBACK MODELS

Depending on your organization structure and needs, there are many variations of chargeback models to work with. I'll review two of the more common ones here.

4.1 SIMPLE CHARGEBACK MODEL

Cost charged per GB = Cost of raw GB of storage allocated to application and owner

- Based purely on cost of the storage array divided by number of GB
- No tiering, protection, configuration or support overhead costs are calculated in the cost per GB
- In other words, the raw storage configuration includes RAID configuration level, NetApp SNAP technology overhead and usage, etc.

Example: 100GB Raw storage with RAID 1 yields 50 GB allocated storage. Customer is charged for 100 GB of raw storage, but only 50GB is usable because of the protection requested.

This model is used primarily by IT organizations that don't chargeback for storage but want to provide some measure of cost awareness per GB by application and business entity. This information can be used for budgetary justification and for cost awareness of how much application storage is costing the company.

However, this is not very realistic view of the true cost of neither storage nor the other resources used by the applications.

4.2 LOADED CHARGEBACK MODEL (FULLY BURDENED)

Cost charged per GB = raw or allocation per GB of storage PLUS the cost of infrastructure, Virtual Servers, all support and overhead (as you saw in the report above)

- Based on the cost of the storage arrays, tiering, service level, level of protection (RAID), Thin Provisioning, SNAP technology overhead and usage, cost of VM or physical servers, cost of storage support personnel and software, cost of helpdesk support and software, cost of maintenance, heat, lights, space, electric, communications infrastructure and lots more. You will typically add up the costs for these resources and chargeback (or showback) by application and business entity,

The loaded chargeback model is typically more realistic and thus used to more accurately report the true cost of storage. IT organizations that are cost centers or implementing chargeback billing to their internal customers will typically use some variation of this model. Cloud and service providers always use the fully loaded model and will also throw profit margin in the mix. All of this is reportable using OnCommand Insight Data Warehouse reporting.

5 WHAT'S THE PROCESS?

In the old days (not so long ago) and even today, chargebacks (and/or cost awareness) was manually constructed by the combination of:

- Storage administrators would use vendor-specific device management tools to manually collect usage data at each device level
- Storage network (SAN) administrators would manually collecting usage data (number of ports) using vendor-specific switch management tools
- Host administrators would manually collect usage information from each host that the DBs or applications reside on using host OS or DB specific tools
• VM administrators would manually collect usage data from the ESX environment using VMware or Hyper-V tools

Then somehow all this data was manually mashed together in a spreadsheet. Some funky calculations were manually created to hopefully provide some idea around cost awareness. Unfortunately, the data was not consistent enough, the calculations were not coordinated or accurate (too many variables), the details were not complete, and the data was obsolete as soon as you hit the save button (if not before).

Obviously, this was all a very manual intensive process that takes up days to weeks of your administrators and managers valuable time. The information is moderate at best, not completely accurate and continues to chew up the time of your staff “each” time you want these types of report generated. Even if you automate this using some scripts, you still own the scripts and the accuracy will change as soon as 1 variable does. (And it always does!)

OnCommand Insight provides automated methods to standardize, collect, dissect and report on the costs of storage, infrastructure and some VM usage at the application, tier, BU, and service levels. It also provides very robust options like drilldown, charting, adding outside costs and most importantly “automation”!

6 ALIGNED COSTS WITH USAGE LEVELS

The key to accurate cost accounting using OnCommand Insight is to align costs with actual usage by application, customer/business entity (or external customer in the case of cloud providers), tiers, service levels, datacenters and other business level criteria.

OnCommand Insight automatically discovers and collects the storage usage information from the environment and slices it up by host (or virtual server) to storage. However, because neither OnCommand Insight (nor any other application) can automatically discover your specific business applications or the owners, you need to tell OnCommand Insight about your business attributes.

We start by defining your tiers and services in OnCommand Insight according to the way you already have them defined. (Or if not, we can help you define them). We include the cost factor, configuration and names for those tiers in OnCommand Insight. Next, we add annotations in OnCommand Insight for your business entities and applications and tie them to the hosts or virtual servers that the applications are running on. OnCommand Insight automatically marries this information with what it has already discovered from your environment to provide cost accounting reports on storage usage by tiers, applications, and rolled up to customer/business entities, datacenters and ultimately to the cloud level reporting. Add these once (and they can be imported for ease) and you can maintain them in OnCommand Insight to automatically keep your reporting up to date and accurate.

Typical alignment use cases include:

• OnCommand Insight discovers and aligns storage through to the servers or virtual servers the applications are running on.

• Align application and business entities (data owners) with servers or VMs

• Establishing and aligning tiers in OnCommand Insight

• Establish loaded cost per GB (loaded explained above)

• Establish Service Levels and costs (if you chose) in OnCommand Insight

• (this happens automatically once you put in the Business elements) Associate and report cost to business entity by applications at multiple levels including Cloud with breakdown to services, tiers, storage devices, storage pools, volumes, storage network, protocols (fibre channel, NFS,
Chargeback For Heterogeneous Storage using SANscreen

7 CHARGEBACK USING ONCOMMAND INSIGHT

Business entities, applications, tiers, service levels, need to be annotated in OnCommand Insight to provide the full application to storage utilization and ultimately chargebacks. Once these business elements are annotated, OnCommand Insight automatically calculates the disk space used by each application and rolls up to reporting at the host, application, tier, consumer/owner, and datacenter and enterprise level reporting through the OnCommand Insight Data Warehouse. Additionally, other infrastructure assets used by the applications such as fibre channel (FC) ports, VM count, cpu and memory usage and administrative overhead can be also be automatically added to this rolled up usage reporting.

7.1 ADDING ANNOTATIONS FOR APPLICATIONS AND BUSINESS ENTITIES

OK, now that we’ve completed setting up our tiers and services in OnCommand Insight, it’s time to tell OnCommand Insight about your application, customer/business units, and datacenters so it can provide you with business level usage by application and roll that information up to customer/business unit (owner) and datacenter levels for cost accounting, cost awareness and chargebacks.

Applications use server, network, and storage resources as well as support services. All of these elements can be factored into the chargeback equation. In OnCommand Insight, applications are directly associated with the customer/business unit that own them and the servers they are hosted on. Ultimately, cost awareness and chargebacks are done at the application level, which rolls up to the customer/business unit level.

Adding annotations into OnCommand Insight to record information about your business entities may seem a little daunting at first but it’s really easy and quick. Additionally, it provides a dynamic location to keep all that information so it can automatically be used for cost accounting, usage, and other reporting needs (outside of chargeback) rather than sit in someone’s static spreadsheet.

Let’s discuss the three methods for importing application, customer/business unit and datacenter annotations into OnCommand Insight.

Step by step details of how to add annotations for applications and business units are covered in the OnCommand Insight User Guide. (Formerly the SANscreen Service Insight User Guide).

7.2 IMPORTING ANNOTATIONS FOR APPLICATIONS, BUSINESS ENTITIES, AND DATACENTER

We can use a csv file to import the bulk of your application, consumer/owner, datacenter, server alignment in the beginning. After that, you should maintain that information in OnCommand Insight so it remains up to date and dynamic. This allows OnCommand Insight to provide you with automated reporting on usage without you manually gathering and gluing all this information together (again) for your boss.

Speaking of someone’s static spreadsheet… I’ll guarantee you someone has most of this information already in a spreadsheet or report of some kind. It may not be completely up to date but it’s a great start. Usually the Server Admins, the DB / Application Admins or the VM Admins have that information together. (Maybe all of the above…)

Importing the annotations for applications, customer/business entities and datacenters is pretty simple.
- Make sure your hosts and VMs are all identified in OnCommand Insight. You need hosts identified so the import utility can associate the applications and business entity/customer information to the hosts and VMs.
- Download the OnCommand Insight import utility kit (usually found on the NOW site or it’s also on your OnCommand Server).
- Use the csv example provided in the kit to modify the spreadsheet to the format needed to import the data into OnCommand Insight. Name the reformatted spreadsheet so you can identify it. For this example, let’s call it annotate060112.csv. (You can use this method to import any of the annotations that OnCommand Insight has.) Just add them to additional columns.
- Once you import them successfully, there will be a list of mismatches you can resolve. These are usually misspellings or syntax issues that prevent matching applications to hosts. The rest can be viewed in OnCommand Insight “Inventory>Hosts” views. Make sure you configure your host view to add the business and applications columns to the views using the checkboxes.
7.3 MAINTAINING AND APPLYINGANNOTATIONS FOR APPLICATIONS AND BUSINESS ENTITY RESIDING ON SERVERS AND VMs

If you have not already imported annotations using the import utility, OR you are maintaining application and owner annotations in OnCommand Insight, you can use this simple method to add and remove annotations associated with hosts and VMs.

1. For OnCommand Insight 6.2 and above, go to Inventory>Hosts view. Then from the main menu bar select Action and click on Manage Applications. Here we can add, edit, delete and save the applications and Business Entities you need. For adding, editing and removing datacenter and other annotations go to OnCommand Settings and select Annotations types.

2. Once you have added the annotations into OnCommand Insight, select (or use control key to multiple select) the Hosts or VM(s). Right-click on the hosts/VM(s) you want to add the annotations to and select “SET Applications”. Select the applications/business entity you want associated with that host/VM, click OK and you are done. OnCommand Insight automatically adds those to the reporting as shown in the two views below.

8 ACCOUNTABILITY AND CHARGEBACK REPORTING

Now that we have configured your tier structure and annotated OnCommand Insight with your business information and the automated Extract Transform and Load (ETL) process has run, we can review some of the many reports that are automatically generated from OnCommand Insight through the Data Warehouse.

Additionally, I'll discuss how you can use OnCommand Insight to generate custom reports using the built-in Business Insight Advanced (drag and drop), Report Studio (report formatting), and MySQL from the open schema Data Warehouse database.

8.1 STANDARD REPORTS: COST ACCOUNTING BY TIERS, APPLICATION AND BUSINESS UNIT/CUSTOMER

There are many reports available through the OnCommand Insight. Below are a few examples of these reports. More can be found by accessing OnCommand Insight through the Data Warehouse using http://<DWH_Server_IP>:8080/reporting.

Let's review some of the reports.

Business Entity (or Customer) accountability: These are some of the preconfigured tables and charts from the Cost Accounting dashboard. These are calculated from the storage allocated to each application and rolled up to reporting at the tier and customer or business entity level.

Business Entity Accountability

Provisioned Capacity (TB) by Business Entity and Tier

<table>
<thead>
<tr>
<th>Provisioned Capacity (TB)</th>
<th>Silver</th>
<th>Gold</th>
<th>Gold-Fast</th>
<th>Total(Tier)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenant Blue Inc</td>
<td>0.48</td>
<td>0.35</td>
<td>8.64</td>
<td>9.47</td>
</tr>
<tr>
<td>Tenant Green Corp</td>
<td>6.74</td>
<td>36.79</td>
<td>4.62</td>
<td>48.15</td>
</tr>
<tr>
<td>Total(Business Entity)</td>
<td>7.22</td>
<td>37.14</td>
<td>13.26</td>
<td>57.62</td>
</tr>
</tbody>
</table>

Below is the pie chart summary of the Top business unit/customers capacity usage. In the live reports, you can mouse over the pieces of pie and you can see GBs used by that application. If you click on the piece of pie, it will create a tabular report detailing how many GB are used on specific arrays by that application. (See example of the tabular report below)
Tabular report breakdown of storage usage by Customer/BE, applications, host, storage array and tiers

Historical Capacity Accountability by Business Entity and Tier

Tiers: Bronze, Gold, Gold-Fast, Silver, Tier 1, Tier 2, Tier 3, Tier 4
Business Entity: Blue 5c, Green Corp

Date: End of Last Quarter - Dec 31, 2011 12:00:00 AM
* Date not available for requested date. Report reflects data as of Jun 3, 2011

Business Entity Hierarchy

<table>
<thead>
<tr>
<th>Provisioned Capacity (TB)</th>
<th>Tier</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gold</td>
</tr>
</tbody>
</table>
| Top BU Using Tiers: This is another representation in chart form where business entities or customers are using specific tiers of storage. In the live reports, you can mouse over the pieces of pie and you can see GBs used by each business entity/customer. If you click on the piece of pie, it will create a trending chart.
chart on usage by that tier and a tabular report detailing how many GB are used on specific arrays by that business entity/customer over time.

**Top Applications Using Tiers:** These charts show you how storage is used by each application and tiers in your environment. In the live reports, you can mouse over the pieces of pie and you can see GBs used by that application. If you click on the piece of pie, it will create a trending chart on usage by that tier and a tabular report detailing how many GBs are used on specific arrays by that application over time.
8.2 AUTOMATED CHARGEBACK REPORTING

The reports above are examples of capacity usage reports that are available in OnCommand Insight through the Data Warehouse. They show how much storage each application and BU/Customer is using.

Add to that the cost per GB factors from the models we discussed in the beginning of this document and OnCommand Insight will automatically generate reports like the one below showing you the cost of storage that each business entity / customer is using. This is a pretty high level report, but this starts to provide you with a cost awareness of storage usage from a business perspective.

![Top Cost Contributors (BUs)](image)

These are automatically generated from OnCommand Insight and can also be drilled into for details on storage usage at the application, host, array and tier levels.
In addition to business level reporting by tiers and BU’s (as shown above), you can create the detailed level by Business Entity including Tenant, Line of Business (LOB), Business Unit (BU), Project, Service Level and/or, Tier Levels and Applications in similar formats such as the report below:

9  CUSTOM REPORTING USING BUSINESS INSIGHT ADVANCED

As you know, the information and format of any report is largely personal preference and our desire to see certain data looking a certain way. These reports can be easily generated in the format you want using drag and drop technology in Business Insight Advanced.

To get detailed information on chargebacks, we need to go into Business Insight Advanced tool and generate a report in the format you are looking for. Let’s take a look how easy this is.

The report below shows is an example of a report you can create using Business Insight Advanced in OnCommand Insight Data Warehouse. This report shows accountability by tenant, application, and storage tier and also features fixed cost columns of VMs used by each Application and the overhead associated with each application.

Once you save the report, you can schedule this report to run and output this in many formats such as PDF, HTML, HML, CSV, Word, etc. You can also have this report automatically scheduled to run at designated intervals, emailed, put in folders, printed and other options.

Each report can be built for specific customers to let them see ONLY what is owned by them and not other customers. This is part of our Secure Multi-Tenancy reporting support in OnCommand Insight.
The report below is an example of a more complex Chargeback report showing variable costs by VM configuration tiers with added fixed costs for overhead. As you can see, there are many formats and reports that you can create using "Drag and Drop" technology in Business Insight Advanced without knowing SQL!
10 CREATE NEW REPORT USING REPORT STUDIO

Note: This document is not designed to teach you how to use Report Studio but to provide you some information about the capabilities, flexibility and robust features built into OnCommand Insight Data Warehouse that you can use to create or modify your own custom reports.

Report Studio is a very comprehensive but complex tool to use to create your own custom reports from OnCommand Insight Data Warehouse. You need an intimate knowledge of how Report Studio works as well as how the Data Warehouse Datamarts are formatted and the data within them. To become more acquainted with Report Studio, it is recommended you take the Report Studio training from IBM. (This is not available through NetApp.)

10.1 TO CREATE A NEW REPORT USING REPORT STUDIO, PERFORM THE FOLLOWING

- Log into OnCommand Insight Data Warehouse Reporter (i.e. http://<DWHServername.com>:8080/reporting)
- Go to Public Folders

10.2 SELECT REPORT STUDIO

In the upper right corner of the GUI, select the Launch dropdown and select Report Studio
10.3 SELECT CAPACITY FOLDER

Select the Capacity Folder then your folder of choice below that.
10.4 SELECT CREATE A NEW REPORT OR TEMPLATE

As you can see, there are many options for creating different types of reports. Let's select the generic prospective.

10.5 SELECT REPORT TEMPLATE

The Report Template will show as below. Then you can select the specific data marts and start building your custom report. To learn more about how to use Report Studio, contact IBM for Report Studio training.
11 CUSTOM REPORTING USING OPEN SCHEMA DATABASE

Note: This document is not designed to teach you how to use MySQL but to provide you some information about the open schema database and where to find it documented. You are responsible for learning MySQL.

The MySQL database schema is documented so you can use it to create your own custom reports from OnCommand Insight Data Warehouse. You need an intimate knowledge of how MySQL works as well as how the Data Warehouse Data marts are formatted and the data within them.

To access the documentation for the open schema database:

- Log onto the OnCommand Insight Data Warehouse administration GUI at http://<DWHHostName_or_IP>/dwh
- Select “Documentation”
As you can see, you can access the DWH User Guide and the database schema diagrams of each Datamart.

Under Documentation, select “Database Schema”.

From here you can see the schema of each of the tables within the Data Warehouse MySQL database.

You can scroll down the Database Schema in the center frame and select which database you want to go to or you can scroll down the “All Tables” frame and select a specific table schema to display on the right side of the screen (as you see above).

If you want to view a specific data mart schema, go back under DWH Documentation window and select the specific Datamart you want to view.

12 SUMMARY

OnCommand Insight provides you with easy flexible and robust cost awareness and chargeback reporting capabilities. Using OnCommand Insight’s built in tier and annotation functionality, you can tell OnCommand Insight about your business elements and OnCommand Insight will automatically marry that information with the configuration information discovered from your storage arrays, SAN, hosts and VM environments to provide you with automated cost awareness and usage reporting by application, customer/business entity, tiers, datacenters and the like.

Additionally, you can use 3 other tools built into OnCommand Insight to generate custom reports based on your own skill level and needs.
Business Insight Advanced allows you to create reports using drag-and-drop technology.
Report Studio allows you to create and format reports.
The Schema Database allows you to create reports using SQL queries that you develop to access the data directly from the DWH schema.

For more information on OnCommand Insight, contact the OnCommand Insight team.
Email us at: xdl-oncommandforpartners@netapp.com
View other online videos at the OnCommand Insight Video links on the Community

or visit us on our website at www.netapp.com/oncommandinsight
NetApp provides no representations or warranties regarding the accuracy, reliability or serviceability of any information or recommendations provided in this publication, or with respect to any results that may be obtained by the use of the information or observance of any recommendations provided herein. The information in this document is distributed AS IS, and the use of this information or the implementation of any recommendations or techniques herein is a customer’s responsibility and depends on the customer’s ability to evaluate and integrate them into the customer’s operational environment. This document and the information contained herein may be used solely in connection with the NetApp products discussed.

© 2012 NetApp. All rights reserved. Specifications are subject to change without notice. NetApp, the NetApp logo, Go further, faster and SANscreen are trademarks or registered trademarks of NetApp, Inc. in the United States and/or other countries.