knowledge14®

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Lab Guide

Field Normalization:

Provide Better Data Consistency

Steve Bandow & Aleck Lin

Lab instance: https://**<<name>>**.lab.service-now.com

Login / Passwords:

admin / Knowledge14

itil / Knowledge14

employee / Knowledge14

Field Normalization Labs: Introduction

- Why Field Normalization? Real world data is unavoidably chaotic.
  - People make typos, hold the caps lock down, etc.
  - Sources of data do not always agree.
  - Things change over time.
- Field Normalization imposes order by enforcing consistency across:
  - Data values.
  - Data formats.
  - Numerical representation.
- When you complete this lab, you learn:
  - What field normalizations and transformations do.
  - What you can accomplish with Field Normalization.
- What you need to know now:
  - How to use ServiceNow in general.
  - Better if you know how to administer ServiceNow.
  - For a few features, some JavaScript knowledge is required.

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Lab Goal

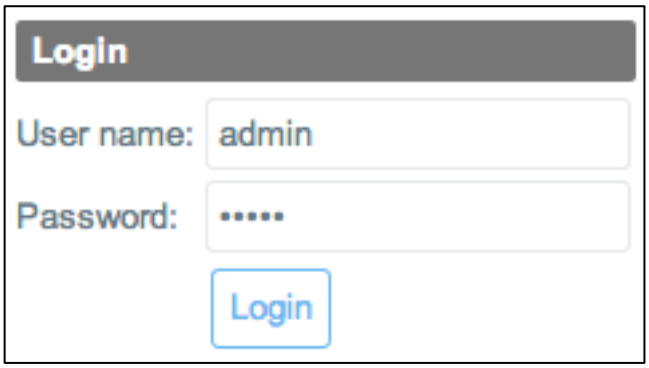
Locate the Field Normalization application and introduce some of the data issues normalization can address.

Getting Started

Log on to Your Training Instance

1. Your instance URL is on the cover page.

2. Login using the **admin** credentials provided on the cover.

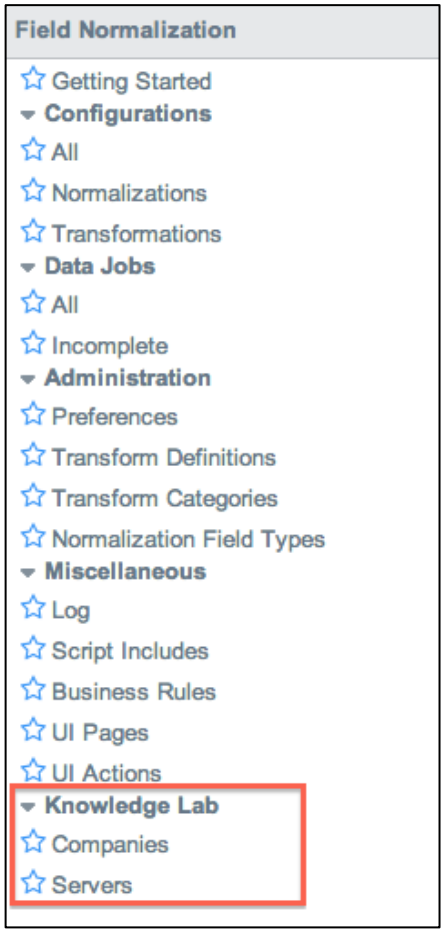


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The Field Normalization Application

1. The Field Normalization application is installed with the Field Normalization plugin. The plugin is not installed by default, but is pre-installed for this lab.

2. Find and expand the Field Normalization application in the left navigation menu.



Note: The Knowledge Lab modules at the bottom are filters to conveniently access the test data for our lab. They are not part of the out-of-box plugin.

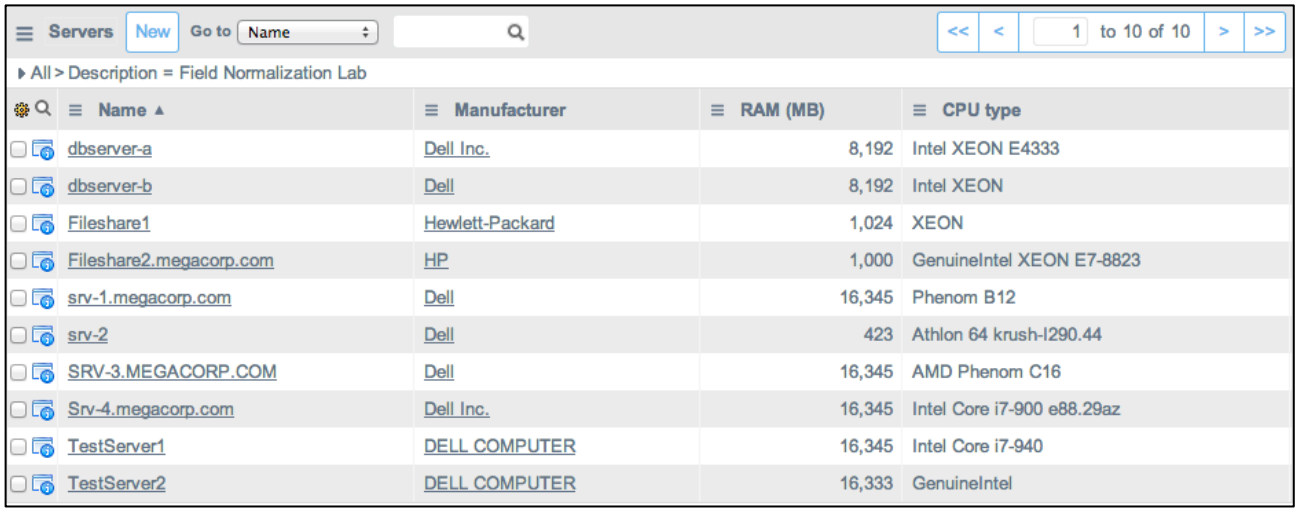
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What does the Lab Cover?

1. In the Left Navigation Pane, click **Field Normalization** to expand the **Field Normalization** application.

2. Click the **Field Normalization > Knowledge Lab > Servers** module to the display the list of server data used in the lab.

NOTE: In the subsequent sections these steps are abbreviated to **Application Name > Module Name**.



Servers | New | Go to Name | << < 1 to 10 of 10 > >>

All > Description = Field Normalization Lab

Name ▲	Manufacturer	RAM (MB)	CPU type
dbserver-a	Dell Inc.	8,192	Intel XEON E4333
dbserver-b	Dell	8,192	Intel XEON
Fileshare1	Hewlett-Packard	1,024	XEON
Fileshare2.megacorp.com	HP	1,000	GenuineIntel XEON E7-8823
srv-1.megacorp.com	Dell	16,345	Phenom B12
srv-2	Dell	423	Athlon 64 krush-l290.44
SRV-3.MEGACORP.COM	Dell	16,345	AMD Phenom C16
Srv-4.megacorp.com	Dell Inc.	16,345	Intel Core i7-900 e88.29az
TestServer1	DELL COMPUTER	16,345	Intel Core i7-940
TestServer2	DELL COMPUTER	16,333	GenuineIntel

3. Ok, what is wrong with the server data?

- You cannot buy 16,345 MB of RAM
- CPU type – too much detail
- Manufacturers – there is more than one Dell
- The server names are inconsistent

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Lab Goal

Transform the RAM field for our servers into standardized, more meaningful values.

Lab 1
Transform Numeric Data

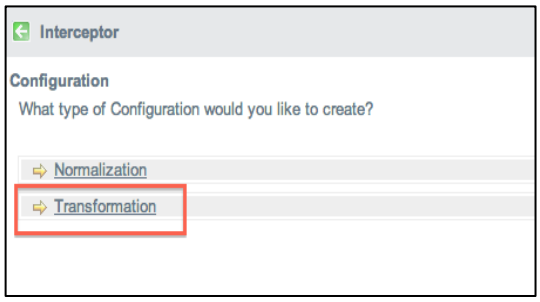
Create the Transformation Configuration

1. Navigate to **Field Normalization > Configurations > All**.

2. Click **New**.

Note: Clicking **New** from the **All** module redirects you to a page where you choose which type of configuration to create. If you click **New** from one of the specific modules, you just get the corresponding form.

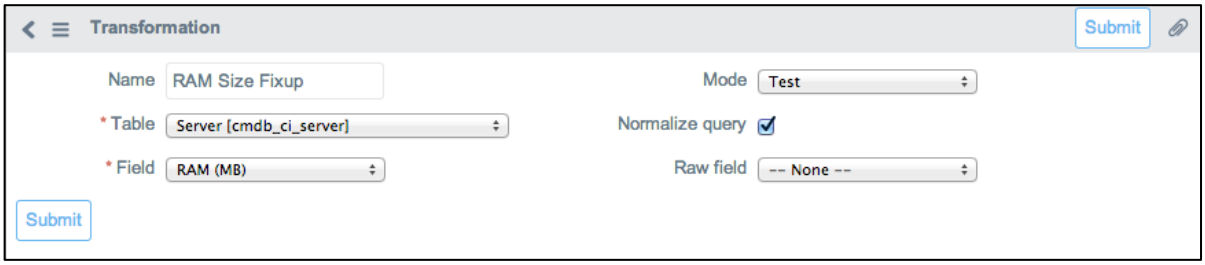
3. On the **Interceptor** page, click **Transformation**.



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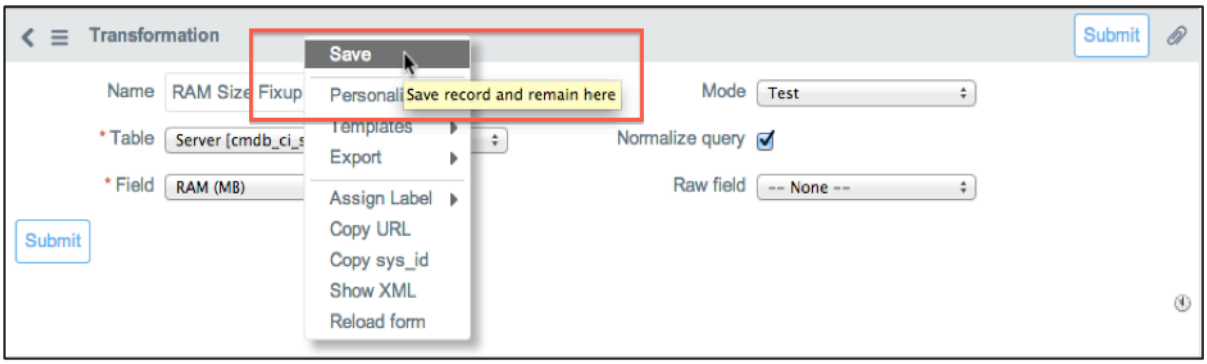
4. Complete the form as follows:

   Name: **RAM Size Fixup**
   Table: **Server [cmdb_ci_server]**
   Field: **RAM (MB)**



NOTE: The configuration is in **Test** mode. You set it to **Active** later and learn the differences throughout the lab.

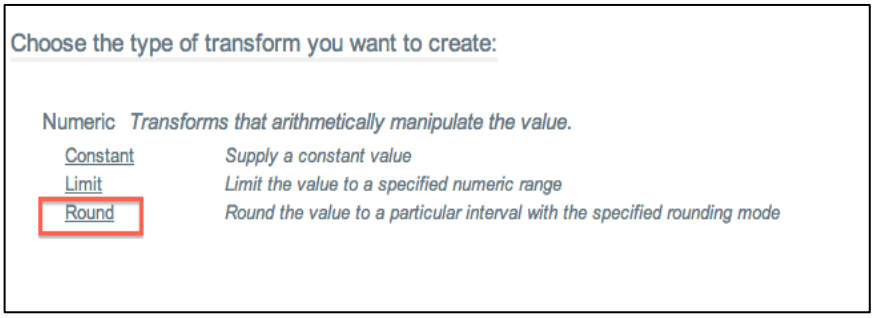
5. Right-click the form header and select **Save**.



6. Go to the **Transforms** related list and click **New**.

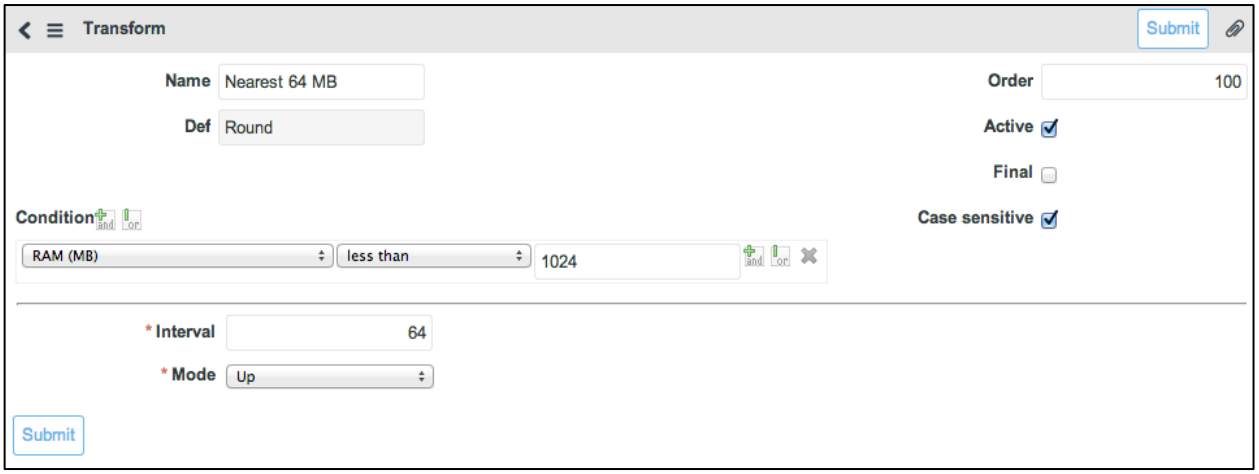
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7. Select **Round**.



8. Complete the form as follows:

   Name: **Nearest 64 MB**
   All of these conditions must be met: **RAM (MB) | less than | 1024**
   Interval: **64**
   Mode: **Up**



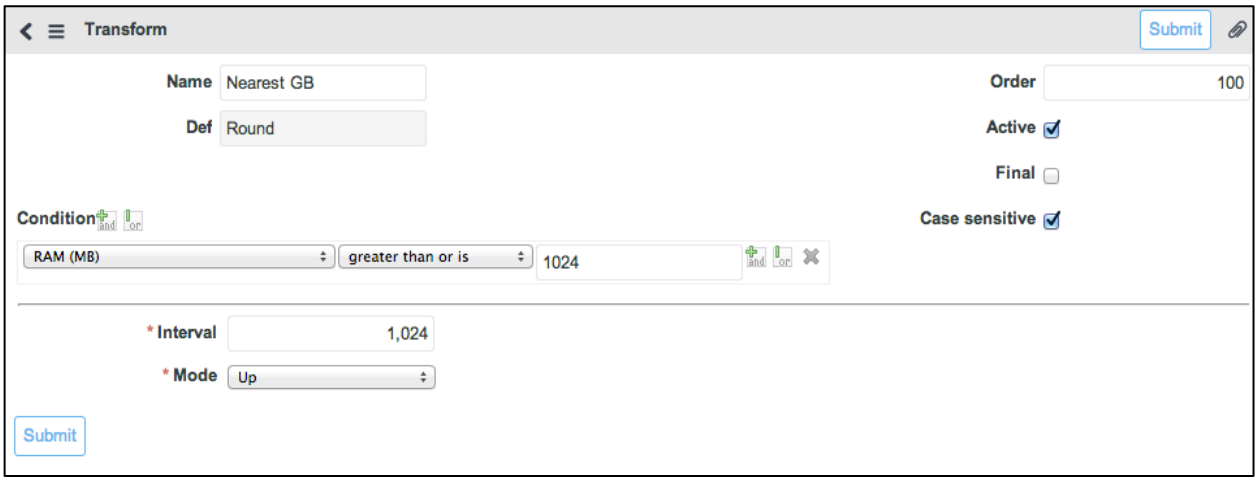
9. Click **Submit**.

10. Observe that you are back on the **Transformation** configuration record.

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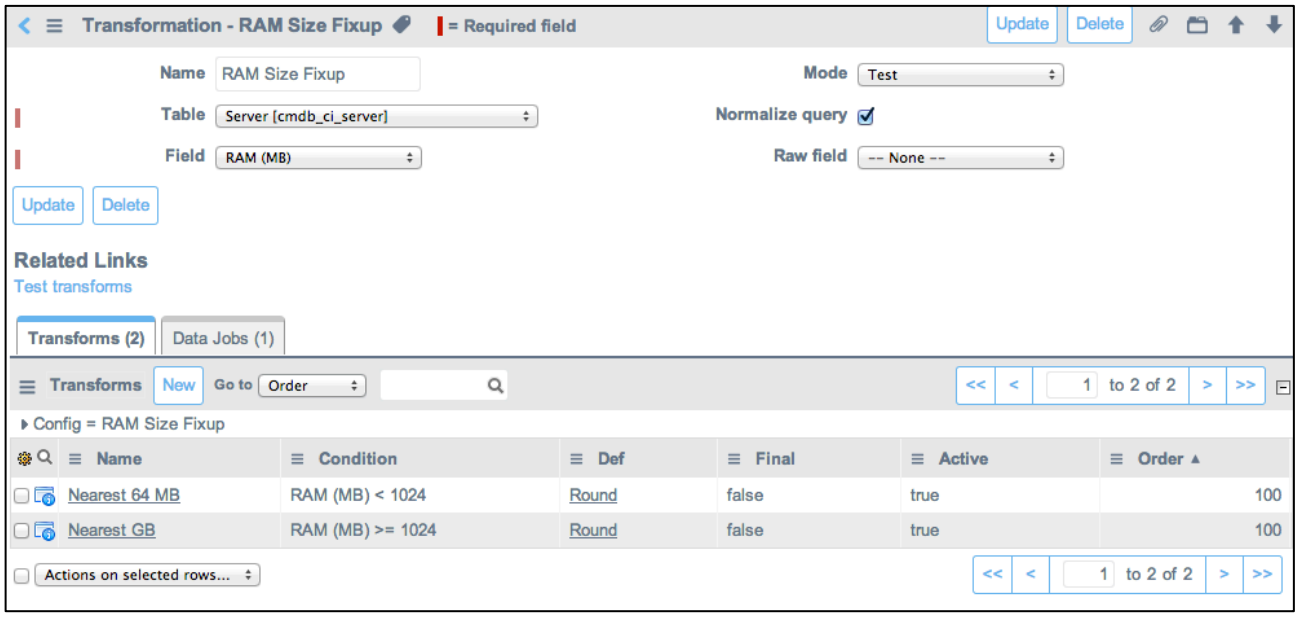
11. Repeat steps 6-10 to add a second **Transform** with details as follows:

    Name: **Nearest GB**
    All of these conditions must be met: **RAM (MB) | greater than or is | 1024**
    Interval: **1,024**
    Mode: **Up**



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Question: What does this **Transformation** do?



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Test the Transformation

1. Navigate to **Field Normalization > Knowledge Lab > Servers**.

2. Click the server named **srv-2**.

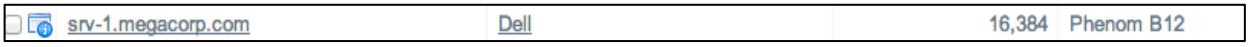
3. **Observe** that the current value for **RAM** is **423**.



4. Change the value to **422** and click **Update**.

Question: What is the value now? Why?

5. You can also test a Transform from the list view. Double-click the **RAM** column for the server named **srv-1.megacorp.com** (the current value is **16,345**).



6. Change the value to **16,344** and click the green **Save** icon.

Question: What is the value now? Why?

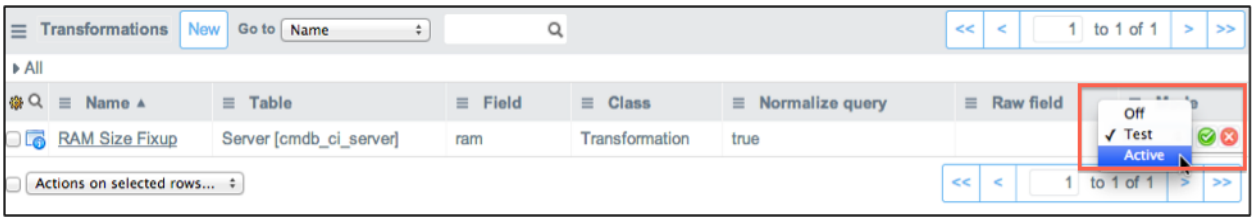
7. The Transforms work. This Transformation configuration is ready to move out of test mode.

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Activate the Transformation

1. Navigate to **Field Normalization > Configurations > Transformations**.

2. In the Transformations list, double-click the **Mode** value for **RAM Size Fixup**, set the value to **Active**, and click the green **Save** icon.



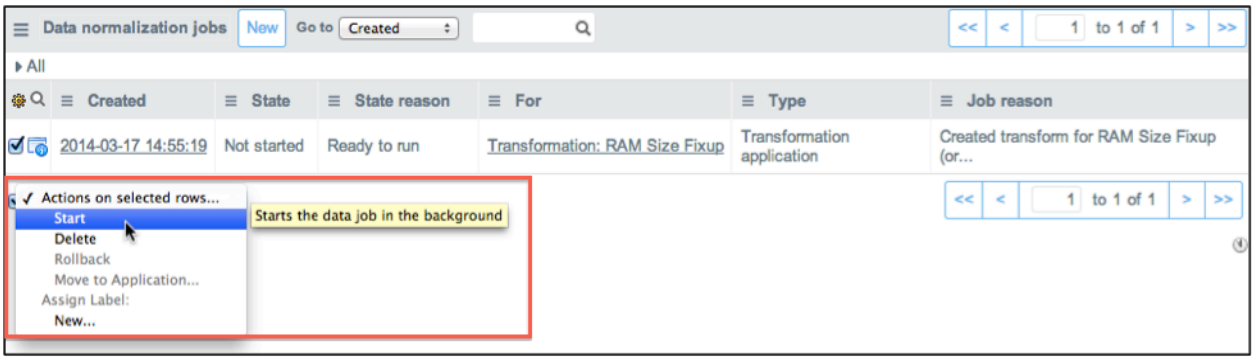
NOTE: The transformation is now active for all users. Any change to RAM size is automatically transformed. But what about all the existing data in our CMDB?

3. Navigate to **Field Normalization > Data Jobs > All**.

4. Observe that there is a job for our configuration: **Transformation: RAM Size Fixup**.

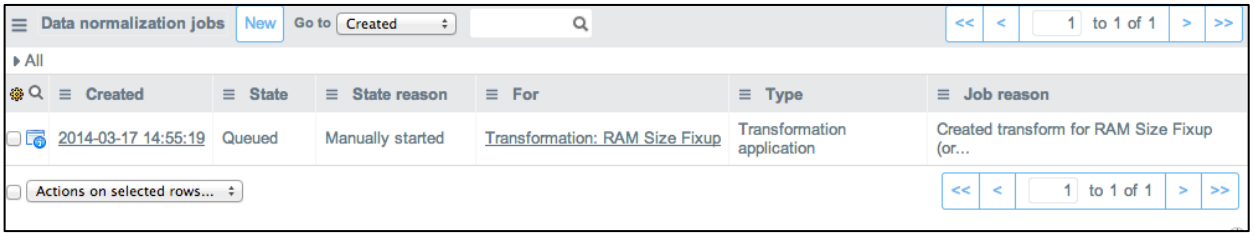
5. Select the check box for the job.

6. Under the **Actions on selected rows...** select **Start**.

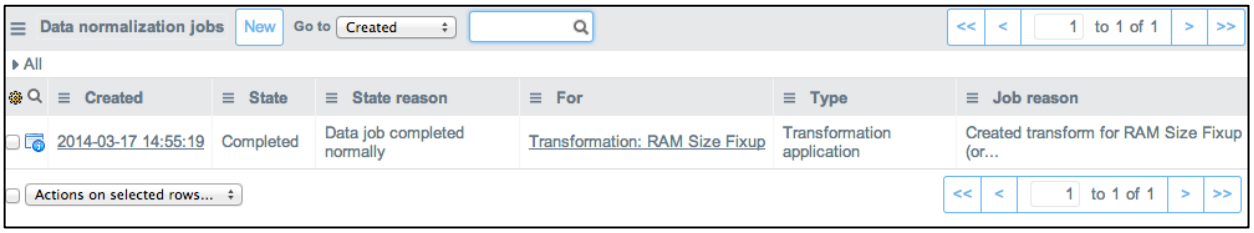


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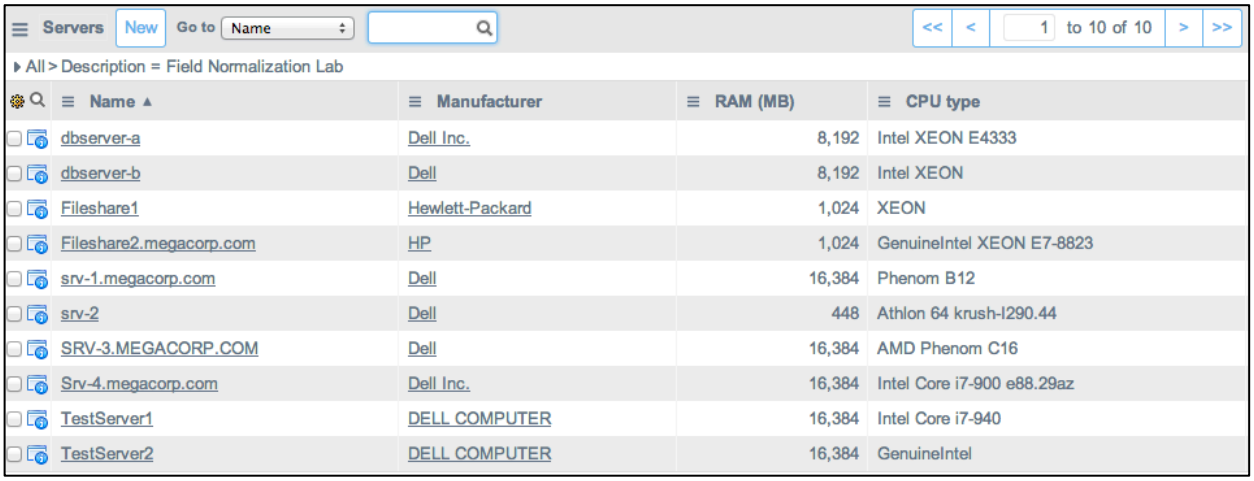
7. The job queues to run in the background.



8. After a few seconds, the job completes. Click **All** to refresh the list.



9. Observe the **RAM (MB)** column in the list of servers – the information is improved!



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Rollback

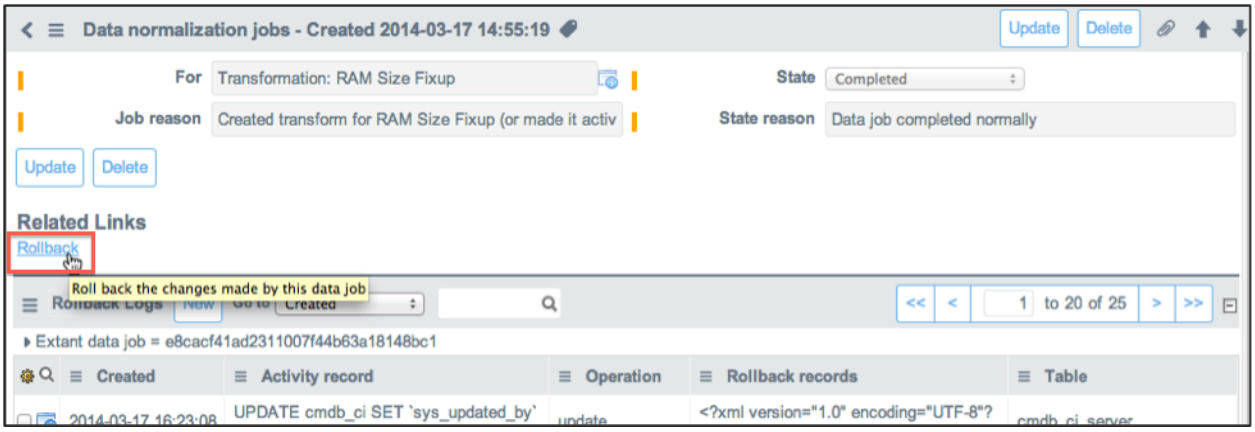
If you realize that something is not working quite right and you need to revert the data back to a previous state, you can roll it back.

1. Navigate to **Field Normalization > Data Jobs > All**.

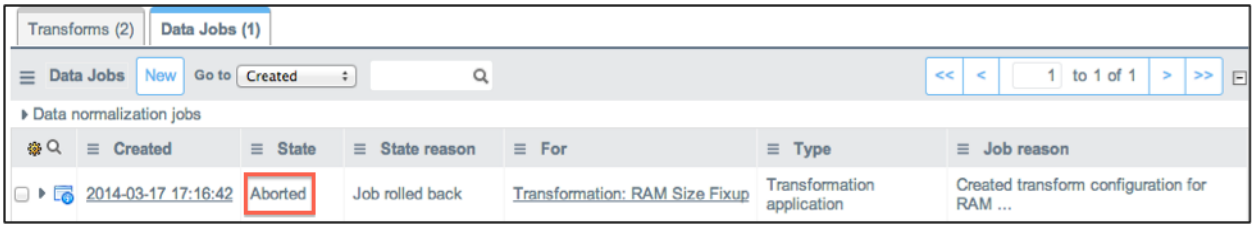
2. Click the completed job.

NOTE: The transform ran against all data in the system so the log contains more information than just the filtered test data used in the lab.

3. Click the **Rollback** related link.

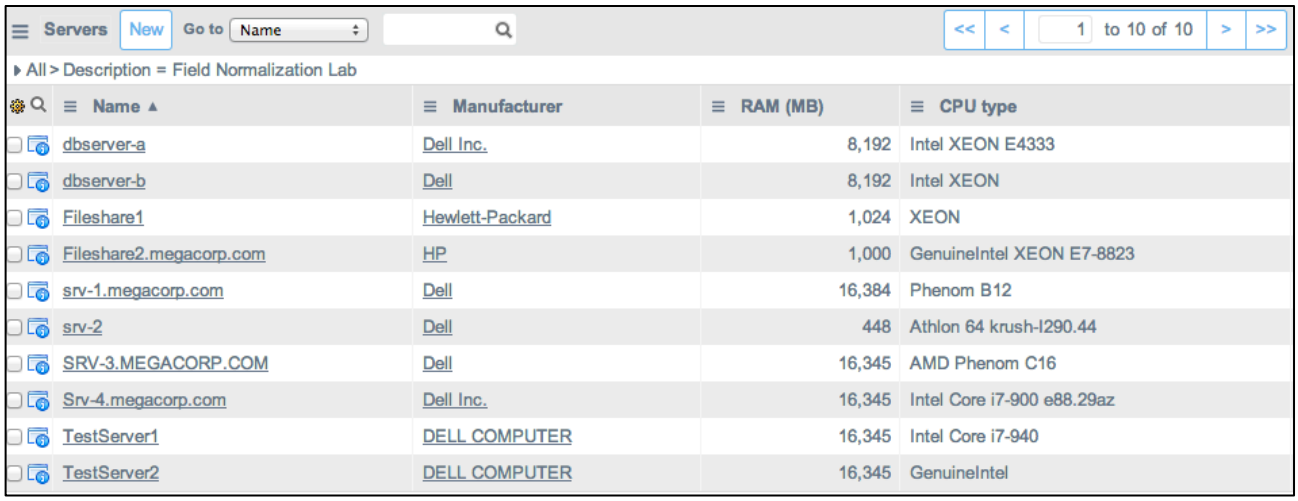


4. Observe that the job state is **Aborted**. This reflects the state of the original job, not the rollback.



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Question: Look at the **RAM** column in the list of servers. Is it back to its ***original*** state? Why or why not?



Servers | New | Go to Name | << < 1 to 10 of 10 > >>

All > Description = Field Normalization Lab

Name ▲	Manufacturer	RAM (MB)	CPU type
dbserver-a	Dell Inc.	8,192	Intel XEON E4333
dbserver-b	Dell	8,192	Intel XEON
Fileshare1	Hewlett-Packard	1,024	XEON
Fileshare2.megacorp.com	HP	1,000	GenuineIntel XEON E7-8823
srv-1.megacorp.com	Dell	16,384	Phenom B12
srv-2	Dell	448	Athlon 64 krush-l290.44
SRV-3.MEGACORP.COM	Dell	16,345	AMD Phenom C16
Srv-4.megacorp.com	Dell Inc.	16,345	Intel Core i7-900 e88.29az
TestServer1	DELL COMPUTER	16,345	Intel Core i7-940
TestServer2	DELL COMPUTER	16,345	GenuineIntel

5. The transformed data was actually accurate, so you want to rerun the Transformation. Navigate to **Field Normalizations > Transformations**.

6. To force a fresh data job to appear, do the following: In the list view, set the Transformation **Mode** to **Off** and **Save** it. Then set it back to **Active** and **Save** again.

7. Open the **Transformation** record.

8. In the **Data Jobs** related list, click the job with a State of **Not Started**.

9. Click the **Start** related link, and let the job process as before.

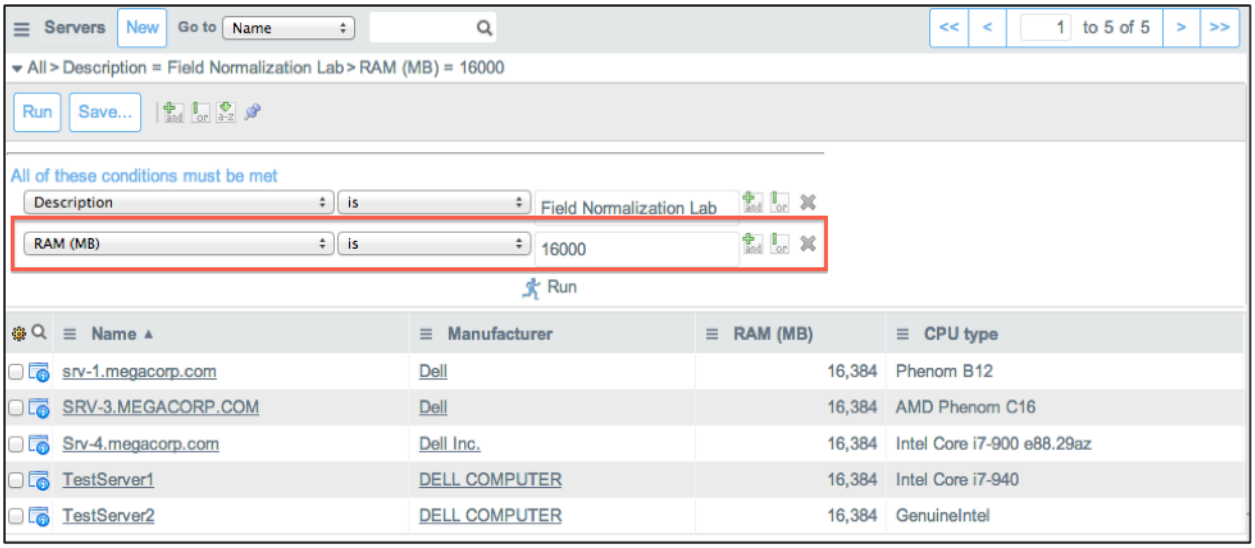
10. Verify that the server data is again transformed.

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Normalize a Query

1. Navigate to **Field Normalization > Knowledge Lab > Servers**.

2. Expand the conditions filter, and add **RAM (MB) | is | 16000** as follows.



3. Click **Run**.

Question: Why does this work?

4. Navigate to **Field Normalization > Transformations** and open the configuration record.

5. Observe that **Normalize Query** is **selected**.

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Review

- If have a numeric field that clean up mathematically, use a **Transformation**.
- Rounding is the most common use, but not the only one.
- If you make a mistake, you can use **Rollback** to undo the transformation job that acted on existing data.
- Test, test, test – just like with software development, you cannot possibly test too much (and, even better, **try it with some test data**, just like you did in the lab)!

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Lab Goal

The current data for CPU Types on your servers is too difficult to report on and get meaningful information. You want to normalize the values to more easily report based on CPU information. To do this, you need to configure and apply normalization.

Lab 2
Normalize String Data

Create the Normalization Configuration

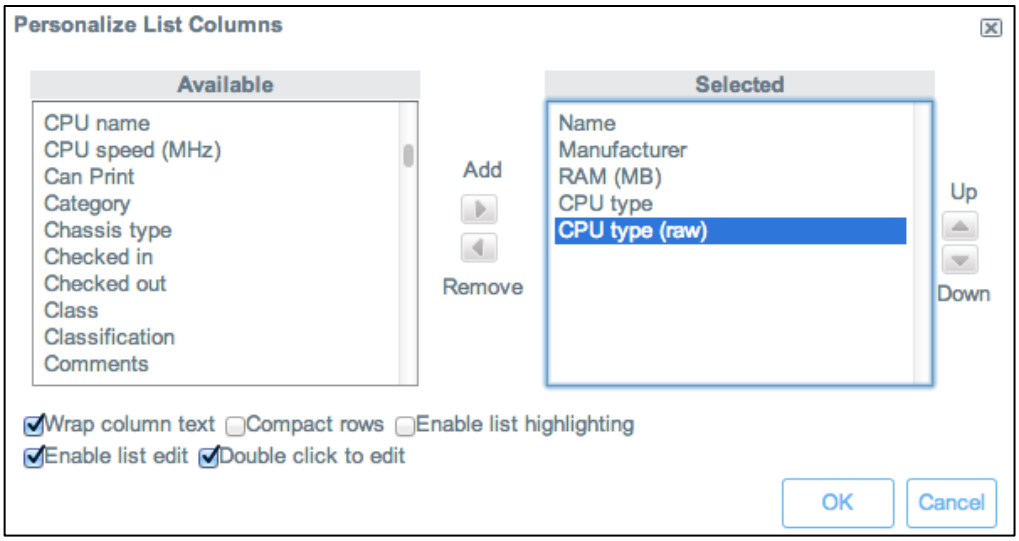
1. Navigate to **Field Normalization > Knowledge Lab > Servers**.

2. Observe the **CPU Type** column.

NOTE: Is **Intel Core i7-900 e88.29** too much information? For argument suppose that **Core** is enough. But, we'll keep the old values around just in case we need them.

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3. In the Servers list, click the **Personalize list** gear icon and add the field **CPU type (raw)** to the view.



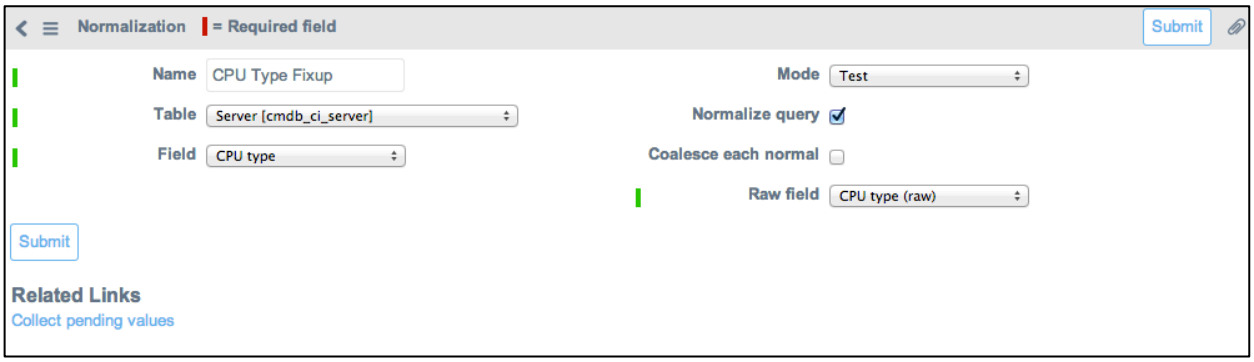
NOTE: The **CPU type (raw)** was added to the Server table for this lab. Your System Administrator can configure this as required based on the needs of your organization.

4. Navigate to **Field Normalization > Configurations > Normalizations**.

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5. Click **New** and complete the form as follows:

   Name: **CPU Type Fixup**
   Table: **Server [cmdb_ci_server]**
   Field: **CPU type**
   Raw field: **CPU type (raw)**



6. Right-click the form header and **Save.**

7. View the **Data Jobs** related list.

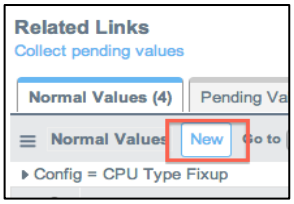
NOTE: A **Pending value collection** job ran automatically. Pending values are gathered from each unique value for the identified field, **cmdb_ci_server.cpu_type**. When the normalization is active, new values are automatically added to this list if they are not normalized. These can be used to configure normalization.

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Normal Values

A Normal Values is the values you want to normalize ***to***.

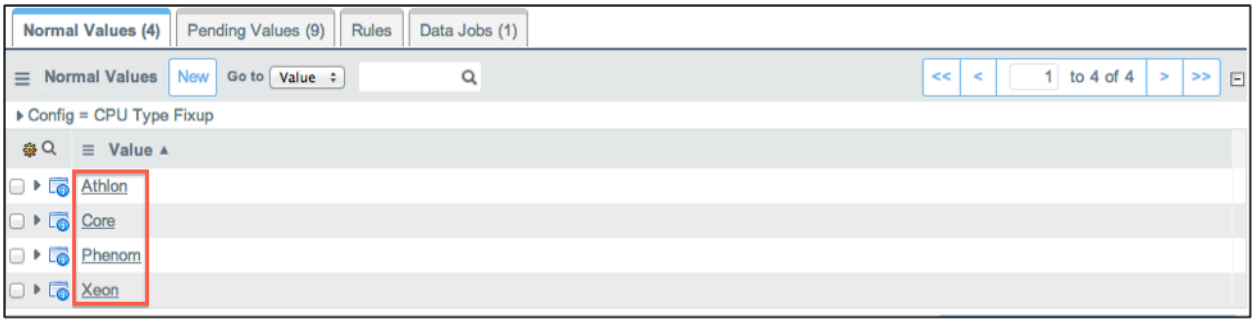
1. Under the **Normal Values** related list, click **New**.



2. Set the Value to **Athlon** and click **Submit**.

3. Repeat steps 1-2 to add three more **Normal Values** as follows:

   Core
   Phenom
   Xeon



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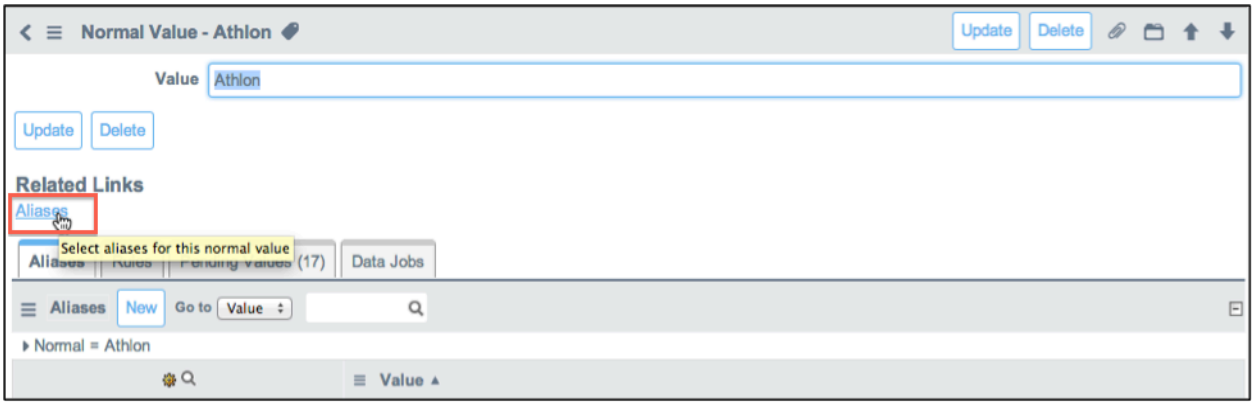
Aliases and Rules

An **Alias** defines *an exact value* that, if matched, converts the field to the corresponding **Normal Value**.

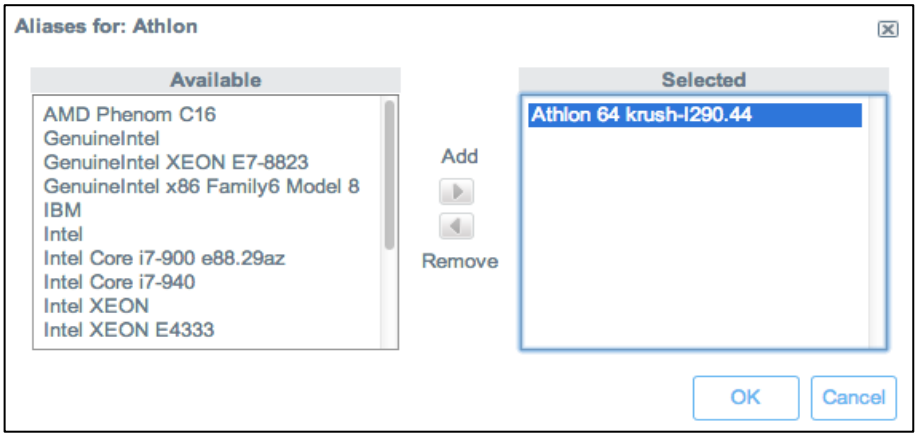
A **Rule** defines *a set of conditions* that, if matched, converts the field to the corresponding **Normal Value**.

1. Click the **Athlon** normal value.

2. Click the **Aliases** related link.



3. Move the item that begins with **Athlon** from Available to Selected.



4. Click **OK**.

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NOTE: If ServiceNow finds this exact value in the field, it converts it to just **Athlon**. In general, aliases work best for normal values that have only a few specific alternative representations. When there are many alternative representations or when you do not know ahead of time what the alternatives might be, there is a better approach.

5. Return to the **Normalization** configuration record.

6. Open the **Core** Normal Value, and view the **Rules** related list.

7. Click **New** and complete the form as follows:

   Name: **Contains "Core"**
   Make alias: **checked**
   All of these conditions must be met: **CPU type | contains | core**



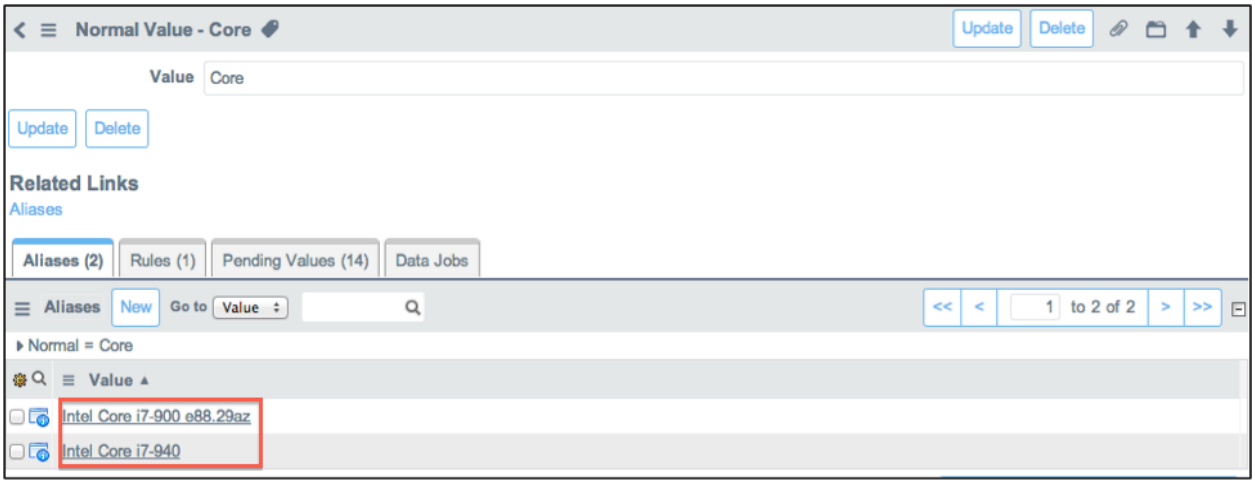
NOTE: With **Make alias** selected, aliases are automatically created for Values that match this rule. The rule does not need to run for that exact value in the future.

8. Right-click the form header and **Save**.

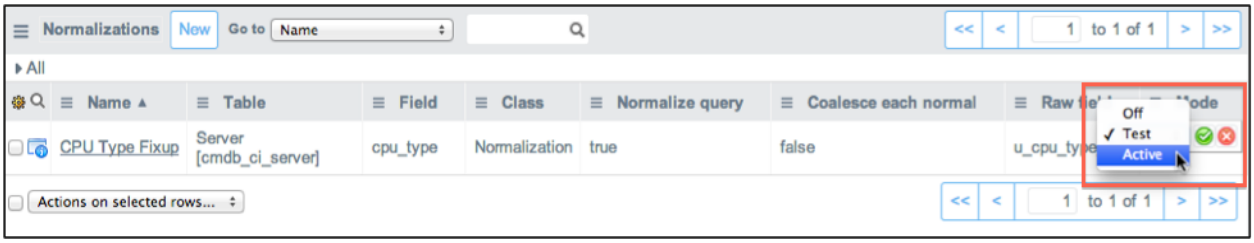
9. Click the **Apply to pending values** related link.

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10. When the page refreshes, you should be back on the **Normal Value** record. View the Aliases related list. New aliases have been added!



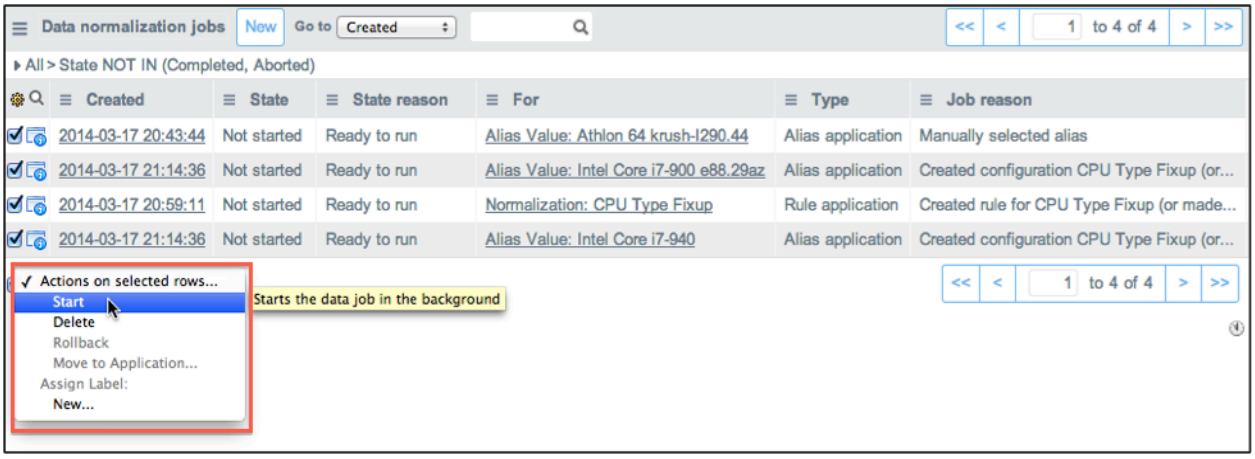
11. Navigate to **Field Normalization > Configurations > Normalizations** and set the configuration to **Active**.



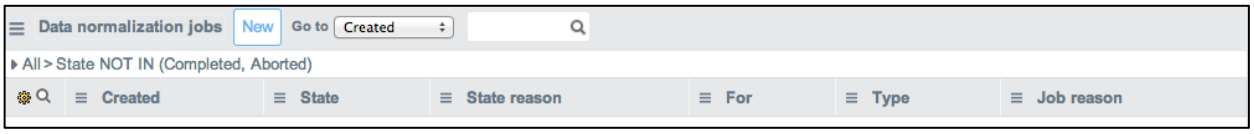
12. Navigate to **Field Normalization > Data Jobs > Incomplete**.

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13. Select all the jobs, then under **Actions on selected rows…** select **Start**.

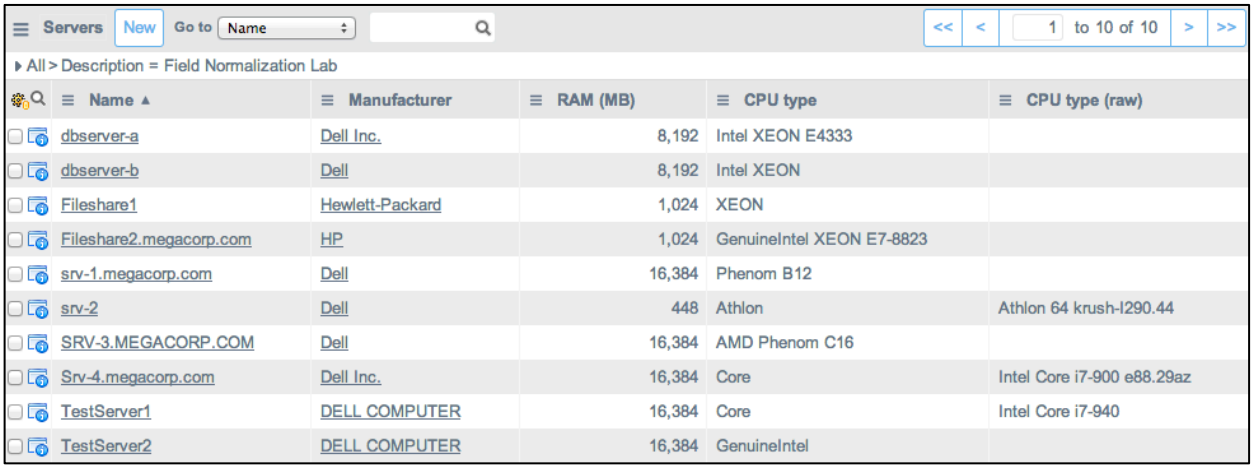


14. Allow a few seconds for the jobs to run. Click **State NOT IN (Completed, Aborted)**. The list of incomplete jobs is empty when they are completed.



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15. Navigate back to the Server list, and check the progress. What raw values are populated?



Name	Manufacturer	RAM (MB)	CPU type	CPU type (raw)
dbserver-a	Dell Inc.	8,192	Intel XEON E4333	
dbserver-b	Dell	8,192	Intel XEON	
Fileshare1	Hewlett-Packard	1,024	XEON	
Fileshare2.megacorp.com	HP	1,024	GenuineIntel XEON E7-8823	
srv-1.megacorp.com	Dell	16,384	Phenom B12	
srv-2	Dell	448	Athlon	Athlon 64 krush-l290.44
SRV-3.MEGACORP.COM	Dell	16,384	AMD Phenom C16	
Srv-4.megacorp.com	Dell Inc.	16,384	Core	Intel Core i7-900 e88.29az
TestServer1	DELL COMPUTER	16,384	Core	Intel Core i7-940
TestServer2	DELL COMPUTER	16,384	GenuineIntel	

NOTE: For the next few steps, start at the **CPU Type Fixup** Normalization configuration record. If necessary, just use the left navigation menu to get back where you started.

16. Create rule for the **Phenom** Normal Value as follows:

Name: **Contains "Phenom"**
Make alias: **checked**
All of these conditions must be met: **CPU type | contains | phenom**



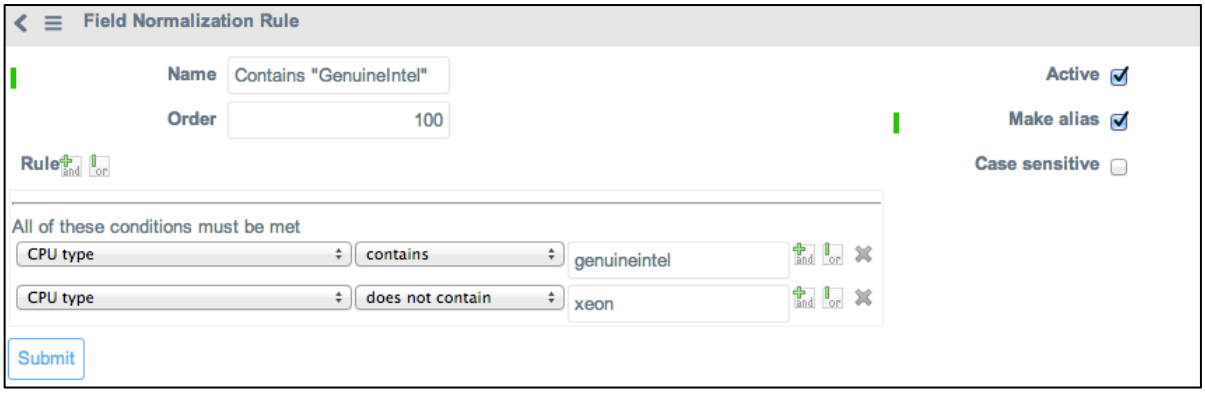
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17. Create a rule for the **Xeon** Normal Value as follows:

    Name: **Contains "Xeon"**
    Make alias: **checked**
    All of these conditions must be met: **CPU type | contains | xeon**



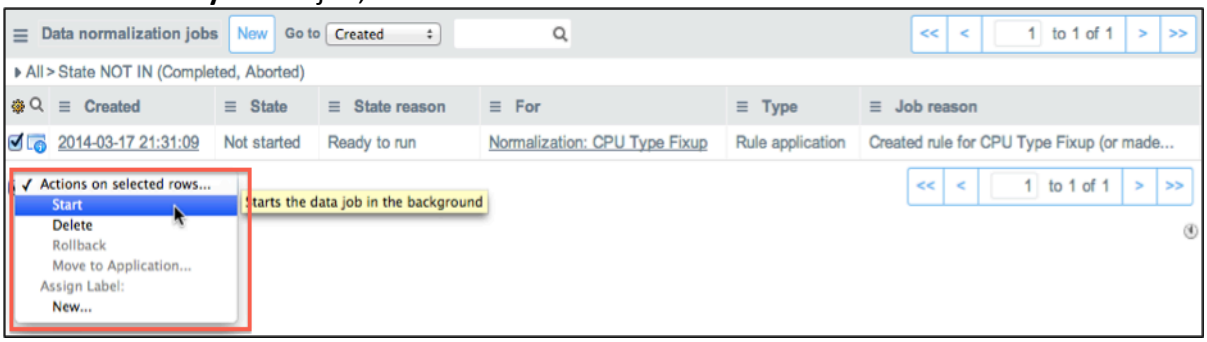
18. Create a rule for **GenuineIntel**. Add the rule to the **Core** Normal Value, but make sure it does not overlap with the one from the **Xeon** rule, as follows:



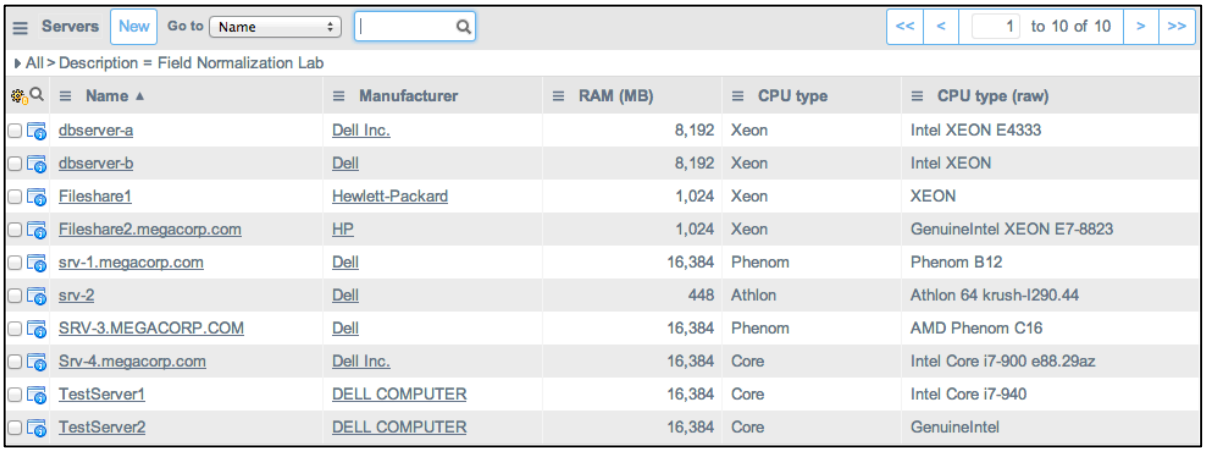
19. Navigate to **Field Normalization > Data Jobs > Incomplete**.

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20. Select the **Ready to run** job, then select **Start** from the **Actions on selected rows** menu.



21. Let the job complete and then view the Server list.



Name	Manufacturer	RAM (MB)	CPU type	CPU type (raw)
dbserver-a	Dell Inc.	8,192	Xeon	Intel XEON E4333
dbserver-b	Dell	8,192	Xeon	Intel XEON
Fileshare1	Hewlett-Packard	1,024	Xeon	XEON
Fileshare2.megacorp.com	HP	1,024	Xeon	GenuineIntel XEON E7-8823
srv-1.megacorp.com	Dell	16,384	Phenom	Phenom B12
srv-2	Dell	448	Athlon	Athlon 64 krush-l290.44
SRV-3.MEGACORP.COM	Dell	16,384	Phenom	AMD Phenom C16
Srv-4.megacorp.com	Dell Inc.	16,384	Core	Intel Core i7-900 e88.29az
TestServer1	DELL COMPUTER	16,384	Core	Intel Core i7-940
TestServer2	DELL COMPUTER	16,384	Core	GenuineIntel

22. Click the **Personalize list** gear icon and reset the list columns to the default.

Review

- You can clean up string values with Normalization. Specifically, you can define a set of values that map to one single Normal Value.
- You can use a list of specific Aliases to define that set, or you can use a more generic Rule.
- You can retain the raw, untouched values in a separate column, so as not to lose any data.
- Do not forget: if you make a mistake, you can always roll back the jobs.

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Lab Goal

Lab 3
Coalesce Data

How do you handle multiple variants of something that should really be represented by one record, such as “Dell”, “Dell Inc”, and so on?

What do you do with reference fields? For example, Servers have a Manufacturer field that points to the core_company table. You can normalize on the value, but you do not want to point to multiple records with the same value.

You merge, or *coalesce*, the records into the one you want to keep. In this lab you clean up the company name table by normalizing with a coalesce to eliminate duplicate variations of the same company.

Create the Normalization / Coalesce Configuration

1. Navigate to **Field Normalization > Knowledge Lab > Companies**.

2. There are our variants, three variations of Dell and two of HP.

Companies New Go to Name << < 1 to 5 of 5 > >>

All > Name starts with dell .or. Name starts with hp .or. Name starts with hewlett

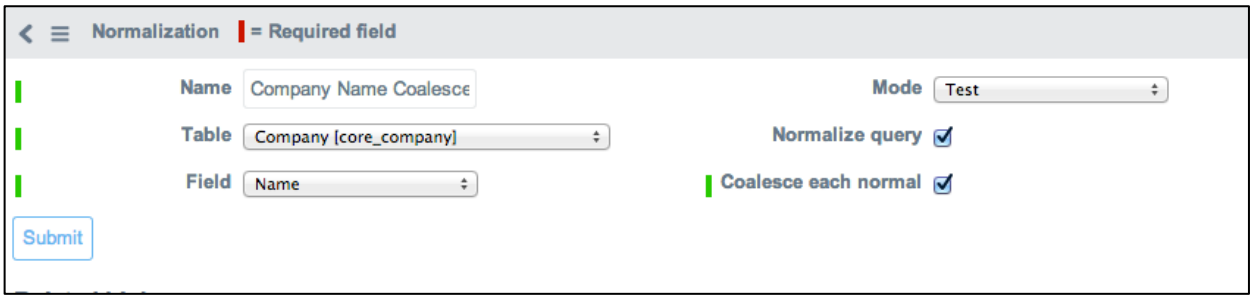
Name ▲	Street	City	Zip / Postal code	Phone	Updated
Dell					2014-03-17 14:20:50
DELL COMPUTER					2014-03-17 14:20:57
Dell Inc.	2300 Greenlawn Blvd	Round Rock	78664	(512) 338-4400	2013-05-09 12:23:32
Hewlett-Packard	3000 Hanover Street	Palo Alto	CA	650-857-1501	2013-05-06 22:50:23
HP					2014-03-17 14:21:08

3. Navigate to **Field Normalization > Configurations > Normalizations**.

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4. Click **New** and complete the form as follows:

   Name: **Company Name Coalesce**
   Table: **Company [core_company]**
   Field: **Name**
   Coalesce each normal: **checked**



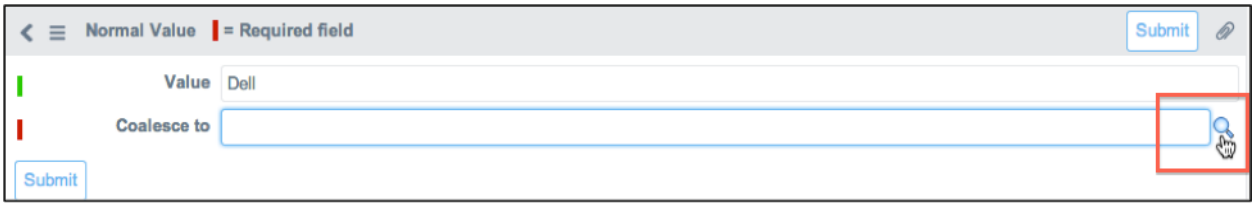
NOTE: **Coalesce each normal** is just an option on a Normalization configuration.

5. Right-click the form header and **Save**.

6. Under the **Normal Values** related list, click **New**.

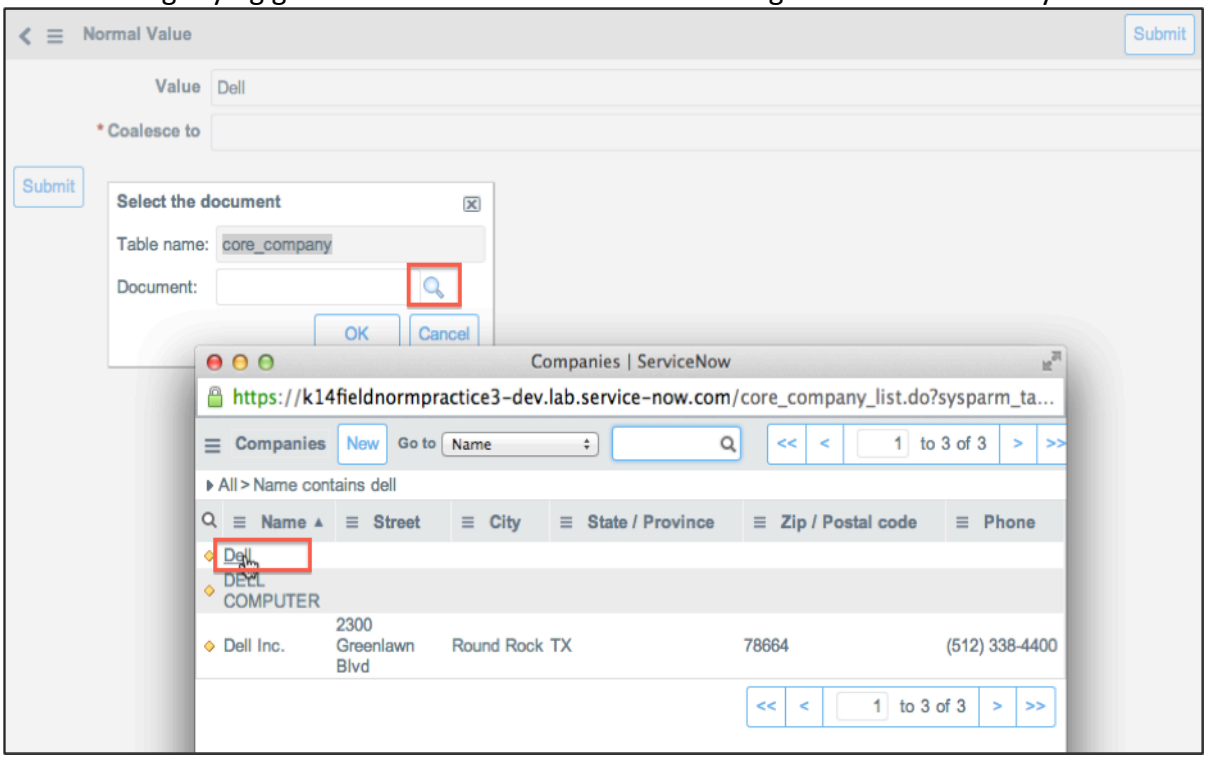
7. Set the Value to **Dell**.

8. Click the **magnifying glass** to the right of **Coalesce to**.



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9. Click the magnifying glass in the **Select the document** dialog and locate the entry for **Dell**.



10. Click **Dell** (don't be concerned that it doesn't have any address information, we will see something interesting with that soon) then click **OK**.

11. In the **Normal Value** record, click **Submit**.

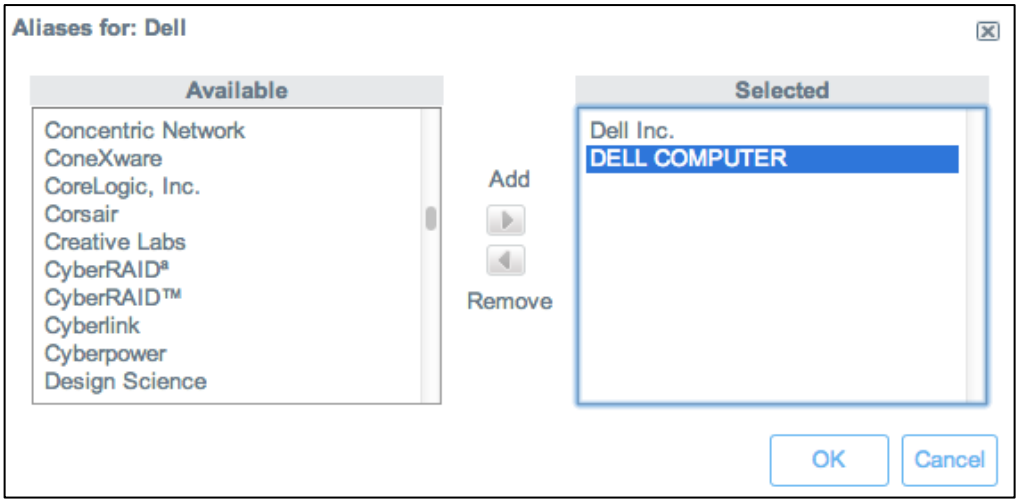


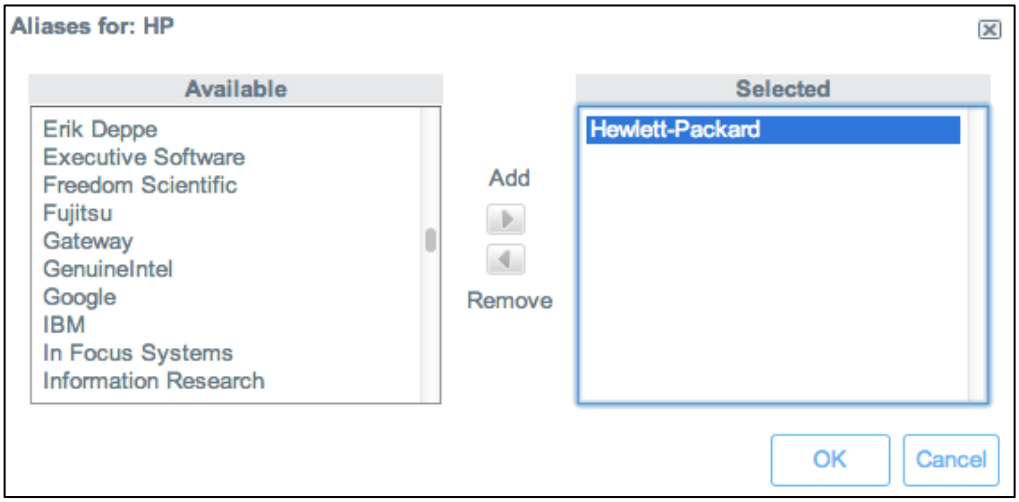
12. Repeat **steps 5-9**, this time for **HP** to get the following:



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13. As in a previous lab section, add **Aliases** for the two **Normal Values**, as shown here. Hint: Click into each **Normal Value**, then use the **Aliases** related link. You need to do a bit of scrolling as there is more company data than just what you use in the lab.





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Apply the Normalization / Coalesce

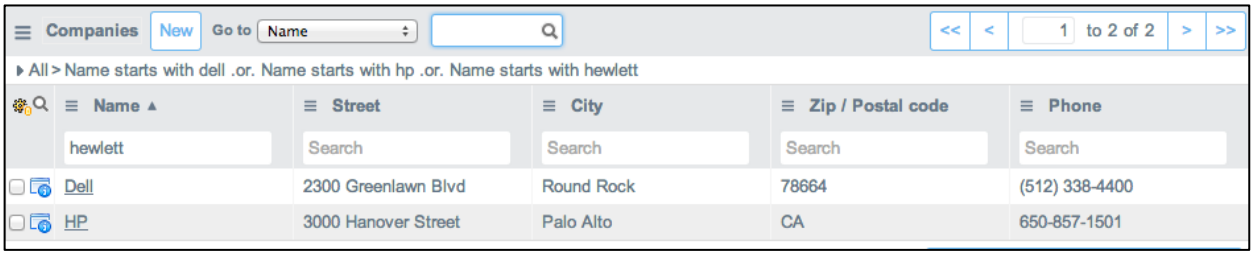
1. You need to set the **Company Name Coalesce** Normalization to **Active**. Navigate to the configuration record and do so.

2. Navigate to **Field Normalization > Data Jobs > Incomplete**. Select all of jobs and **Start** them.

NOTE: When each the Alias Application job runs, it will automatically create a second job for the Coalesce.

3. Wait for both job types to complete.

4. Now look at the Company records.



NOTE: The other fields, such as the address information, coalesced too!

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5. View the Server list.

Servers New Go to Name << < 1 to 10 of 10 > >>

All > Description = Field Normalization Lab

Name ▲	Manufacturer	RAM (MB)	CPU type
dbserver-a	Dell	8,192	Xeon
dbserver-b	Dell	8,192	Xeon
Fileshare1	HP	1,024	Xeon
Fileshare2.megacorp.com	HP	1,024	Xeon
srv-1.megacorp.com	Dell	16,384	Phenom
srv-2	Dell	448	Athlon
SRV-3.MEGACORP.COM	Dell	16,384	Phenom
Srv-4.megacorp.com	Dell	16,384	Core
TestServer1	Dell	16,384	Core
TestServer2	Dell	16,384	Core

Review

- Coalesce is powerful!
  - You specify a **Normal Value** and define **Aliases** for it.
  - Automatically updates all references to alias records to instead reference the appropriate normal record.
  - Automatically deletes the alias records after the references are cleaned up
- This can be a little scary, since it can delete records. But there is some protection:
  - You cannot run the normalization jobs while in test mode
  - You can roll back if there is an issue!

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Lab Goal

Review the built-in user roles for Field Normalization.

Lab 4
User
Roles

Role Definitions

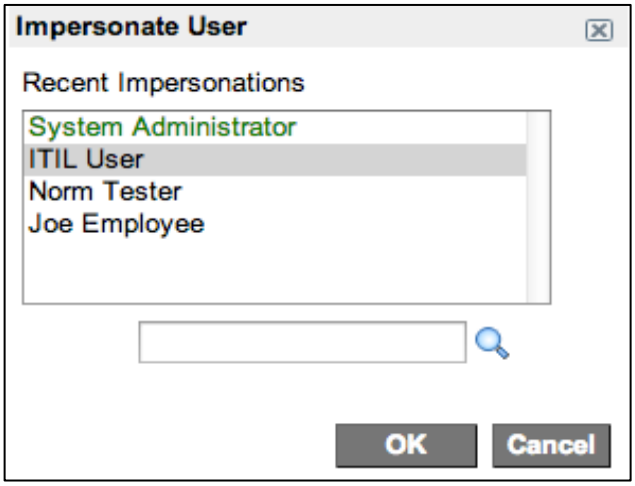
- **normalizer**: Person authorized to manage field normalization and transformation.
- **normalization_tester**: Person authorized to create test records for normalizations and transformations. Only records opened by users with this role are available for testing normalization and transformation rules in Test mode.

Try the Roles in Test Mode

1. Navigate to **Field Normalization > Transformations**.
2. Open the configuration called **RAM Size Fixup**, created in a previous lab section.
3. Set the **Mode** to **Test** and **Update** the record.

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4. Impersonate, or log in as, **ITIL User**, which has no Normalization roles.



5. Navigate to **Configuration > Base Items > Servers** and open any Server.

NOTE: ITIL User does not see the Field Normalization decoration for **RAM (MB)**.



6. Set the value for **RAM (MB)** to **1023**, and **Save** the record.

NOTE: It did not normalize!

7. Set the value for **RAM (MB)** back to **1024**, and **Save** the record.

8. Impersonate, or log in as, **Norm Tester**, which has the **normalization_tester** and **itil** roles.

9. Navigate to **Configuration > Base Items > Servers** and open any Server record.

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NOTE: Norm Tester sees the Field Normalization decoration for **RAM (MB)**.



10. Set the value for **RAM (MB)** to **1023**, and **Save** the record.

NOTE: It normalized!

11. Navigate to **Field Normalization > Configurations > All**. Wait… can you?

NOTE: Norm Tester cannot see the Field Normalization application. Only someone with the **normalizer** or **admin** roles can.

12. Impersonate, or log in as, **Norm Alizer**, which has the **normalizer** role.

13. Navigate to **Field Normalization > Configurations > All**.

Note: Norm Alizer can see the Field Normalization application.

14. Open the **RAM Size Fixup** configuration, and set it to **Active** mode.

15. Impersonate, or log in as, **admin**.

Review

- Roles dictate whether or not you can…
    - Configure normalizations.
    - Normalize values while in Test mode.
    - See decorations on normalized fields.

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Lab Goal

The Server names in the environment are not consistently represented. Some use Fully Qualified Domain Names (FQDNs) and some use upper case characters. You have a standard to use only lower case characters in the names. Use a Transform to fix the list of server names.

Lab 5
Transform String Data

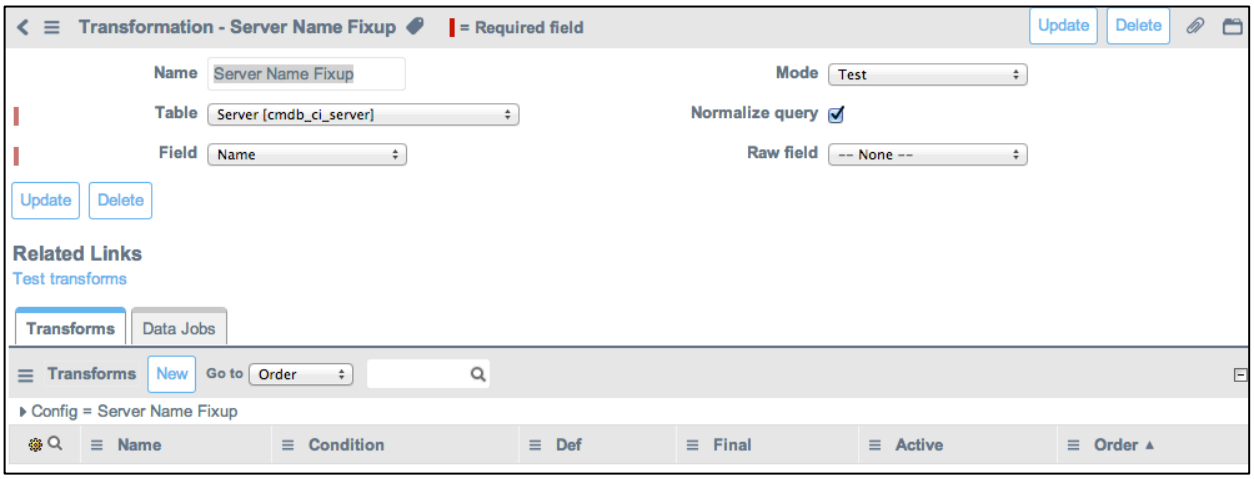
Create the Transformation Configuration

1. Navigate to **Field Normalization > Knowledge Lab > Servers**. What is left to do?

2. Navigate to **Field Normalization -> Configurations > Transformations**.

3. Click **New** and complete the form as follows:

   Name: **Server Name Fixup**
   Table: **Server [cmdb_ci_server]**
   Field: **Name**



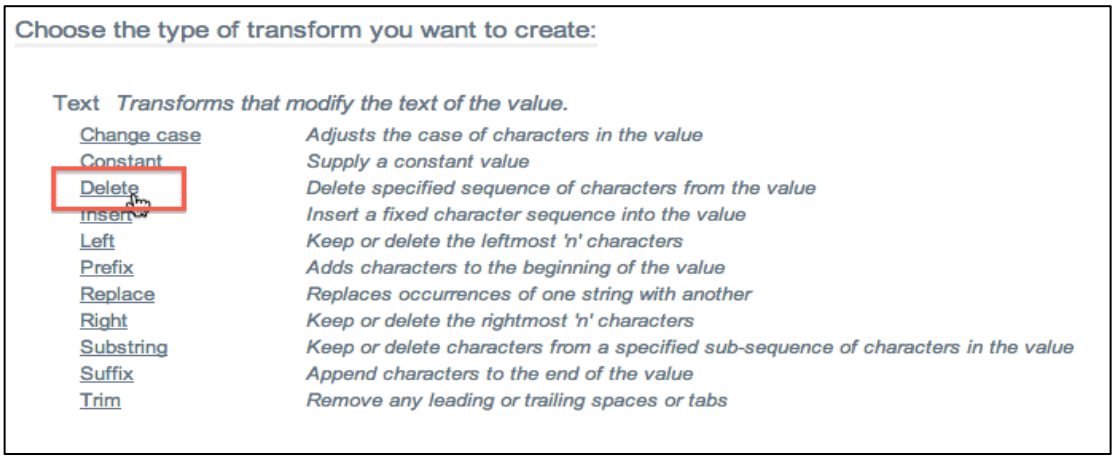
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4. Right-click the form header and **Save**.

5. Under the **Transforms** related list, click **New**.

NOTE: There are different transforms than you saw previously because **Name** is a string type field, while the **RAM (MB)** field was a numeric type field.

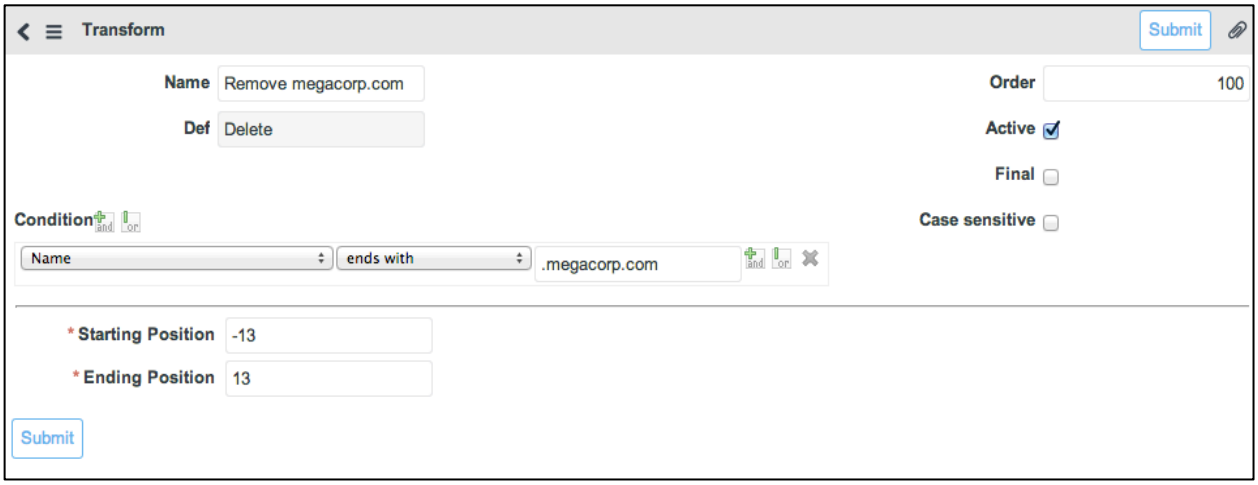
6. Click the **Delete** transform type.



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7. Complete the form as follows:

   Name: **Remove megacorp.com**
   Case sensitive: **unchecked**
   All of these conditions must be met: **Name | ends with | .megacorp.com**
   Starting position: **-13**
   Ending position: **13**



NOTE: The conditions say:

- Apply this transform only to those names ending with **.megacorp.com**.
  - The starting position of **-13** means 13 characters from the right.
  - The string **.megacorp.com** is 13 characters long.
  - The ending position of **13** means 13 characters to the right from the starting position.
- End result: Any trailing .megacorp.com is removed.

8. Click **Submit**.

9. Navigate back to the **Server Name Fixup** configuration.

10. Under the **Transforms** related list, click **New**.

11. Select the **Change case** option.

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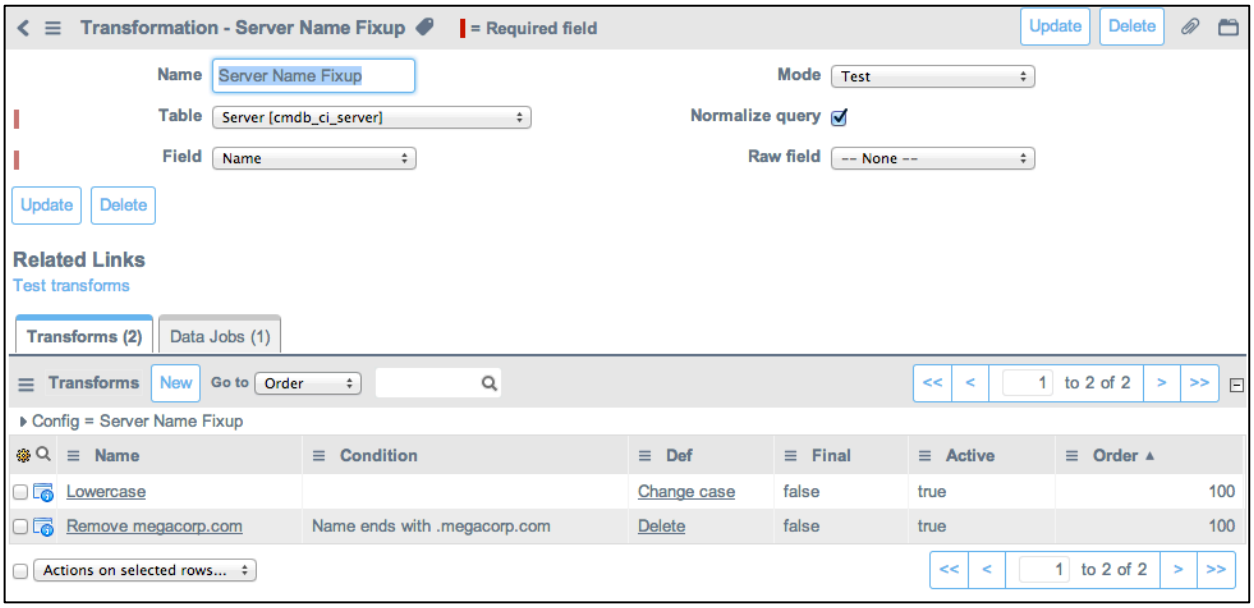
12. Complete the form as follows:

    Name: **Lowercase**
    Case sensitive: **unchecked**
    Mode: **Lower**



13. Click **Submit**.

14. The **Server Name Fixup** configuration should now look like this:



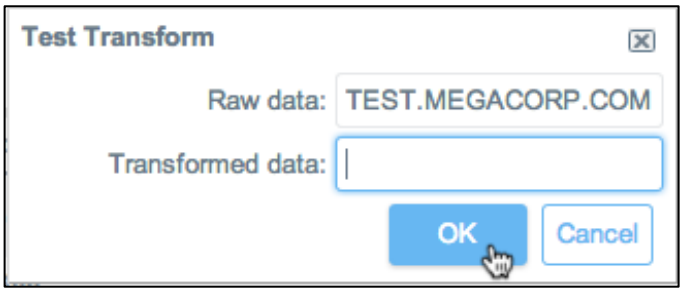
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Test and Apply the Transformation

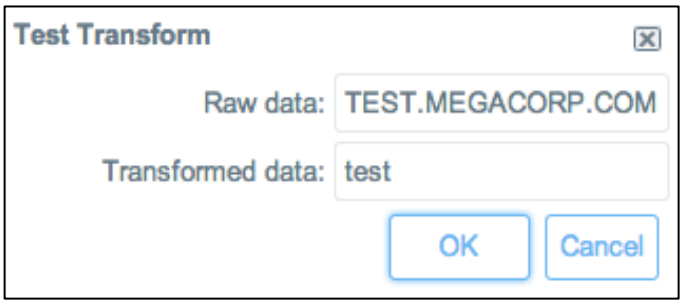
1. Click the **Test transforms** related link.

2. Fill in the test data as follows and click **OK**:

   Raw data: **TEST.MEGACORP.COM**



   NOTE: The result should be **test** as shown here.

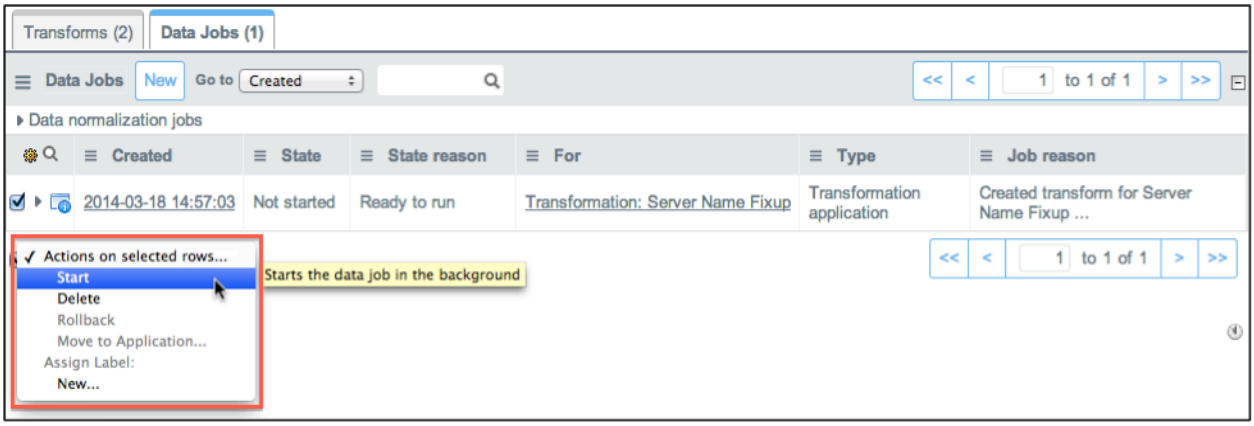


3. Click **Cancel** to close the test dialog.

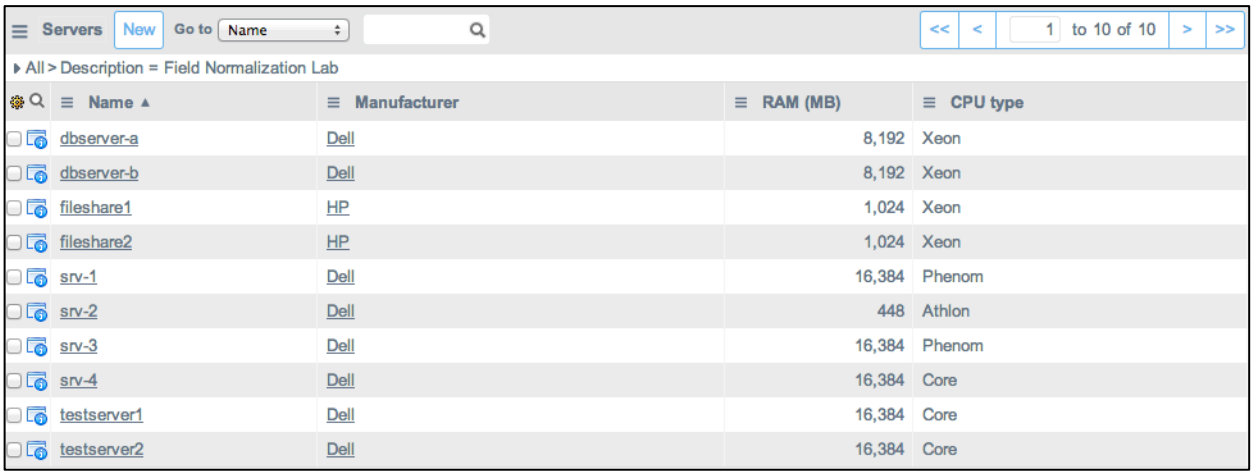
4. In the **Server Name Fixup** configuration, change the **Mode** to **Active**, and **Save** the record.

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5. Run the Transformation application **Data Job**.



6. Check out the updated Server list.



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Review

- The string transform is versatile! Default options allow:
  - Insert and delete substrings
  - Add on or remove prefixes and suffixes
  - Clean up punctuation and whitespace
- You can test without changing actual records with the **Test Transform** related link.

Back to the Beginning – Is the Data fixed?

- You cannot buy 16,345 MB of RAM… Check.
- CPU type – too much detail… Check.
- Manufacturers – there is more than one Dell… Check.
- The server names are inconsistent… Check.

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