Overview
This lab will guide through all the complete steps for an example CIH implementation. The fundamental building blocks are:

- Application
- Topic
- Publication
- Subscription

This lab document will instruct the reader through each of the building blocks and how they work together to achieve the example CIH implementation.

Prerequisite
Having a user name and password for IICS. This was mentioned in the lab presentation. Navigate to https://www.informatica.com/trials/informatica-cloud.html. This form should be filled out by NOT using your own work email as userID, but rather create a userID of your own, e.g. john_sample@demo.com.
me@mywork.com

Use my email address as my username.

myuser@demo.com

First Name  Last Name

Sr Developer

949-444-5555

Mywork

United States

Mycity

California

92626

Data Center Location

North America

Yes, I would like to receive communications from Informatica about products, solutions, and events.

I have read & agreed to the Subscription Agreement

START YOUR FREE TRIAL
Very importantly ensure Data Center Location is “North America”. Uncheck “Use my email address as my username” and provide the input required by the form followed by clicking on “START YOUR FREE TRIAL”.

You will receive an email instantaneously allowing you to activate your IICS account.


Use your new user account with password to log in and click on “Integration Hub”.

Prior to using Integration Hub for the very first time, it needs to be instantiated.
Provide your user and password, use “Informatica Cloud Hosted Agent” and use “Hosted” repository. CIH is now ready for use.

In the labs we are going to create CIH publishers and subscribers. The subscribers need a connection to land the subscription data. For the lab purposes we will use Azure SQL DB. As preparation for the subsequent labs one connection object needs to be created.

Log into IICS and go to “Administrator”.

1. Log into IICS and go to “Administrator”
2. From the navigation menu choose “Connection”.

3. Click “New Connection” at top right.
4. Fill out the connection properties as shown:

![Connection Details](Image of connection details)

- **Connection Name:** azureDB
- **Type:** SQL Server
- **Runtime Environment:** Informatica Cloud Hosted Agent
- **SQL Server Version:** SQL Server 2016
- **Authentication Mode:** SQL Server Authentication
- **User Name:** IW19_CIH_LAB
- **Password:** ****
- **Host:** iw19.database.windows.net
- **Port:** 1433
- **Database Name:** IW19_CIH_LAB
- **Schema:** dbo
- **Code Page:** MS Windows Latin 1
- **Encryption Method:** Login SSL
- **Crypto Protocol Version:** TLSv1
- **Validate Server Certificate:** False
- **Trust Store:**
- **Trust Store Password:**
- **Host Name in Certificate:**

5. The following table provides the connection properties:
### Connection Details

<table>
<thead>
<tr>
<th>Connection Name</th>
<th>azureDB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>SQL Server</td>
</tr>
<tr>
<td>Runtime Environment</td>
<td>Informatica Cloud Hosted Agent</td>
</tr>
<tr>
<td>SQL Server Version</td>
<td>SQL Server 2016</td>
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<tr>
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<tr>
<td>User Name</td>
<td>IW19_CIH_LAB</td>
</tr>
<tr>
<td>Password</td>
<td>Informatica1</td>
</tr>
<tr>
<td>Host</td>
<td>iw19.database.windows.net</td>
</tr>
<tr>
<td>Port</td>
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</tr>
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<td>TLSv1</td>
</tr>
<tr>
<td>Validate Server Certificate</td>
<td>False</td>
</tr>
</tbody>
</table>

6. Test the connection and ensure it connects to the database correctly.
7. Save the connection object.

This connection is now ready to use in the subsequent exercises.

### Background and Scenario

In order to better manage the delivery of important enterprise data, CIH will be used to achieve this goal. In this lab we will implement publishing Order data from ERP into CIH so that it will be available to subscribing applications, teams and projects. The Order data is very important to the organization and CIH will manage, streamline and visualize the publication and subscription activities related to this data asset.

The typical process of a CIH implementation will consist of setting up “Topics” in CIH, basically the desired data model of important assets (Order data for this lab). CIH organizes data providers and consumers inside “Applications”, such as ERP publishing and Data Warehouse and others subscribing. Publishers and subscribers are built either with IICS Data Integration jobs (mappings or synchronization tasks) or directly from CIH via provided REST API. We will now start the lab exercise to achieve this goal.
Create Applications

Applications allow to reflect descriptive names for both publications and subscriptions, for example ERP, MDM, Enterprise Data Warehouse, Data Lake, Datamart etc.

1. Log into IICS and navigate to Integration Hub.

2. Use the “New” button

3. Select “Application”
4. Enter the Application Name and Description (ERP)

5. Repeat steps 2, 3 and 4 to create applications for:
   a. Enterprise Data Warehouse
   b. Finance
   c. Sales Datamart
Create Topics

Topics in CIH represent the canonical model of the high value data assets. For this lab we will create a topic for Orders data which consist of order header and order detail. Please follow the steps below.

In preparation for topic creation please download the JSON structure files from here:  https://network.informatica.com/docs/DOC-18209

This provides orders.json and order_details.json.

Orders topic.

1. Use the “New” button.

2. Choose Topic.
3. Name the topic “Orders” and leave default choices.

![Image of New dialog box with Topic selected]

- **Topic Name:** Orders
- **Description:**
- **Topic Type:** Incremental Load
- **Publication data retention period:** 7 days

4. Create a table from a Metadata File.
5. Use orders.json (as it was created in this lab’s preparation step). The table name will be “orders” and click the Load File button.

6. Click OK and the structure for “orders” is created.

7. Now we Click “Create Table From” one more time for order_details, use create from “Metadata File”.
8. Use order_details.json (as it was created in this lab’s preparation step). The table name will be “order_details”. Click the Load File button.

9. Click OK and the structure for order_details is created.

10. Click Save to save the Orders topic consisting of the “orders” and “order_details” tables and ensure you see the success message.
11. Click on Explore

12. Ensure Orders topic is shown.

This concludes the topic creation exercise.

Create Publishers

Now that topics have been created in CIH it is time to set up publications of data. Data will be published into the CIH topics from the source application(s). CIH is an integrated part of IICS and we will use IICS Cloud Data Integration (CDI) to publish into CIH. We can use mappings with mapping task or a synchronization task to achieve this. For our first CIH publisher we will use an IICS synchronization task.

1. Log back into IICS and navigate to “Data Integration”. 
2. Use the “New” button.
3. In the New Assets dialog go to Tasks and select Synchronization Task and click Create.
4. Provide an appropriate name and description for the task and click Next.

5. For connection type click “Sample” and use the Oracle type sample.
6. The source object to use is ORDERS. A data preview of the ORDERS data from the “Sample Oracle Connection” will be displayed.

7. Click Next.

8. The Target connection is “Cloud Integration Hub”. Target Object is “Orders/orders”.

9. Click Next.

10. No filter is needed.
11. Click Next.
12. Fields are already mapped in this case since the source matches the CIH topic exactly. You can validate the mapping with “Validate Mapping”.

13. Click Next.
14. Leave defaults on Schedule tab.
15. Click Finish to save the task.
16. This DI task will be controlled from CIH rather than being run manually, so we will navigate to Integration Hub.

17. Use the New button to create a new Publication.
18. Select Publication.

19. Provide a name for the CIH publication and a description.
20. Select ERP as the Application, Orders for the Topic and under Task choose the previously created CDI Synchronization task for orders publishing from ERP.

21. Schedule for this example is “Manually”, but keep in mind that CIH provides a very easy to use time based scheduler as the other option which is almost always chosen by a real world scenario.

22. Save the publication and look for the message indicating “Publication created successfully”.

23. Go to “Explore”.
24. Highlight the publication and right click on it for the actions menu to appear and click “Run”.

25. Navigate to “Events”.

26. Use the Refresh button on the menu to update the display of current events.
27. Make sure the publication runs properly and ends with a successful Event Status.

This concludes building a simple CIH publisher that is based on an IICS CDI Synchronization Task.

Create Subscribers

Among the many benefits of using CIH is the ability to provision high quality enterprise data to be delivered to subscribers easily. In this exercise we will go over the subscription process. Similar to the publication process we will use IICS CDI tasks, both mapping tasks and synchronization tasks for the implementation of subscribers. A subsequent exercise further below will take focus on subscribing via direct REST API, which is an additional option provided within CIH.

The scope of the demo requires a total of three subscribers for the applications of:

- Finance
- Enterprise Data Warehouse (optional exercise in the advanced section of this lab guide)
- Sales Datamart (optional exercise in the advanced section of this lab guide)

Following we will set up a subscriber for the Finance application. The orders data for Finance only needs order header for this exercise and the data should only include shipped orders (Status field is equal to “Shipped”). The implementation will use an IICS CDI Synchronization task and here are the steps:

1. Go to IICS Data Integration.
2. Click “New” button and create a Synchronization Task.
3. Name the task and provide a reasonable description.

4. Configure the source to be CIH (connection called “Cloud Integration Hub”). This uses only “Orders/orders”. 
5. Target is the “finance_orders” table in azureDB, do not truncate the table and select bulk load.

6. Create a new data filter.
7. Completed filter looks like this.

8. Field mapping can be auto mapped.

9. Click Finish. Nothing is needed on the Schedule tab.
10. Navigate back to the Integration Hub area of IICS and use the “New” button to create a new subscription.
11. Provide a subscription name and description.
   a. Leave defaults.
   b. Application is Finance.
   c. Select and add the Orders topic.
12. Select the Task to be the CDI Synchronization task from the previous step (which implemented the subscriber for Finance).

13. Schedule the subscription when published data is ready.
15. Test this subscription by running from Explore screen. Highlight the subscription and right-click on it to access the actions menu and selecting “Get previous publications”.

16. The Events page should show success and indicate the number of rows consumed.
At this time, we completed publishing orders data from ERP into CIH and we developed the first subscriber for Finance. More complex subscriber exercises can be found in the advanced section of this guide and can be completed in case you have time left during this lab session.

Navigate to the CIH home page and observe the artifacts and relationships that have been built thus far.
Monitor CIH Events

This exercise will focus on operational aspects of CIH. The Events page in CIH allows the operator to see all events (System Events, Publications, Subscriptions) as well as useful information about each.

In order to get some Events to show up, run the ERP publication for Orders data:

1. The Events page allows to view all CIH activity. Click on the arrow to get the related subscribers for the ERP orders publication.

2. This will now show all related subscription events. The status can be:
   a. Success
   b. Error
   c. Delayed (CIH will automatically run these events at their scheduled time)

3. Run the one delayed subscription to observe it going from Delayed to Final. The application link in the Events page can be clicked to go to the application screen.

Use the “Refresh” button if needed to see the most recent event results.
4. Using the action menu “Run” we can manually run this subscription before it’s time based schedule.

5. Back on the Events page this will now show the event in a “Processing” stage.

6. Once completed, the consumption status automatically shows “Final”.

7. The top of the Events page allows the user to set a variety of filter options or leverage the “Find” box to search for any text in order to narrow down the scope of events. If there are any error or delayed events those can also directly be clicked to.

8. Experiment with different search and filter criteria.

9. The action menu on the right allows for some actions.
a. If an event is in Error status the operator can Reprocess it.
b. An event status can be manually changed or discarded.
c. The operator can bring up the session log of the actual IICS CDI job.
d. The operator can look at summary level information via “Processing Information”

10. Experiment with all the action menu changes to observe and learn the information CIH provides in this context.

Another operational aspect of CIH are Monitoring Rules. They are designed to notify user(s) about very specific types of events and outcomes.

Here are the steps to explore Monitoring Rules.

6. In Integration Hub click “New”.

7. Choose Monitoring Rule.
8. Name the rule. The description of the rule serves as part of the email text delivered to the user. Specify the asset type (Publication or Subscription) and select which asset you like to monitor. Provide a status to monitor for and an email to deliver the notification to.

**General Details**

- **Rule Name**: Publication_Rule
- **Description**: Dear User,  
  This is to notify you of successful completion of the CITP publication "publish_ERP_orders".

- **Model**:  
  - Enabled
  - Disabled

- **Content**:  
  If the events of Publications: publish_ERP_orders  
  Are in status: Complete  
  Then: Send email to: sampleuser@myemail.com

**Affected Assets (1 Publication)**

Select the publication or subscription that you want to monitor.

- **Asset Type**: Publication
Now you can run the ERP publication for orders and it will deliver an email according to the monitoring rule.

Typically, users will most likely want to be notified of failures, but for this exercise to get an immediate action from the rule we simply monitored a successful outcome of the ERP orders publication.

This concludes the Events operational exercise. CIH elevates monitoring information beyond just data integration job information. Events are reported as publications or subscriptions along
with Topic and Application information, thus making it much more relevant to the data engineer and/or operator than simply looking at a job monitor. The events are fully searchable and filterable and different actions like reprocessing and adjusting status are offered right in the page.

**Data driven subscriber with CIH REST API**

In addition to building publishers and subscribers with IICS CDI and synchronization task, CIH also offers publishers or subscribers to achieve this via direct REST API. This is just a simple selection when creating a pub or sub in CIH. The REST options allows for much broader, more event driven use cases. The REST API can be invoked from a SaaS application, from a home grown application or process and also last but not least from IICS Cloud Application Integration (CAI). This exercise will not go into CAI, but great material about CAI is available at Informatica Word and/or out website.

The provide an example of this class of use cases we will configure a subscriber to the Orders data that uses the subscription REST API.

The IT team plans on enhancing the Sales Datamart with some home grown functionality that mostly leverages REST. The ask is to create a subscription mechanism for Orders data for the Sales Datamart that supports IT’s requirement for REST.

The exercise steps are as follows:

1. Go to the IICS Integration Hub area.
2. Open the Sales Datamart application.
3. Provide a name and description for the subscription.
   a. Ensure that “Subscribe Method” is “Consume data with an API”.
   b. Application is Sales Datamart.
   c. Topic is Orders.
4. Notice that at this point CIH automatically provides the REST endpoint as well as the link to the swagger definition. It is not necessary for this lab to implement a Notification URL, however, this is very useful for real world implementations.

5. Save the subscription.

6. Run the ERP orders publication so that there is some data for the subscriber to consume.

7. Now we can test this REST subscriber. We are suggesting to use a simple online tool under https://reqbin.com/. Use your web browser and navigate to https://reqbin.com/.

8. Consumption of CIH subscription data is a REST POST request where the URL is copied from the CIH subscription definition.

9. On the reqbin form paste the URL, select “POST”. Select “Basic Auth” and provide your user and password for IICS.
10. Click on “Content” and provide an empty JSON structure as shown below.

```
{
}
```

11. Click on the “Send” button and reqbin will submit the REST request to CIH and the right side of the screen will display the resulting subscription data in JSON array structure.
The implementation of a REST based data driven CIH subscriber is now completed.

**CIH advanced exercises**
This section provides additional exercise steps to build a more complex CIH Publisher based on an IICS CDI mapping.

1. Log back into IICS and navigate to “Data Integration”.

2. Use the “New” button.
3. In the New Assets dialog go to Mappings and select Mapping and click Create.
4. Provide an appropriate name and description for the mapping.

5. Drag one additional source and target from the left into the mapping canvas, connect objects as shown and appropriately name both sources and targets as shown.
6. Edit the “Orders” source under “Source” and click on “New Connection”.

7. Choose “Sample Data”.
8. Select the “Oracle” entry.

9. Select “Single Object” and via Select button bring in the ORDERS source. Optionally via Preview Data you can take a look at the source data.
10. Repeat the previous steps and edit the Order_Details source object to use the Sample Oracle Connection and the ORDERDETAIL object. Save the mapping progress for now.

11. Edit the CIH_orders target. Use connection “Cloud Integration Hub” from the Connection drop down menu.
12. For the Object select “Orders/orders” and click OK.

13. Repeat the previous steps for the CIH_order_details target. Use the Cloud Integration Hub connection and object Orders/order_details.

14. Map the target fields for CIH_orders, use “Automatch” with “Exact Field Name”
15. The design tool will confirm your field match.

☑️ 7 fields were mapped using Exact Field Names

16. Map the target fields for CIH_order_details, same as in previous step.

17. Ensure you see the success message for 5 mapped fields. Save the current mapping progress.

☑️ 5 fields were mapped using Exact Field Names

18. The integrations between IICS CDI and CIH use parameterization of the target related to CIH. Setup the connection parameter.

19. In editing the CIH_orders target choose New Parameter.

20. Ensure type of “connection” and provide an appropriate name.
21. Edit the CIH_order_details target object, change the connection from “Cloud Integration Hub” to using the connection parameter from the previous step.
22. Now save and validate the mapping and ensure “Valid” check box is shown.

23. From the Actions menu in the top right corner of the design canvas choose “New Mapping Task”.

24. Provide an appropriate task name and task description and select “Informatica Cloud Hosted Agent” for the Runtime Environment.
25. Click Next and set the connection parameter to use the “Cloud Integration Hub” connection.

26. Click Next and then Finish. There is no need to fill out anything on the Schedule tab.

27. Mappings and tasks related to CIH are never run by hand, this will cause errors. Instead CIH uses those mappings and tasks and starts them under the control of the CIH scheduling mechanism.

28. Navigate back to the Integration Hub area.

29. Use “New” button to create a new publication.
30. Provide a publication name and description. Method is “Publish with a Data Integration Task”, application is “ERP”, topic is “Orders”. For the task select the mapping task created in steps 23 through 26. This dialog gives access to an easy time based scheduler which is a very powerful tool. For the lab we choose “Manually or by external trigger”.
31. Save the new publication.
32. Go to “Explore”.
33. Use the Actions menu on the right.
34. Select “Run”.

35. Navigate to “Events”.

36. Ensure the newly created orders publication from ERP runs successfully.

37. The events page has a refresh button on the top, click it occasionally during run time of the publication until a successful status is observed.

Ensure the events page shows a green check mark for successful publication.
This concludes the exercise of creating a CIH publication by leveraging an IICS CDI task (a mapping in this case). Now data has successfully been published to CIH. We can now onboard subscribers and deliver high quality data to the subscribers at their chosen latency.

Following are exercise steps for additional subscriber strategies. This section provides the two optional subscriber tasks which are leveraging IICS CDI mappings to build more sophisticated logic.

This exercise will build two more subscribers for the applications of:

- Enterprise Data Warehouse
- Sales Datamart

Please follow these steps for the subscription exercise.

1. As mentioned, a subscription will also either leverage an IICS mapping or a synchronization task. Navigate to the Data Integration area of IICS.

2. We will create a mapping to implement the CIH subscriber of order data for the Enterprise Data Warehouse.

3. Click the New button in Data Integration and create a new mapping.
4. Provide a reasonable mapping name and description.

![Mapping properties](image)

**Name:** m_CIH_subscribe_orders_EDW
**Location:** Default
**Description:** mapping to implement CIH subscriber of orders data for the enterprise data warehouse

5. Give the source object a reasonable name, set the connection to “Cloud Integration Hub” and Source Type to “Multiple Objects”.
6. Use the actions menu as indicated by the blue exclamation mark.

7. Add a source object.

8. Select “Orders/orders”.

9. By using the action menu again we can add a related object.
10. Add “Orders/order_details” as related object and accept the default inner join on `orderNumber`.

11. The source object will show as follows, indicating the related objects and relationship definition.

12. Under Query Options Configure a filter (in order to reduce down the subscription data for lab exercise purposes).
13. Choose “Completely Parameterized” and name the filter parameter and check that it is of type “expression”.

14. Edit the mapping target object. Set Connection to “azureDB”.
15. For the Object click the Select button and choose “Create New at Runtime”. Name the table by incorporating initials and a two digit number (e.g. birth day or birth month) with orders_edw and click OK.

16. The target object definition should look as follows (please also enable bulk mode as shown):
17. Parameterize the source object of the mapping.

18. Name the source connection parameter.
19. Save the mapping progress and ensure the mapping shows as Valid.

20. From the actions menu create a new Mapping Task.

21. Provide a reasonable name and description and set Runtime Environment to “Informatica Cloud Hosted Agent”.
22. Set Source Parameter Details to “Cloud Integration Hub”.

23. Click “Configure” for the filter query options.
24. Configure a simple filter condition for orderNumber greater than 10400.

25. Save and finish task creation dialog, no need to edit anything on the Schedule tab.
26. Navigate back to the IICS Integration Hub area and click the New button for a new subscription.
27. Name the subscription and provide a description, leave defaults as selected. Set the Application to “Enterprise Data Warehouse”, use the “Add Topic” button to add the “Orders” topic.

<table>
<thead>
<tr>
<th>Topic Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orders</td>
<td></td>
</tr>
</tbody>
</table>

28. For the Task choose the task saved in step 25 (MTT implementing the EDW subscriber for orders data). Schedule is Manually or by an external trigger and data to consume “All available publications”.
29. Save the subscription and ensure success message.

Subscription created successfully.

30. The asset is now available under Explore.

31. Validate the EDW orders subscription by using the actions menu of the Explore screen. Choose “Get Previous Publications” and use the current day both as start and end.
32. The Events screen will show a completed subscription for the data that was published previously in this lab exercise.

The EDW subscriber for orders data is now completed.

We will now add one last subscription implemented by a mapping to demonstrate adding transformations and a new calculated field for the subscriber. The steps are very similar to the first subscriber mapping, thus instructions will be less explicit.

1. The resulting mapping design will look like this.

   ![Mapping Diagram]

   a. Source is from Cloud Integration Hub
   b. Target is a table in azureDB (create new at run time). Use initials and two digit number(e.g. birth day or month) for the table name, for example:
c. Expression adds a calculated field “totalAmount” of type decimal(10,2)

d. Use this expression for totalAmount:
   i. “to_decimal(quantityOrdered,2) * to_decimal(priceEach,2)”
e. Ensure to parameterize the source connection and using multiple source objects with the relationship as shown.

2. Create a mapping task for this newly created mapping, setting name and description, runtime environment and pointing to Cloud Integration Hub for the source parameter.

3. Navigate back to IICS Integration Hub.
4. Create a new subscription under the “Sales Datamart” application.
5. Test this new subscription by running “Get previous publication” via the action menu on the Explore page.

6. Now the home page of CIH will show as follows:
Development of the publisher from ERP and the three subscribing applications for Orders data is now completed. It is very helpful to see the artifacts and their relationships on the home page.