KNIME Tableau Integration User Guide

KNIME AG, Zurich, Switzerland
Version 4.5 (last updated on 2021-08-04)

Table of Contents

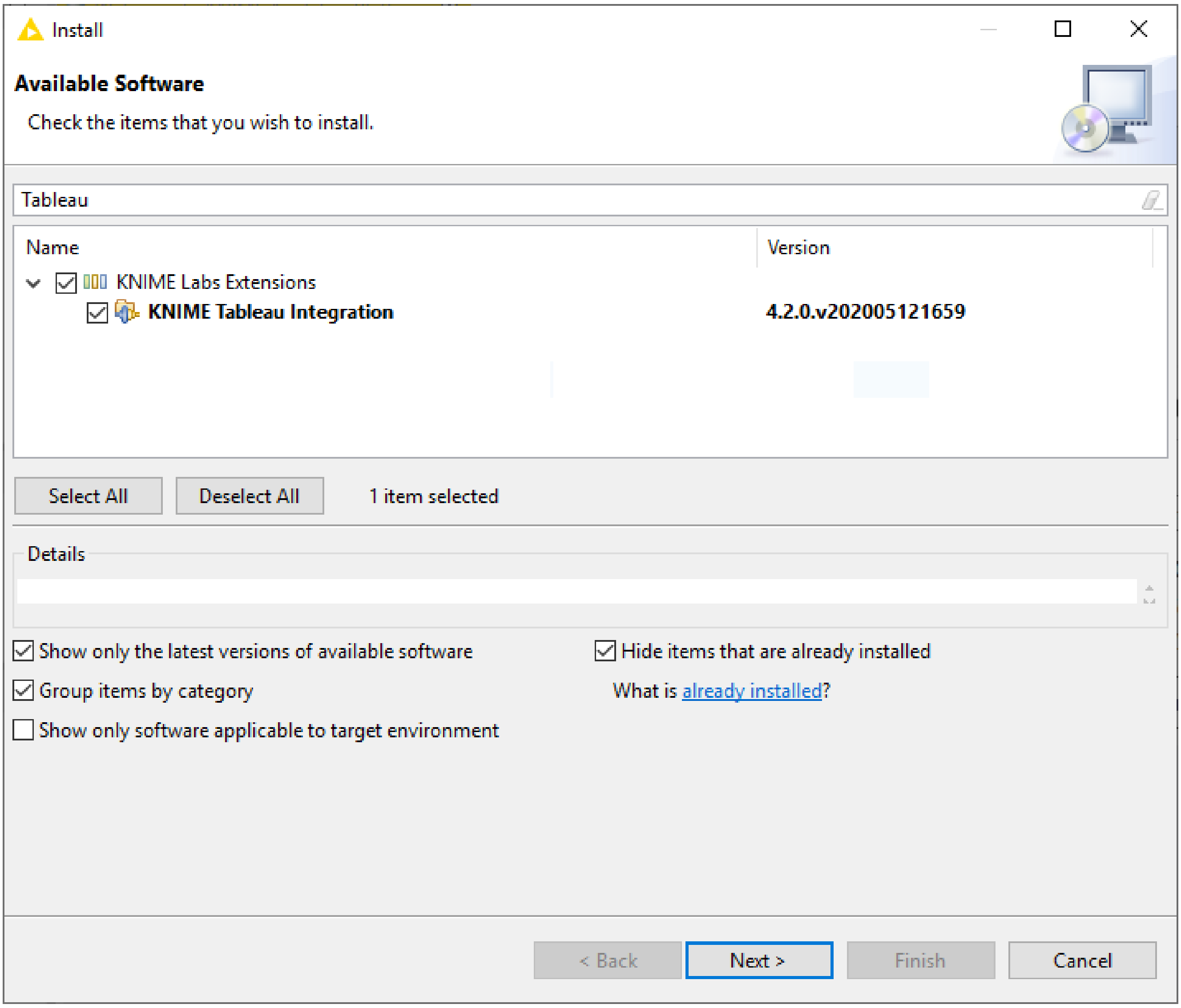
Introduction

This guide explains how to connect KNIME Analytics Platform with Tableau®. There are a few methods you can use to do this, and the text below describes these methods in further detail, while walking through an example KNIME workflow.

Installation

Installing the Tableau Extensions

Navigate to *File* → *Install KNIME Extensions* and type "Tableau" in the search box that appears. When you do, you will see something like the screen below.



Install

Available Software

Check the items that you wish to install.

Tableau

Name	Version
☑ KNIME Labs Extensions	
☑ **KNIME Tableau Integration**	**4.2.0.v202005121659**

1 item selected

Details

☑ Show only the latest versions of available software

☑ Group items by category

□ Show only software applicable to target environment

☑ Hide items that are already installed

What is already installed?

Install the extension **KNIME Tableau Integration**.

The Tableau integration uses the "Tableau Hyper API" which uses the `.hyper` format. If you want to use the `.tde` format for a Tableau Server 10.4 or earlier you can install and setup the legacy extension as described in the Legacy Extensions section. Additional information on the differences between the `TDE` and `.hyper` formats, along with the changes implemented in Tableau 10.5, can be found on the Tableau website.

Once you have installed the extension(s), restart KNIME Analytics Platform and you should see the Tableau nodes in the node repository under *KNIME Labs*. You can now drag and drop the Tableau nodes into your workflow and use them to export data.

Tableau Online Setup

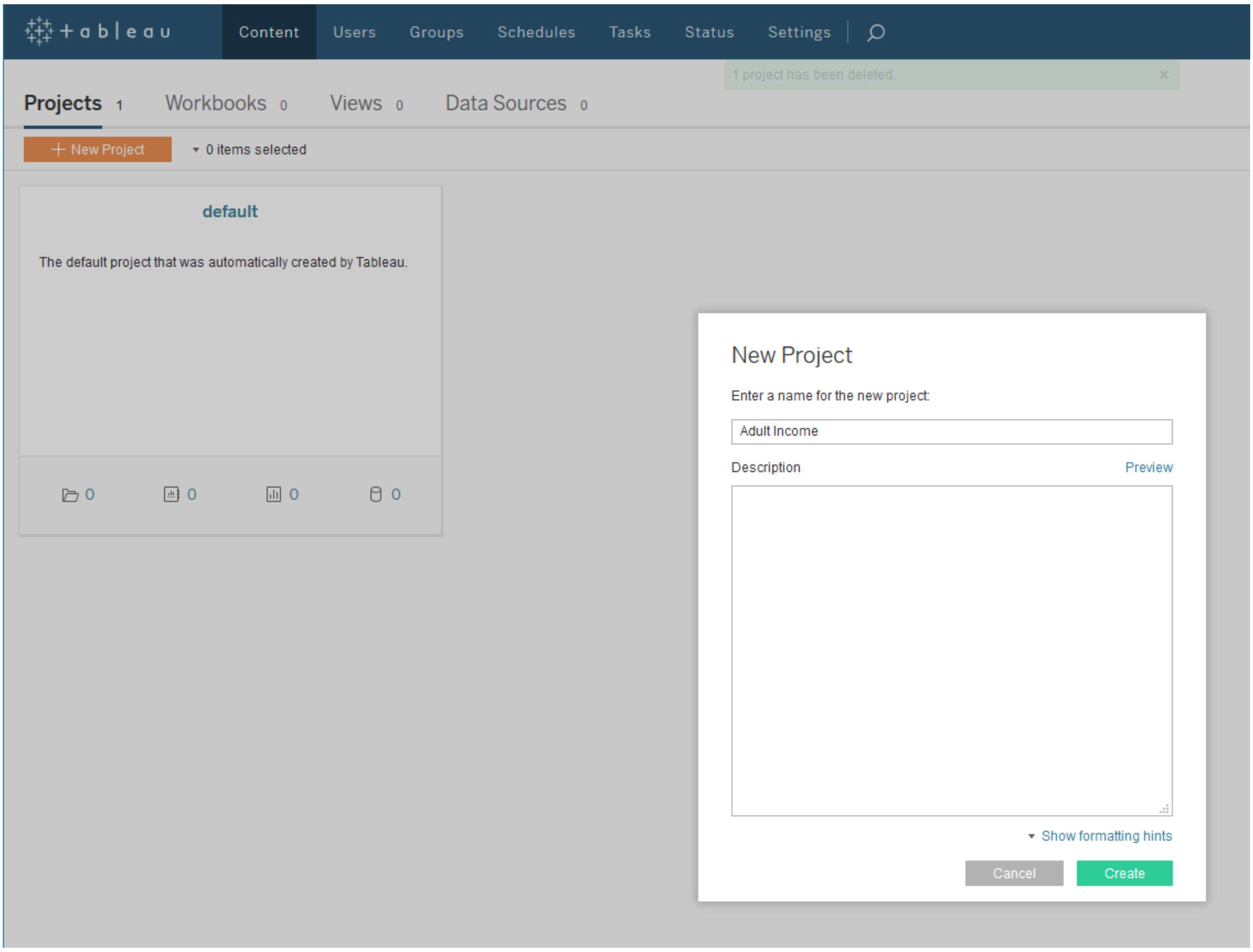
For the purpose of this guide, we will assume that you want to publish data to `Tableau Online`. However, most of what is discussed here also applies if you host your own Tableau server. If you do not already have a `Tableau Online` account, you can create a trial account. For the steps that follow, you will need a few pieces of information:

- The URL of your Tableau server.

> In your KNIME workflows, you must use the redirected specific URL — for example `https://us-west-2b.online.tableau.com` — and **not** the general URL `https://online.tableau.com`.
>
> Also, take particular care to use the secure `https`-protocol.

- Your username
- Your password
- Your Tableau site ID. For *Tableau Online*, this can be observed within the URL itself. Given the URL `https://us-west-2b.online.tableau.com/#/site/ExampleSite/projects`, the site ID is `ExampleSite`.

You will also need to have a Tableau Project already in place on the server. By default, *Tableau Online* creates a default project for you, but it is a good idea to create one and give it an appropriate name. You can do this in *Tableau Online* by navigating to the projects section and clicking on the *New Projects* button. The project we will create for this guide is called "Adult Income".



The default project that was automatically created by Tableau.

New Project

Enter a name for the new project:

Adult Income

Description

Tableau Usage Example

Example workflow

To get started, download the *Tableau Integration Example* workflow from the EXAMPLES server. The workflow and associated dataset is available at `EXAMPLES/05_Reporting/02_Tableau/01_Tableau_Integration_Example`. Go ahead and execute the five nodes listed in the "Usual Modeling Steps" section. This is a workflow that reads in a file containing demographic and income information for a sample of adults working in the United States, and uses the decision tree node to predict and score income classification for the sample. Of more interest to us, the workflow also exports both the raw data and results of the decision tree model using Tableau nodes in a few different ways, which we will discuss in more detail below.

The nodes in the workflow can be easily swapped with the legacy nodes for compatibility with older versions of Tableau.

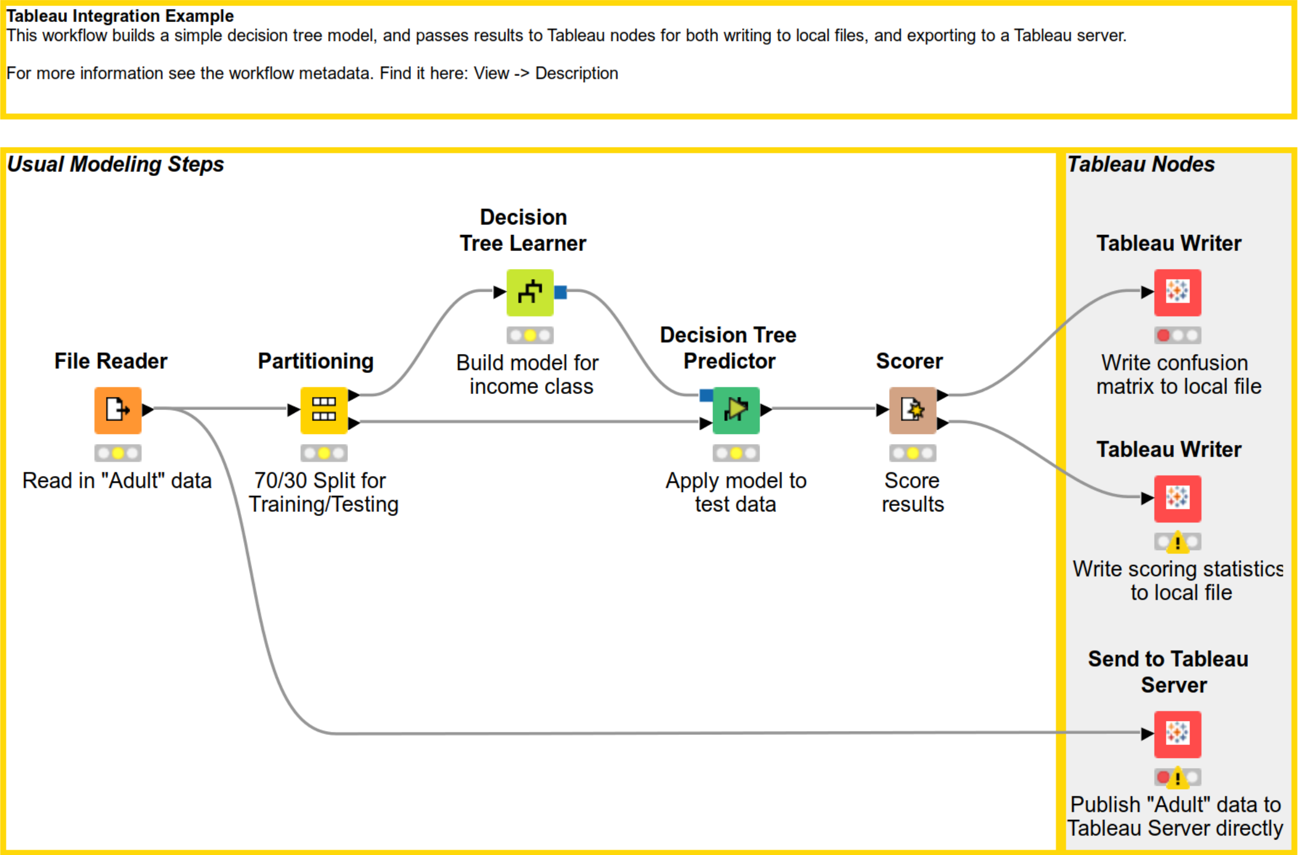
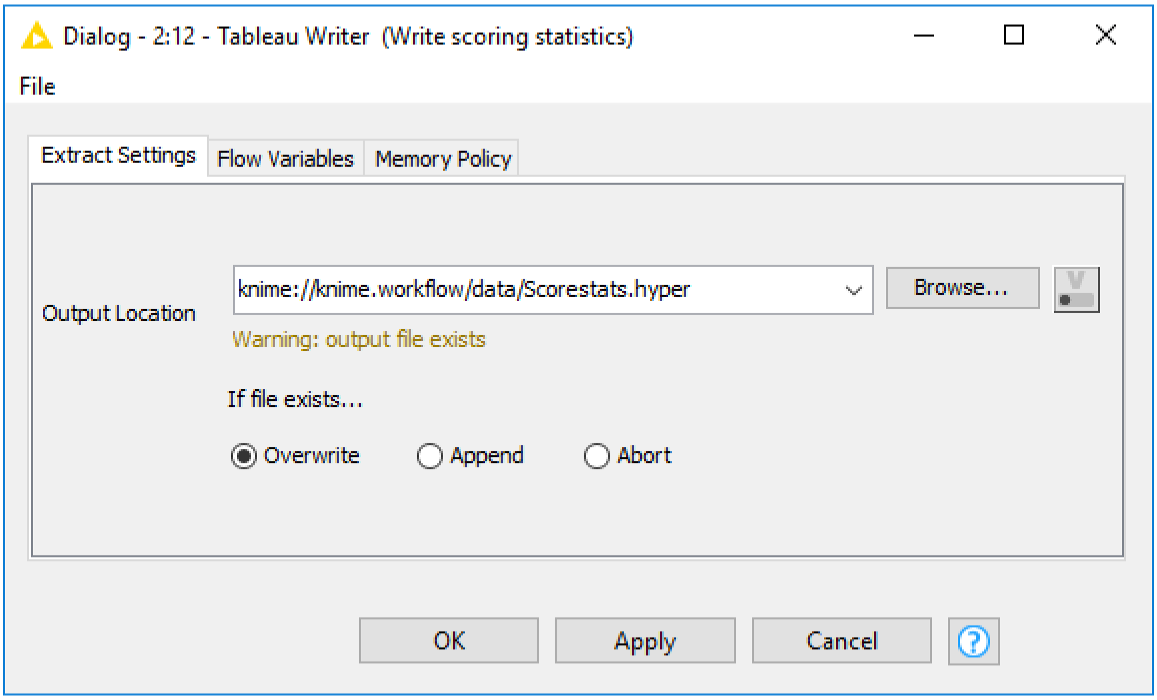


Tableau Integration Example
This workflow builds a simple decision tree model, and passes results to Tableau nodes for both writing to local files, and exporting to a Tableau server.

For more information see the workflow metadata. Find it here: View -> Description

Tableau Writer node

Now that our *Tableau Online* account is in place and KNIME Analytics Platform has been configured, use the *Tableau Writer* node to export a `.hyper` file. Double click the node assigned to write out model scoring statistics to open its settings. The only thing we need to do here is to give a path and file name for the file:



Output Location: knime://knime.workflow/data/Scorestats.hyper

Warning: output file exists

If file exists...

● Overwrite ○ Append ○ Abort

Now, we can execute the node, and a `.hyper` file is created. Files of this type can be imported into *Tableau Desktop* for further analysis, and from there, published to *Tableau Server*. `.hyper` files can also be published directly to a Tableau server by using Tableau's command line utility `tabcmd`. We will discuss each of these methods below.

Publishing .hyper files

`.hyper` files exported from KNIME Analytics Platform can be used directly with a installation of *Tableau Desktop*. Double clicking on the `.hyper` file will open the Tableau interface where you can begin construction of visualizations on the data right away. You can also publish the `.hyper` file for use in the Tableau Online environment via the desktop GUI. To do this, navigate to *Server* → *Publish Data Source*, assign a Project in the resulting dialog, and click *Publish*. This will make the data from the `.hyper` file available in the Tableau Online Environment.

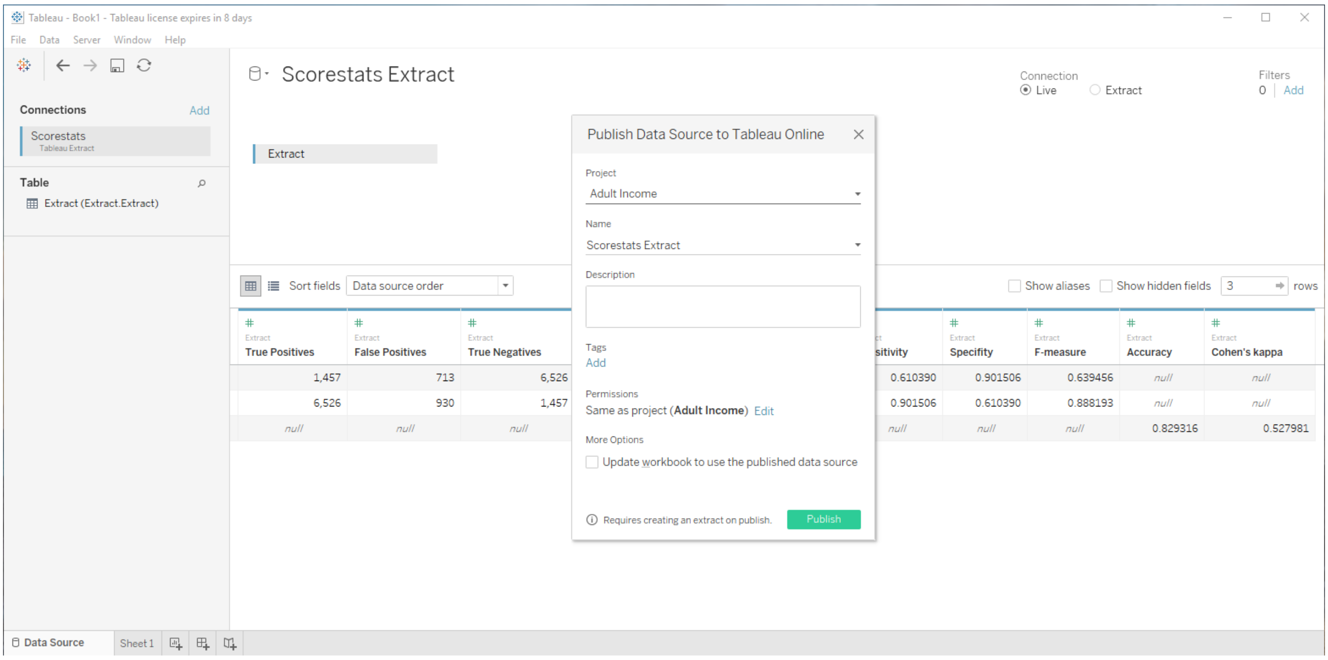


Tableau - Book1 - Tableau license expires in 8 days
File Data Server Window Help
Scorestats Extract
Connections Add
Scorestats
Tableau Extract
Table
Extract (Extract.Extract)
Extract
Connection
● Live ○ Extract
Filters
0 | Add
Sort fields Data source order
□ Show aliases □ Show hidden fields 3 rows
Data Source
Sheet 1

Publish Data Source to Tableau Online

Project: Adult Income

Name: Scorestats Extract

Description:

Tags: Add

Permissions: Same as project (**Adult Income**) Edit

More Options

□ Update workbook to use the published data source

ⓘ Requires creating an extract on publish. Publish

True Positives	False Positives	True Negatives	sitivity	Specifity	F-measure	Accuracy	Cohen's kappa
1,457	713	6,526	0.610390	0.901506	0.639456	null	null
6,526	930	1,457	0.901506	0.610390	0.888193	null	null
null	null	null	null	null	null	0.829316	0.527981

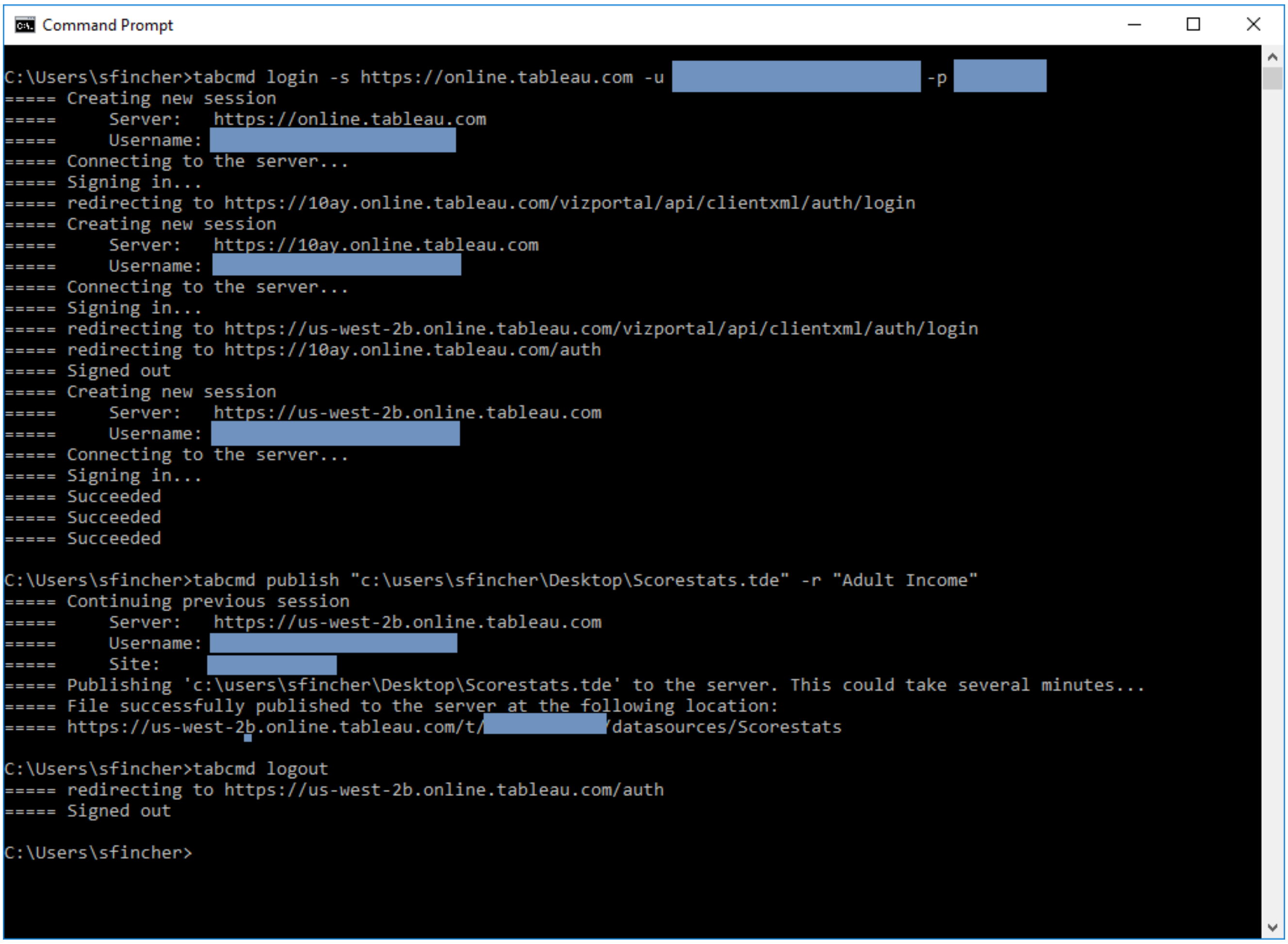
Publishing `.hyper` files can also be done without a GUI, using Tableau’s command line utility `tabcmd`, which requires a separate installation, as detailed on the linked page). `tabcmd` allows for scripting of data management tasks in the server environment, and has a straightforward set of options and parameters. Logging into a Tableau server, for example, can be accomplished with the following command:

```
tabcmd login -s https://online.tableau.com -u YourUsername -p YourPassword
```

Publishing a `.hyper` file to the server can then be done as follows. Use our generated `.hyper` file as an example, making sure to include the full path and project name on the server:

```
tabcmd publish "c:\path\to\file\Scorestats.hyper" -r "Adult Income"
```

The figure below presents the results of using `tabcmd` to publish a `.hyper` file using these commands. The `tabcmd` documentation, linked above, presents a more comprehensive list of available commands and options.

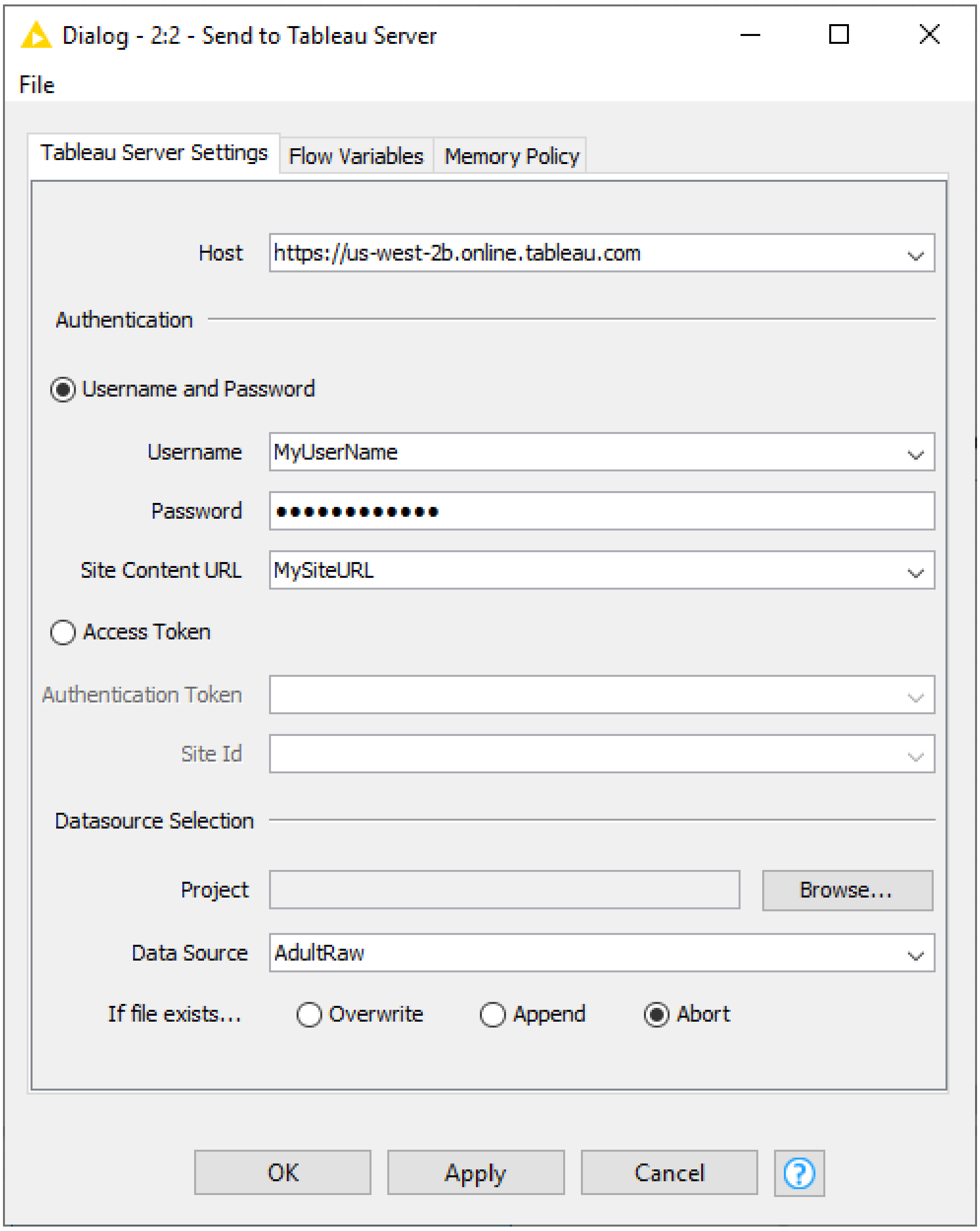


```
C:\Users\sfincher>tabcmd login -s https://online.tableau.com -u [redacted] -p [redacted]
===== Creating new session
=====     Server:   https://online.tableau.com
=====     Username: [redacted]
===== Connecting to the server...
===== Signing in...
===== redirecting to https://10ay.online.tableau.com/vizportal/api/clientxml/auth/login
===== Creating new session
=====     Server:   https://10ay.online.tableau.com
=====     Username: [redacted]
===== Connecting to the server...
===== Signing in...
===== redirecting to https://us-west-2b.online.tableau.com/vizportal/api/clientxml/auth/login
===== redirecting to https://10ay.online.tableau.com/auth
===== Signed out
===== Creating new session
=====     Server:   https://us-west-2b.online.tableau.com
=====     Username: [redacted]
===== Connecting to the server...
===== Signing in...
===== Succeeded
===== Succeeded
===== Succeeded

C:\Users\sfincher>tabcmd publish "c:\users\sfincher\Desktop\Scorestats.tde" -r "Adult Income"
===== Continuing previous session
=====     Server:   https://us-west-2b.online.tableau.com
=====     Username: [redacted]
=====     Site:     [redacted]
===== Publishing 'c:\users\sfincher\Desktop\Scorestats.tde' to the server. This could take several minutes...
===== File successfully published to the server at the following location:
===== https://us-west-2b.online.tableau.com/t/[redacted]/datasources/Scorestats

C:\Users\sfincher>tabcmd logout
===== redirecting to https://us-west-2b.online.tableau.com/auth
===== Signed out

C:\Users\sfincher>
```

Send to Tableau Server node

Perhaps you would like to skip the creation of `.hyper` files altogether, and instead send your data directly to `Tableau Online` from a KNIME workflow. This can be done using the *Send to Tableau Server* node. For this example, we send the raw Adult dataset to our *Tableau Online* server for additional visualization.

Double click the node to bring up the configuration dialog, and enter the required information under the *Tableau Server Settings* tab. Use the *Browse* button to have the node query the Tableau server for active projects. Here, we will be sending our file to the Adult Income project, and giving it a name of `AdultRaw`. Carefully note the format of the URL!



Dialog - 2:2 - Send to Tableau Server

Host: https://us-west-2b.online.tableau.com

Authentication

● Username and Password

Username: MyUserName

Password: ●●●●●●●●●●●●

Site Content URL: MySiteURL

○ Access Token

Authentication Token:

Site Id:

Datasource Selection

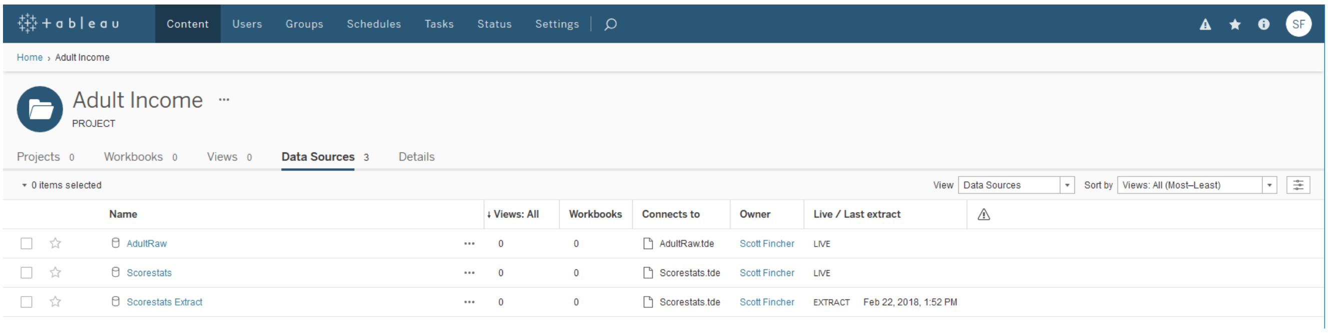
Project:

Data Source: AdultRaw

If file exists... ○ Overwrite ○ Append ● Abort

If we navigate to our project space in *Tableau Online*, we can now see three available data sources:

- Scorestats Extract, published via Tableau Desktop
- Scorestats, published via the command line using tabcmd
- AdultRaw, published directly from a KNIME workflow



Home › Adult Income

Adult Income ···

PROJECT

Projects 0 Workbooks 0 Views 0 **Data Sources 3** Details

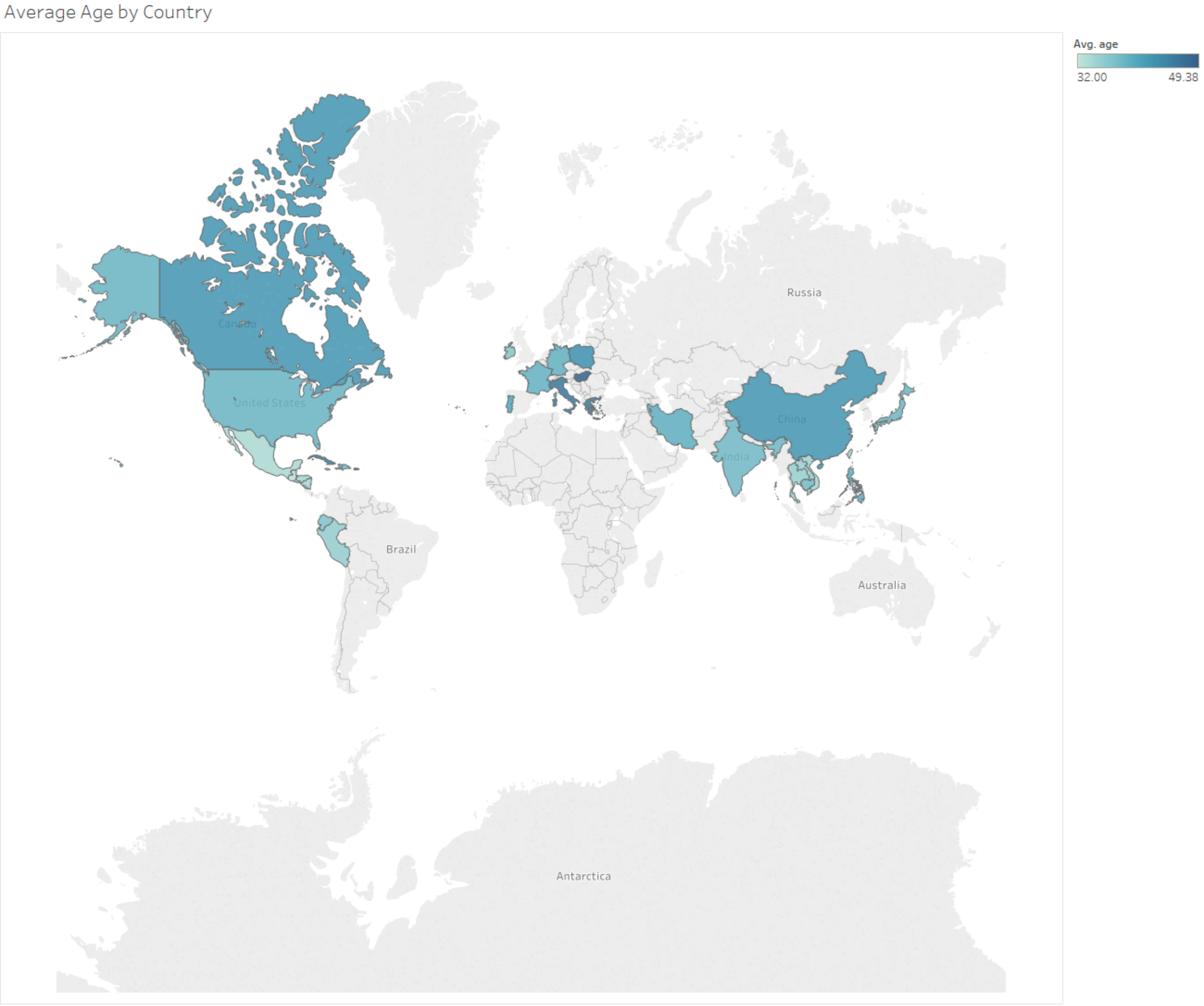
▾ 0 items selected

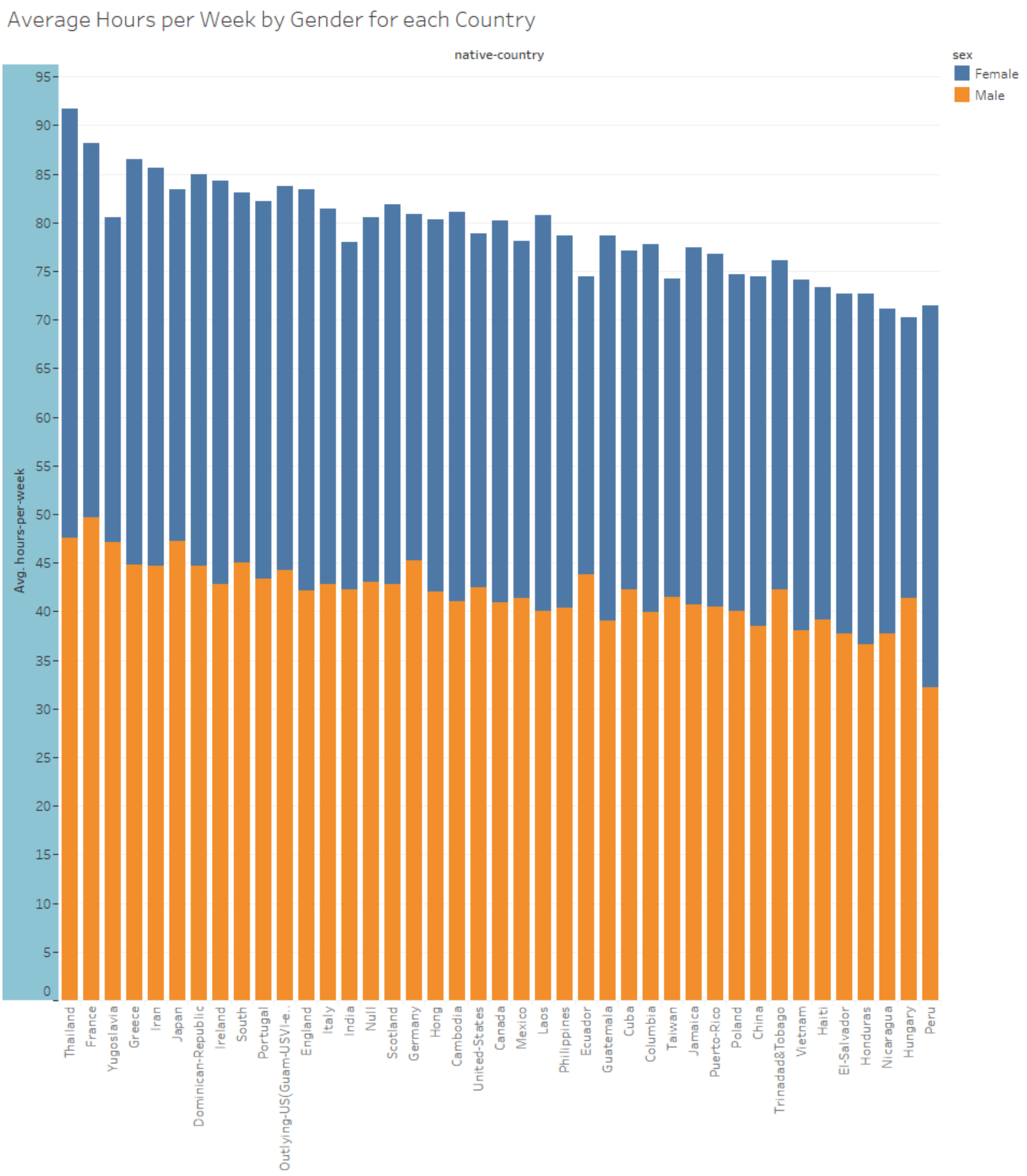
View: Data Sources Sort by: Views: All (Most–Least)

	Name		↓ Views: All	Workbooks	Connects to	Owner	Live / Last extract	
□ ☆	AdultRaw	···	0	0	AdultRaw.tde	Scott Fincher	LIVE	
□ ☆	Scorestats	···	0	0	Scorestats.tde	Scott Fincher	LIVE	
□ ☆	Scorestats Extract	···	0	0	Scorestats.tde	Scott Fincher	EXTRACT	Feb 22, 2018, 1:52 PM

Creating a Visualization in Tableau Online

Once your data has been published to Tableau, you are free to create your visualizations in the usual way. Here are a couple of examples generated from the Adult dataset.The first presents a map of average ages for adults in the data set, by country of origin. The second is a stacked bar chart that shows, in descending order, the total hours adults worked, by gender, in each country.



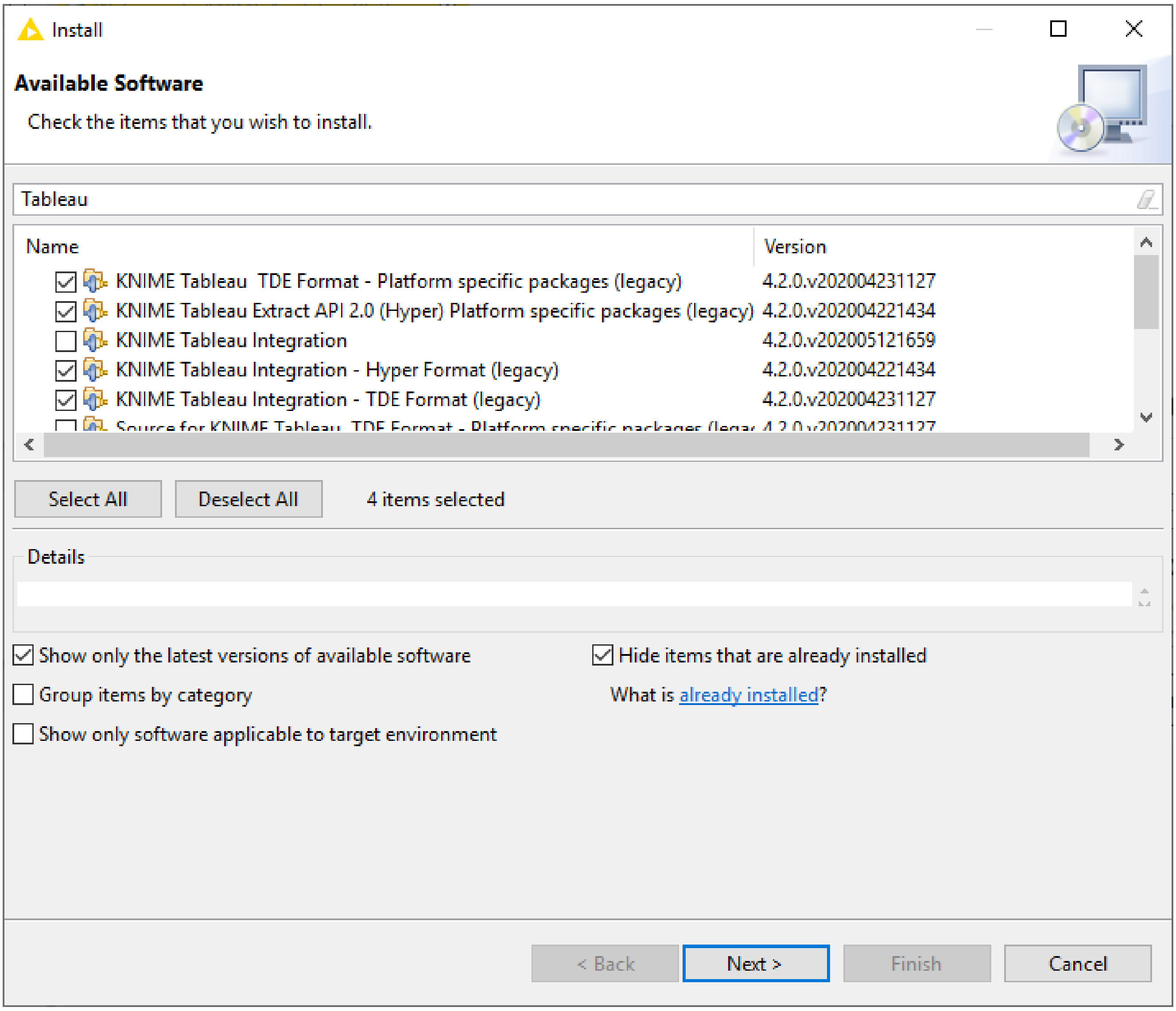

Average Hours per Week by Gender for each Country
native-country
sex
Female
Male
Avg. hours-per-week
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Thailand
France
Yugoslavia
Greece
Iran
Japan
Dominican-Republic
Ireland
South
Portugal
Outlying-US(Guam-USVI-e..
England
Italy
India
Null
Scotland
Germany
Hong
Cambodia
United-States
Canada
Mexico
Laos
Philippines
Ecuador
Guatemala
Cuba
Columbia
Taiwan
Jamaica
Puerto-Rico
Poland
China
Trinadad&Tobago
Vietnam
Haiti
El-Salvador
Honduras
Nicaragua
Hungary
Peru

Legacy Extensions

To keep support for old versions of Tableau the legacy KNIME Tableau integrations are still available. This section describes how they can be installed.

Installing the Legacy Tableau Extensions

Navigate to *File* → *Install KNIME Extensions* and type "Tableau" in the search box that appears and **deselect the checkbox "Group items by category"**. When you do, you will see something like the screen below.



Available Software

Check the items that you wish to install.

Tableau

	Name	Version
☑	KNIME Tableau TDE Format - Platform specific packages (legacy)	4.2.0.v202004231127
☑	KNIME Tableau Extract API 2.0 (Hyper) Platform specific packages (legacy)	4.2.0.v202004221434
☐	KNIME Tableau Integration	4.2.0.v202005121659
☑	KNIME Tableau Integration - Hyper Format (legacy)	4.2.0.v202004221434
☑	KNIME Tableau Integration - TDE Format (legacy)	4.2.0.v202004231127
☐	Source for KNIME Tableau TDE Format - Platform specific packages (legac	4.2.0.v202004231127

4 items selected

☑ Show only the latest versions of available software

☐ Group items by category

☐ Show only software applicable to target environment

☑ Hide items that are already installed

What is already installed?

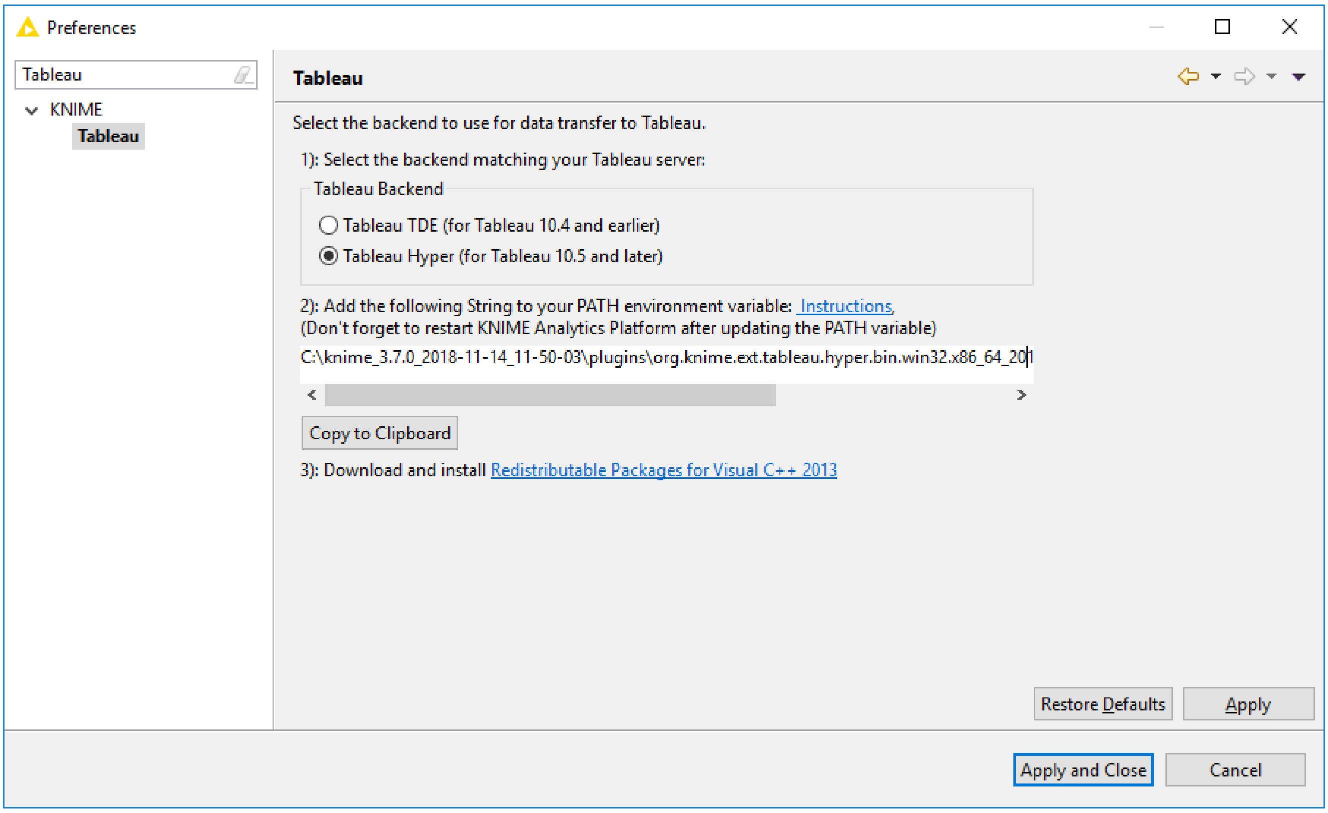
If you have Tableau 10.5 or later, you can use the `.hyper` format, which is created using the Tableau Data Extract API 2.0. Versions 10.4 and earlier use the older `TDE` format, which is created using the Tableau SDK. Select the extensions to install according to what you need. If you are not sure, you can install both, and tell KNIME which format you want to use later. The two extensions labeled **KNIME Tableau Integration** include the KNIME nodes, while the other extensions labeled **Platform Specific Packages** include the back-end support files - specifically, the Extract API or SDK files.

Once you have installed the extension(s), restart KNIME Analytics Platform and you should see the legacy Tableau nodes in the node repository under *KNIME Labs*. You can identify the legacy nodes by the suffix "(Hyper)" or "(TDE)". You can now drag and drop the Tableau nodes into your workflow, but you will need to perform some additional one-time setup on your system `PATH` before they will export data properly.

Installation Setup

Selecting Hyper or TDE

Go to *File* → *Preferences* → *KNIME* and find the Tableau page. Here, you can select whether to use the current `.hyper` format or the older `TDE` format. Changing this setting requires a restart of KNIME Analytics Platform.



Tableau

Select the backend to use for data transfer to Tableau.

1): Select the backend matching your Tableau server:

Tableau Backend

○ Tableau TDE (for Tableau 10.4 and earlier)

● Tableau Hyper (for Tableau 10.5 and later)

2): Add the following String to your PATH environment variable: Instructions,
(Don't forget to restart KNIME Analytics Platform after updating the PATH variable)

C:\knime_3.7.0_2018-11-14_11-50-03\plugins\org.knime.ext.tableau.hyper.bin.win32.x86_64_20

3): Download and install Redistributable Packages for Visual C++ 2013

Updating your System PATH (Windows)

You will need to add the string in the text box to your system's `PATH`. If you are not sure how to do this, click on the blue *Instructions* link to open a page that describes the process in more detail. You can click the *Copy to Clipboard* button to assist in this process. Once you have updated your system’s `PATH` to include either the Tableau Extract API 2.0 (for Hyper) and/or the Tableau SDK (for `TDE`), restart KNIME Analytics Platform.

⚠ Some Windows users may also need to install the Visual C++ 2013 redistributable, but many Windows 10 installations already include it. A link to the redistributable is provided if you do need it.

Installing the native library (Mac OS)

Use the buttons "Open source folder" and "Open target folder" to open the folder with the library files and the folder with the installation target, respectively. Copy the files from the source folder to the target folder to install the Tableau library on your system.

Troubleshooting

"Hyper Server did not call back on the callback port"

The error "Hyper Server did not call back on the callback port: process = -1" can appear randomly using a correctly configured setup with the "Tableau Extract API 2.0 (Hyper)".

This issue is related to the use of the "Tableau Extract API 2.0" and can be solved by using the new KNIME extension which makes use of the "Tableau Hyper API". Install the KNIME extension "KNIME Tableau Integration" as described in the Installation section and use the nodes "Send to Tableau Server" and "Tableau Writer".

This extension will be the default Tableau integration for the upcoming KNIME release.

Open for Innovation
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