

STA 311 Statistical Computing & Data Management

Instructor: Cheng Peng
Department of Mathematics
West Chester University
West Chester, PA 19383

Office: 25 University Avenue, RM 111
Phone: 610.436.2369
Email: cpeng@wcupa.edu

1. Introduction – Access SAS via Citrix

Introduction

- **Course Objectives**
- **Course Delivery Method**
- **Software - SAS**
- **Access SAS through Citrix Receiver**
- **Install Citrix Receiver – Detailed Steps**
- **Launch SAS Application**
- **A Glance of SAS Windows**
- **First SAS Program: “Hello World”**

Course Objectives

To familiarize you with programming in the SAS language. After completing this course, you should be able to:

1. Create SAS data sets from multiple sources, including direct input, external text files, and dataset generated from other applications.
2. Write SAS data sets out in appropriate format and stored it in certain directory.
3. Use appropriate techniques to combine data sets, subset data sets, extract certain observations from datasets
4. Create basic SAS graphs and generate basic reports using appropriate procedures.
5. Perform basic statistical analyses of data.
6. Prepare for the Base SAS Programming Certification Exam

This course will be delivered asynchronously

My Responsibilities

1. Provide learning materials (notes and videos) every week;
2. Assign weekly HW/Quiz to test your understanding;
3. Hold Zoom office hours to help you with the course materials.

Your Responsibilities and Expectations

1. Study the weekly materials as early as possible;
2. Code as much as possible - Learning by coding!
3. Complete the weekly quiz after finish weekly materials before you do the assignments and meet the deadlines;
4. Ask questions!

SAS - Statistical Analysis System

SAS is a software suite developed by SAS Institute that offers advanced analytics, multivariate analyses, business intelligence, data management and numerous other tasks.



SAS was installed on a remote server that resides in the RamCloud at WCU

<https://recap.wcupa.edu/infoServices/ramCloud/default.aspx>

You
can access SAS via a client software called
Citrix Receiver
to transfer data between SAS and your local
computer.

What Citrix Receiver is used for

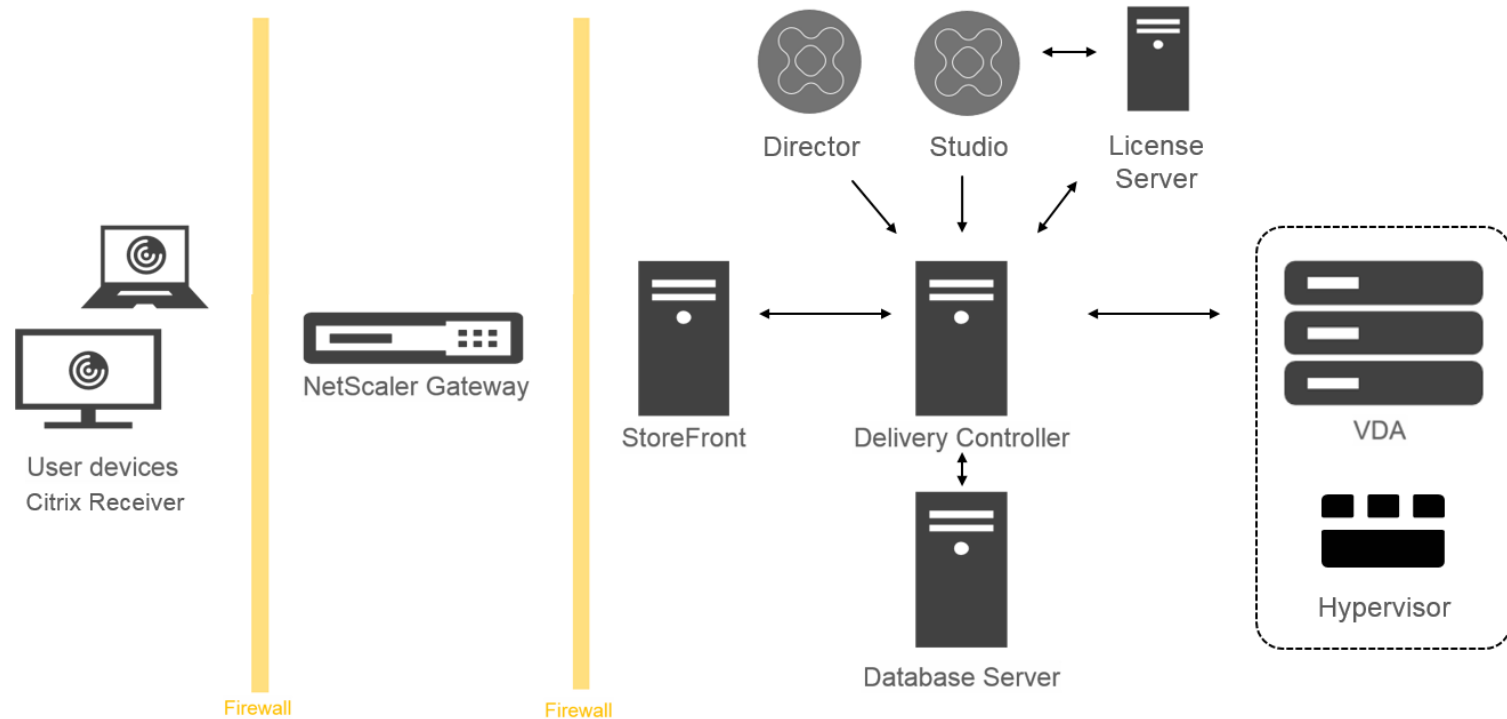
Citrix Receiver is used primarily for connecting users to XenDesktops and XenApp desktops and applications.

Using Citrix StoreFront in conjunction with Receiver allows organizations to provide users with self-service access to their applications and services -- all with a common user interface, regardless of the endpoint device hardware, OS or form factor.

Xen Project (pronounced /'zen/) is a type-1 hypervisor, providing services that allow multiple computer operating systems to execute on the same computer hardware concurrently.

How Citrix Receiver Works

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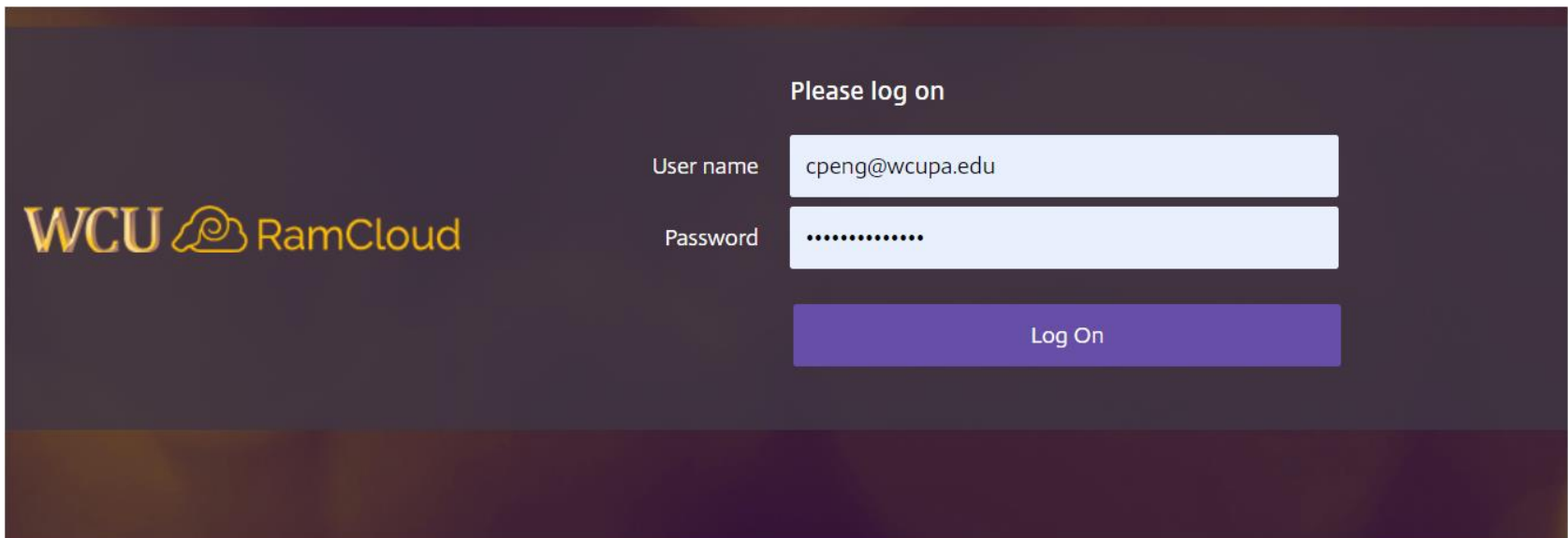


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Install Citrix Receiver on A Local Machine

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Go to ramcloud.wcupa.edu with Internet Explorer or Firefox



The image shows a login page for WCU RamCloud. On the left, there is a logo with 'WCU' in gold, a cloud icon, and 'RamCloud' in white. On the right, the text 'Please log on' is displayed above two input fields. The first field is labeled 'User name' and contains the text 'cpeng@wcupa.edu'. The second field is labeled 'Password' and contains a series of dots. Below these fields is a purple button labeled 'Log On'.

Please log on

User name

Password

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Download and Install Citrix Server



Install Citrix Receiver on A Local Machine

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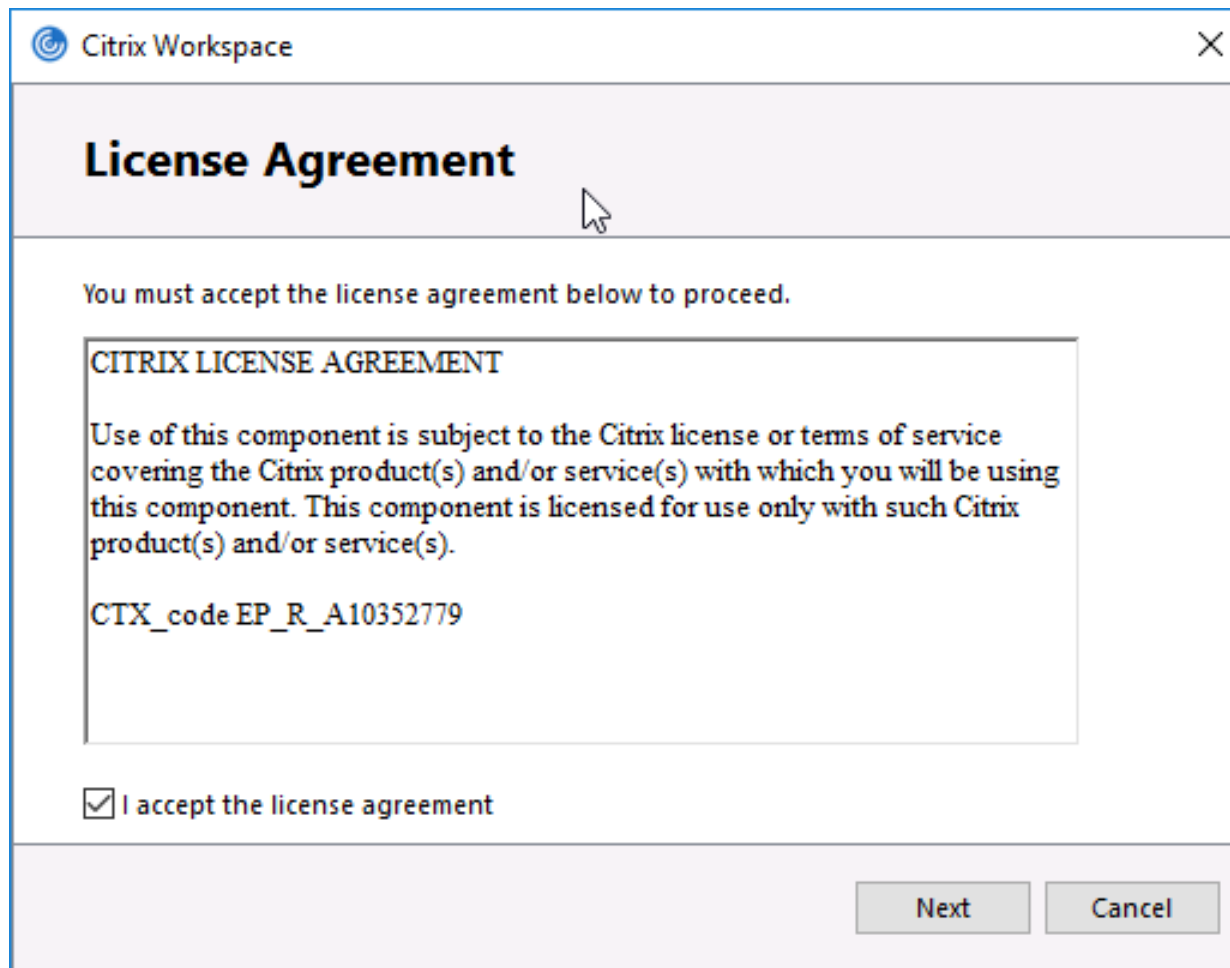
Click Start



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Install Citrix Receiver on A Local Machine

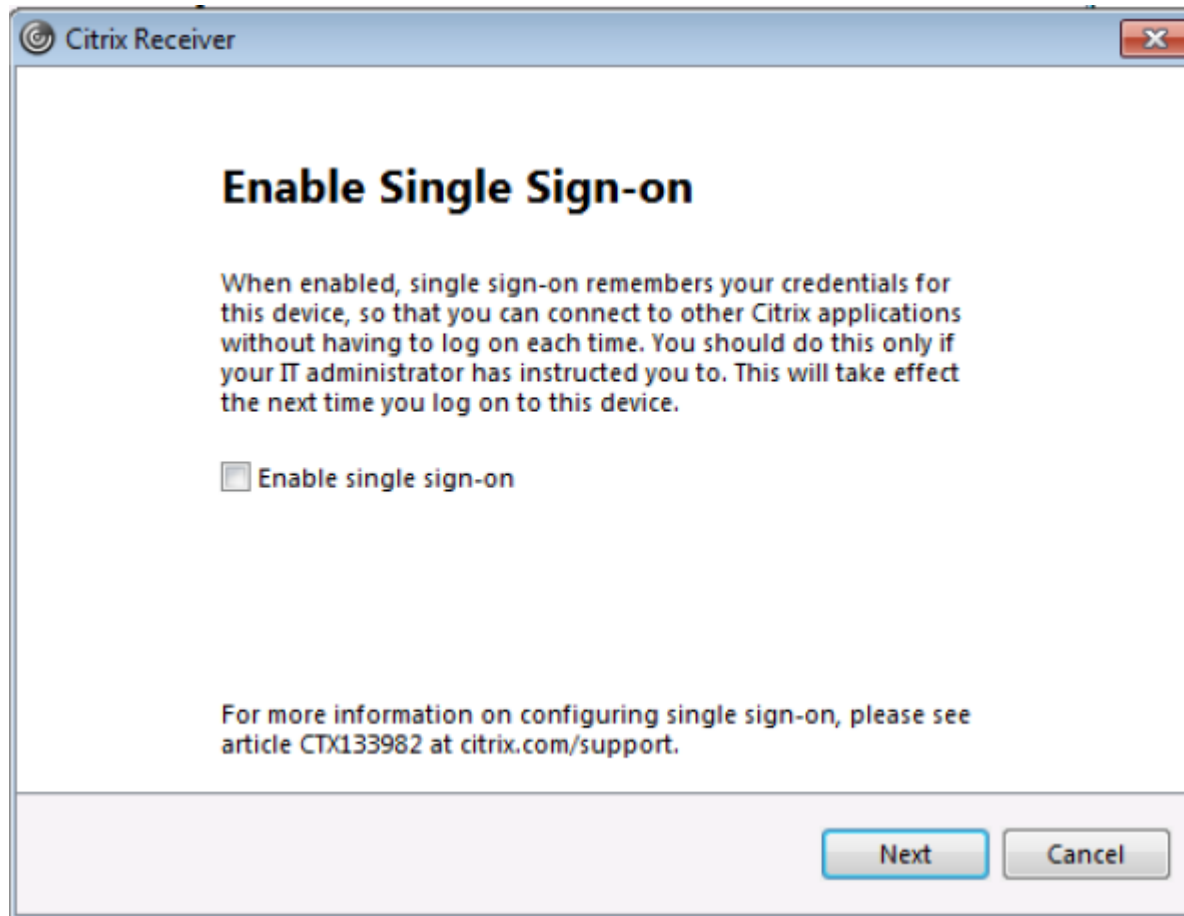
Check “I accept the license agreement” and then Click Start



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Install Citrix Receiver on A Local Machine

Do not Enable Single Sign-on. Just click Next

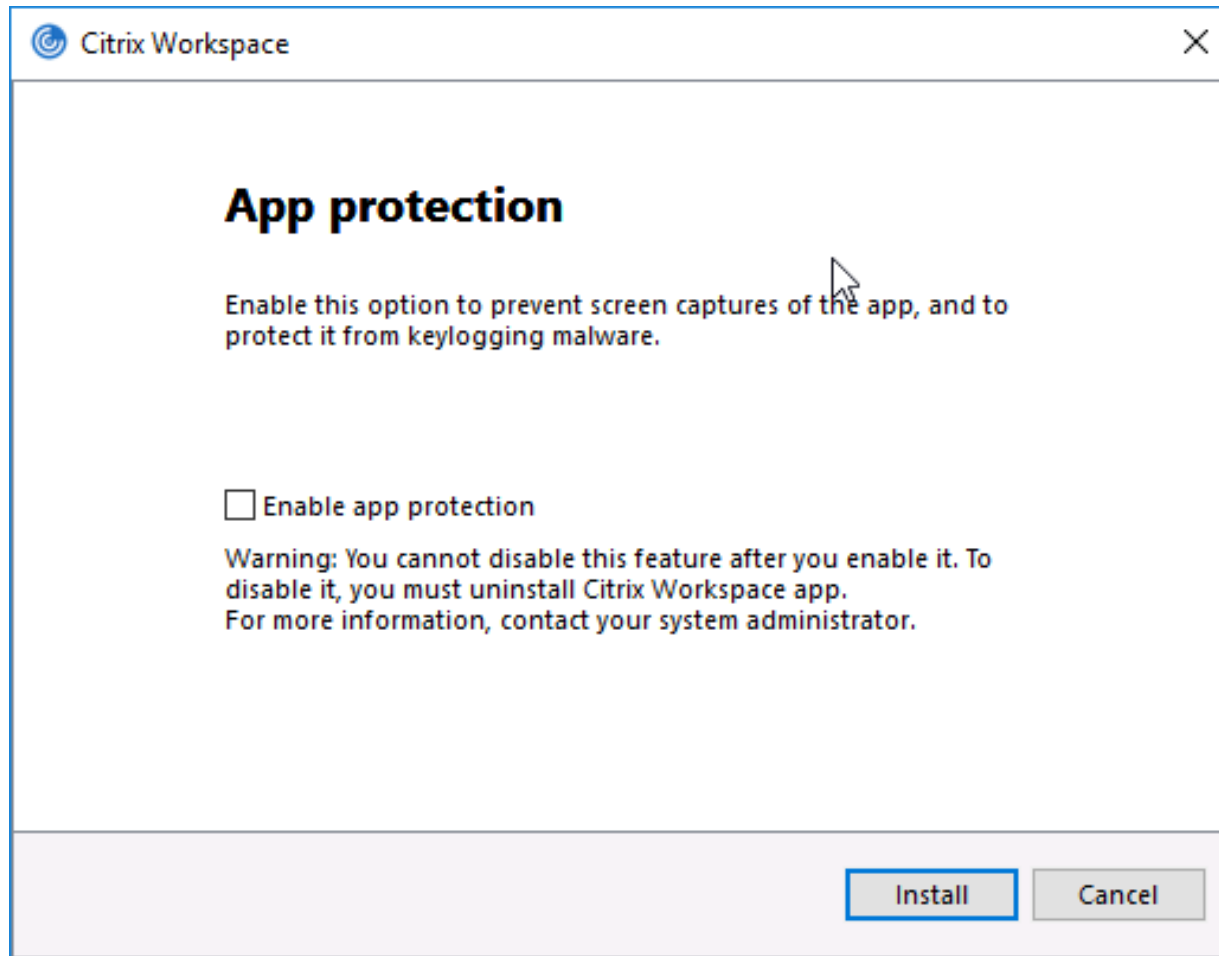


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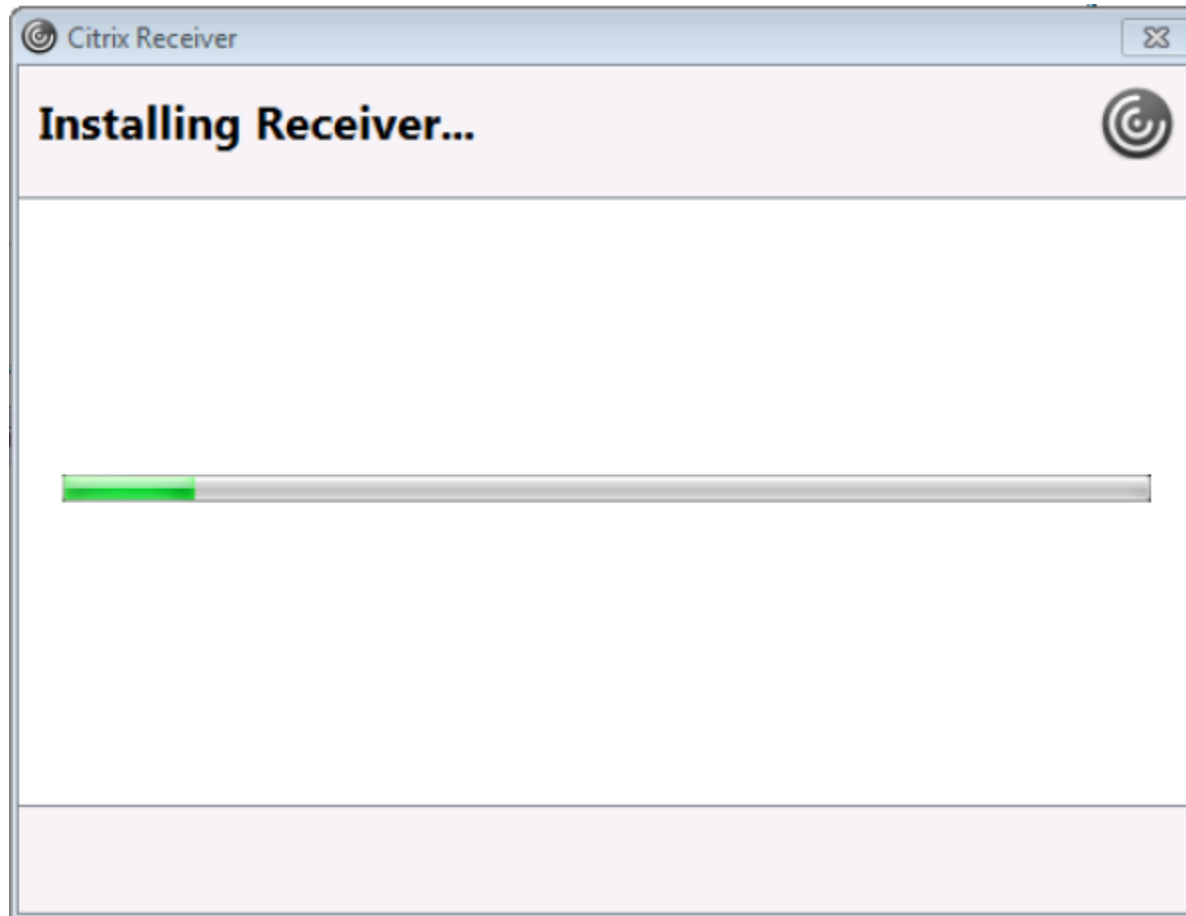
Click Install



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Install Citrix Receiver on A Local Machine

It takes a few seconds to install Citrix Receiver.

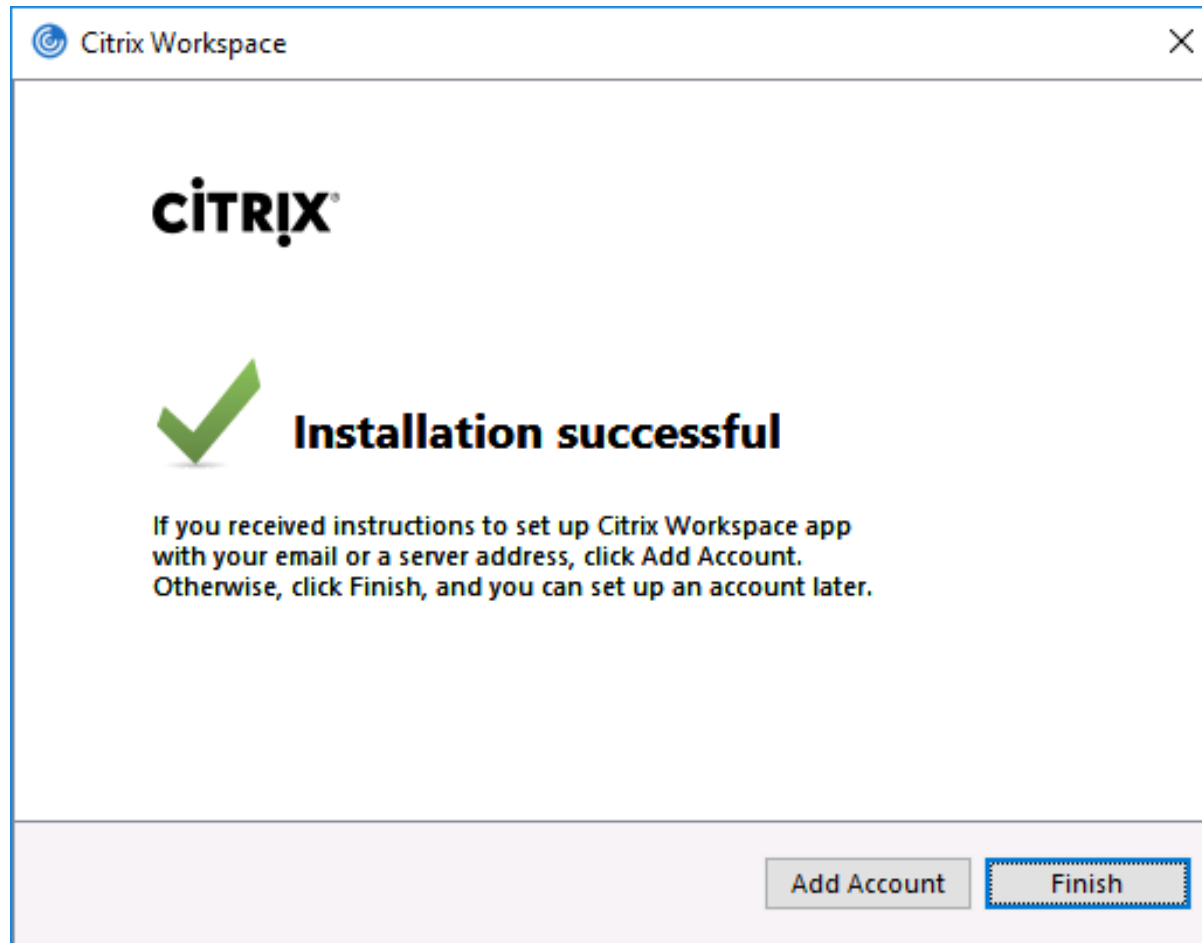


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Install Citrix Receiver on A Local Machine

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Click: Finish



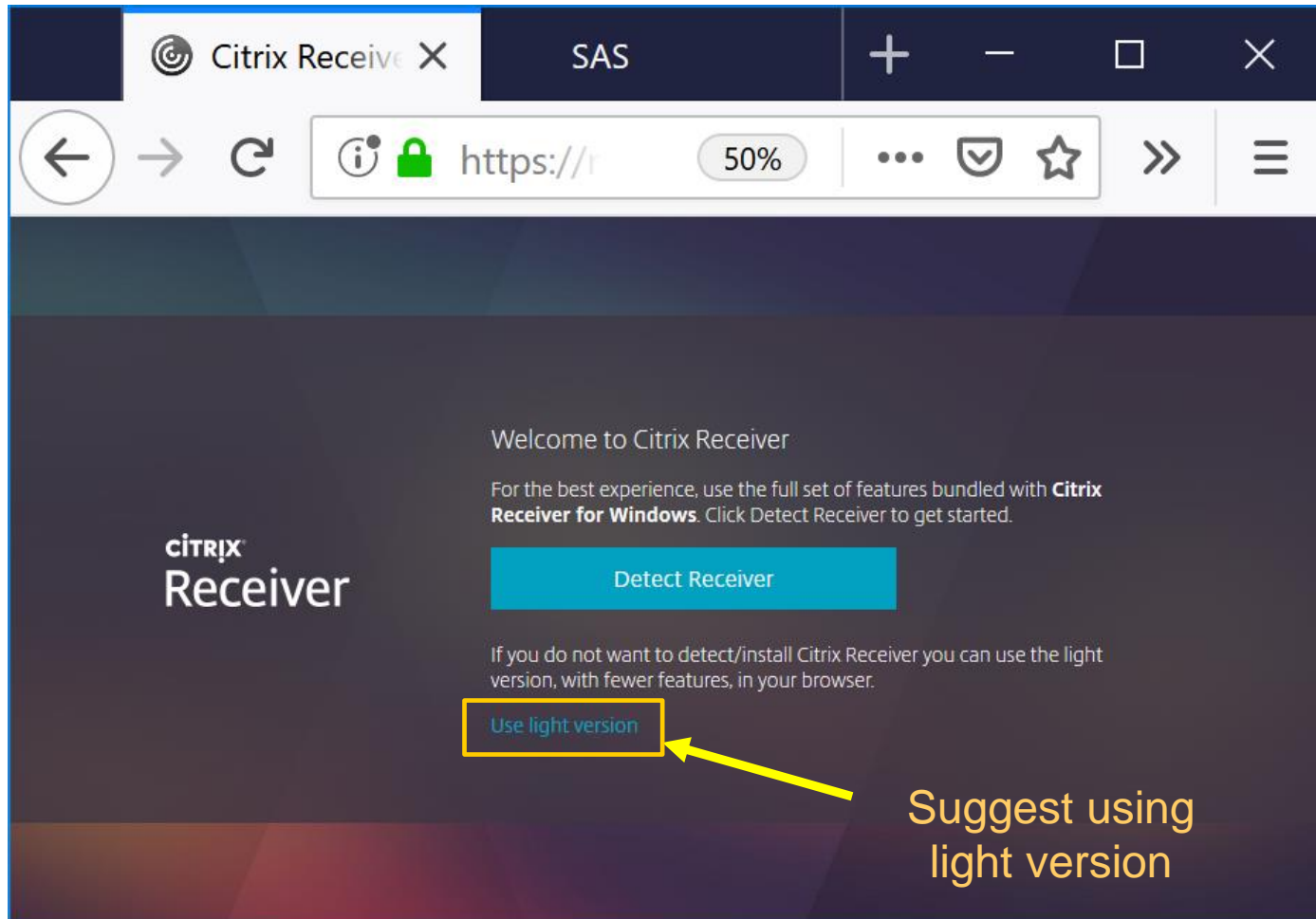
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Once the Citrix Receiver is installed on your machine, you will not need to do this step again.

How to access SAS and other Software?

Install Citrix Receiver on A Local Machine

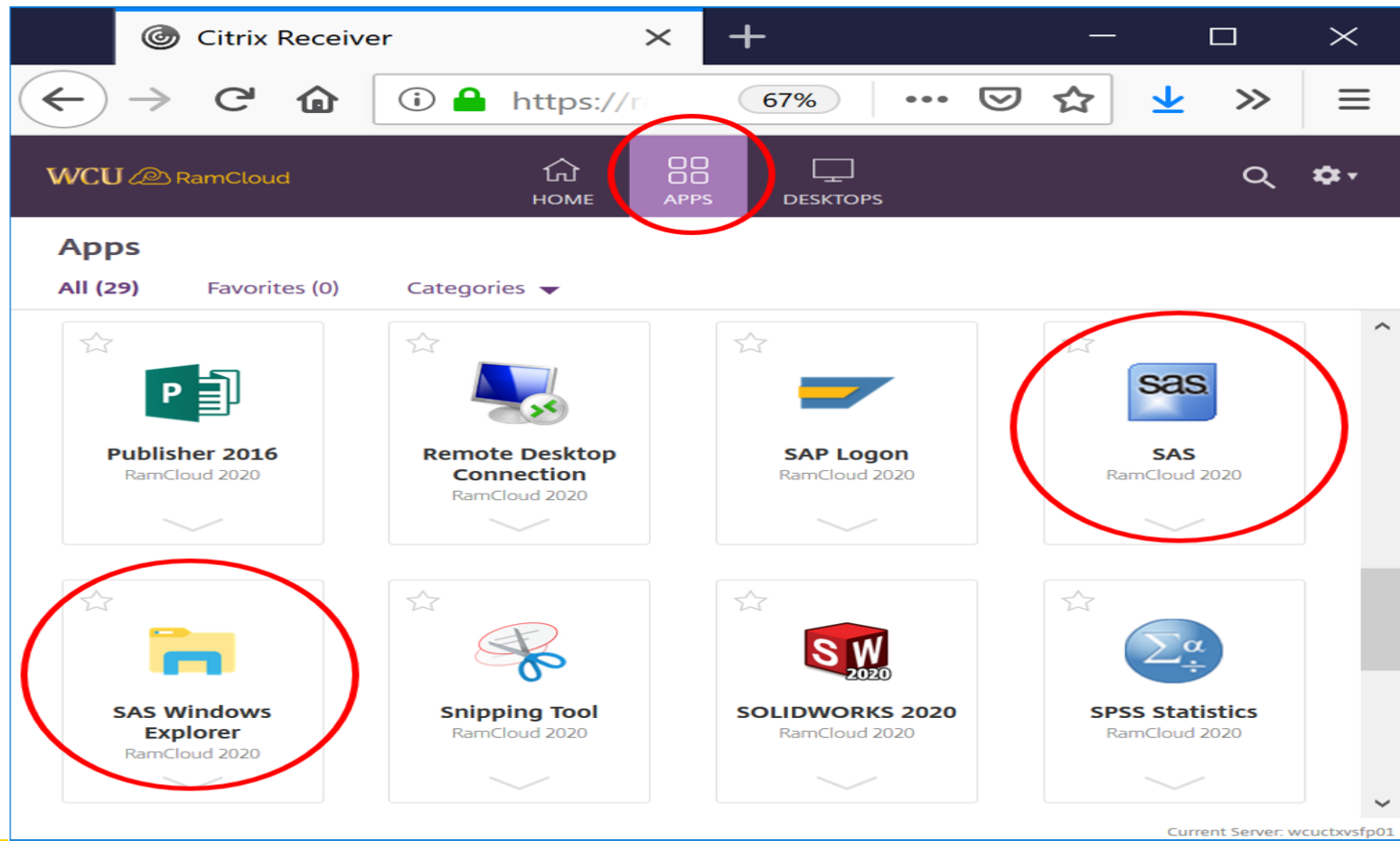
Logon RamCloud as usual



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Launch Applications

Login your RamCloud account (same as you MyWCU and WCU email account login credential) to select software you want to use.



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Click **Permit use**



On a Mac, you can use Safari to download the Citrix Receiver dmg. Run it and complete the installation. When the install is complete, go back to Ramcloud in Safari and launch your applications

To save files,

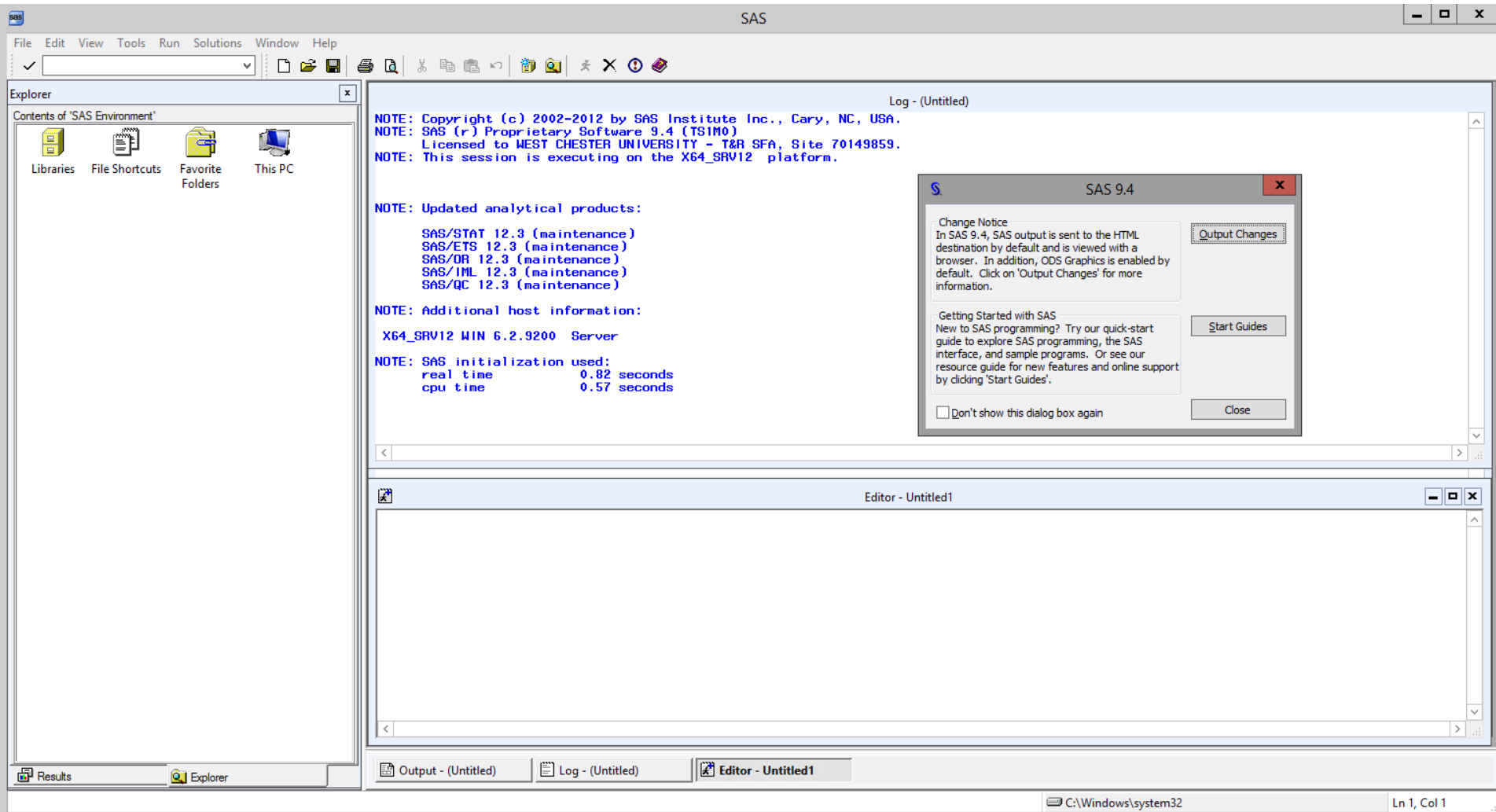
select File > Save As from within the application.
Browse to “Computer” and select your local drive.

To open files saved locally,

select File > Open from within the application
and then browse to your local drives.

Launch SAS

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The screenshot shows the SAS 9.4 software interface. The main window displays a log file with the following text:

```
NOTE: Copyright (c) 2002-2012 by SAS Institute Inc., Cary, NC, USA.  
NOTE: SAS (r) Proprietary Software 9.4 (TS1M0)  
Licensed to WEST CHESTER UNIVERSITY - T&R SFA, Site 70149859.  
NOTE: This session is executing on the X64_SRV12 platform.  
  
NOTE: Updated analytical products:  
SAS/STAT 12.3 (maintenance)  
SAS/ETS 12.3 (maintenance)  
SAS/OR 12.3 (maintenance)  
SAS/IML 12.3 (maintenance)  
SAS/QC 12.3 (maintenance)  
  
NOTE: Additional host information:  
X64_SRV12 WIN 6.2.9200 Server  
NOTE: SAS initialization used:  
.82 seconds  
.57 seconds
```

Overlaid on the SAS interface is a Citrix Workspace - Security Warning dialog box. It contains the following text:

An online application is attempting to access files on your computer.

- Block access
Do not permit the application to read or change your files.
- Allow reading only
The application cannot change files.
- Permit all access

At the bottom of the dialog box is a checkbox labeled "Do not ask me again for this site." which is currently unchecked.

Two blue arrows are present: one points from the "This PC" icon in the SAS Explorer window to the text "Asking access to your computer!", and another points from the "Permit all access" button to the "Contents of 'This PC'" window.

The "Contents of 'This PC'" window shows the following folders and drives:

- Music
- Downloads
- Pictures
- Videos
- Documents
- Desktop
- Local Disk (C: on CPENG-...

The SAS interface also shows a "Log - (Untitled)" window with a "Change Notice" and "Getting Started with SAS" sections.

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SAS Windows

- **Log Window:** It is an execution window. Here, you can check the execution of your program. It also displays errors, warnings and notes.
- **Code Window:** This window is also known as editor window. Consider it as a blank paper or a notepad, where you can write your SAS code.
- **Output Window:** As the name suggests, this window displays the output of the program/ code which you write in the editor.
- **Result Window:** It is an index that list all the outputs of programs that are run in one session. Since it holds the results of a particular session, if you close the software and restart it, the result window will be empty.
- **Explore Window:** It holds the list of all the libraries in the system. You can also browse the system supported files here.

SAS Data Sets

SAS data sets are called as data files. Data files constitute of rows and columns. Rows hold observations and columns hold Variable names.

SAS Variables

SAS has two types of variables:

- **Numeric variables:** This is the default variable type. These variables are used in mathematical expressions.
- **Character variables:** Character variables are used for values that are not used in mathematical expressions.

They are treated as text or strings. A variable becomes a character variable by adding a '\$' sign at the end of the variable name.

SAS programming is based on two building blocks

- **DATA Step:** The DATA step creates a SAS data set and then passes the data onto a PROC step
- **PROC Step:** The PROC step processes the data

A SAS program should follow below mentioned rules

- Almost every code will begin with either DATA or a PROC Step
- Every SAS statement ends with a semi colon
- A SAS step ends with either RUN or QUIT
- SAS codes are not case sensitive
- You can write a SAS statement across different lines or you can write multiple statements in one line

SAS Libraries

SAS library is a collection of SAS data files that are stored in the same folder or directory on your computer or other storage such as USB drive or a space in the cloud.

- **Temporary Library:** In this library, the data set gets deleted when the SAS session ends.
- **Permanent Library:** Data sets are saved permanently. Hence, they can be accessed in the future SAS sessions.

Users can also create or define a new library known as user defined libraries by using the keyword **LIBNAME**. These are also permanent libraries.

Your First Workable SAS Code “Hello World!”



Editor - Untitled1 *

```
/******  
    My First SAS Program  
    Author: C. Peng  
    Date: 08/22/2020  
    Topics: 1. Data Step  
            2. Procedure Step  
*****/  
  
/* Data Step: create a SAS dataset with one variable */  
  
DATA work.HelloWorld;    /* libname.datasetName */  
    my1stSAScode = "Hello World";  
RUN;  
  
/* Procedure step: print out the SAS dataset */  
PROC PRINT DATA = work.HelloWorld;  
RUN;
```

1. Introduction – Access SAS via Citrix

```
/******
```

```
My First SAS Program
```

```
Author: C. Peng
```

```
Date: 08/22/2020
```

```
Topics: 1. Data Step
```

```
2. Procedure Step
```

```
*****/
```

```
/* Data Step: create a SAS dataset with one variable */
```

```
DATA work.HelloWorld; /* libname.datasetName */
```

```
my1stSAScode = "Hello World";
```

```
RUN;
```

```
/* Procedure step: print out the SAS dataset */
```

```
PROC PRINT DATA = work.HelloWorld;
```

```
RUN;
```

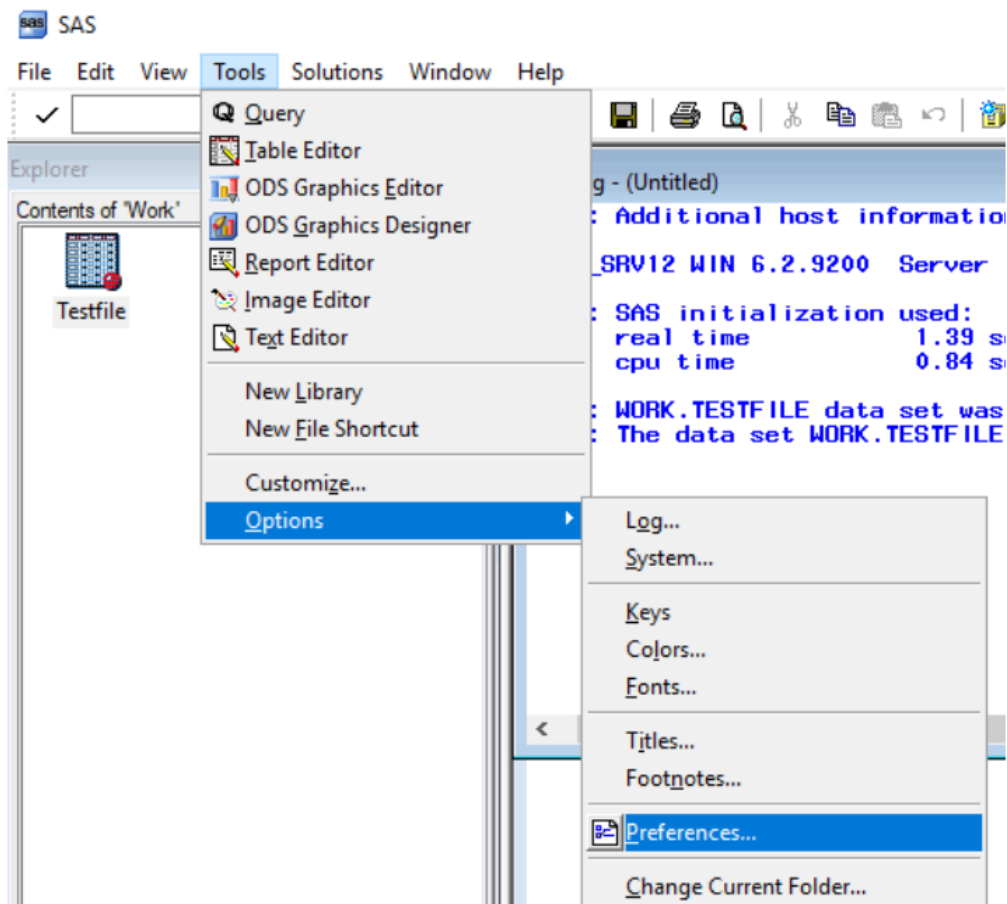
```
308  /*****
309      My First SAS Program
310      Author: C. Peng
311      Date: 08/22/2020
312      Topics: 1. Data Step
313              2. Procedure Step
314  *****/
315
316  /* Data Step: create a SAS dataset with one variable */
317
318  DATA work.HelloWorld;  /* libname.datasetName */
319      my1stSAScode = "Hello World";
320  RUN;
```

NOTE: The data set WORK.HELLOWORLD has 1 observations and 1 variables.
NOTE: DATA statement used (Total process time):
 real time 0.03 seconds
 cpu time 0.01 seconds

```
321
322  /* Procedure step: print out the SAS dataset */
323  PROC PRINT DATA = work.HelloWorld;
324  RUN;
```

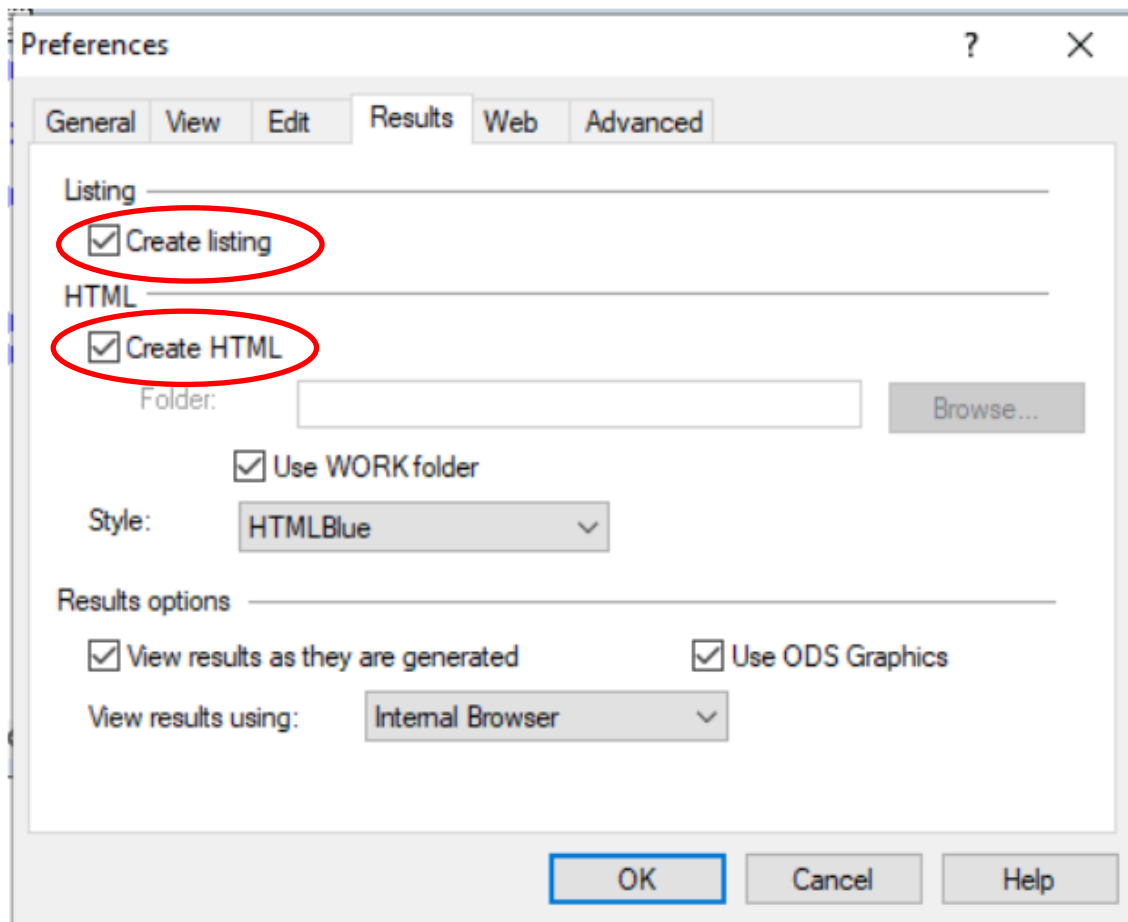
NOTE: There were 1 observations read from the data set WORK.HELLOWORLD.
NOTE: PROCEDURE PRINT used (Total process time):
 real time 0.04 seconds
 cpu time 0.00 seconds

Select Output Formats: HTML and Listing



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Select Output Formats: HTML and Listing



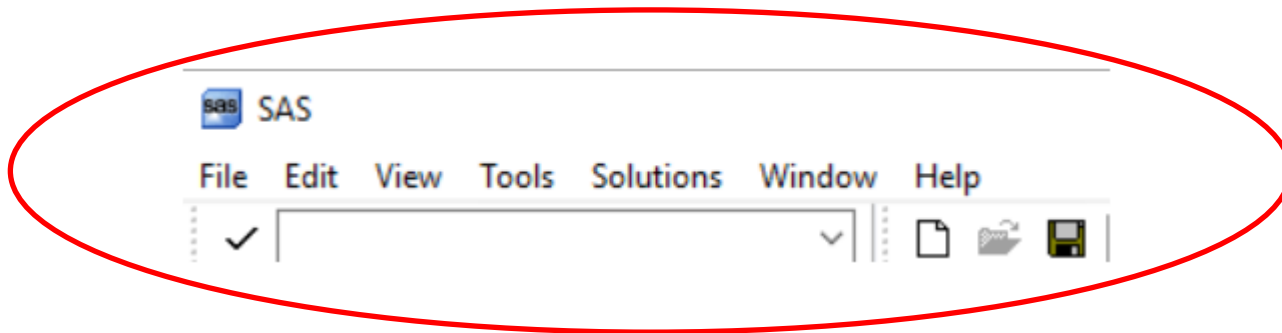
Listing Output



The screenshot shows the SAS Output window titled 'Output - (Untitled)'. The window header includes 'The SAS System' and the date '02:52 Saturday, August 22, 2020'. The output is displayed in a table with two columns: 'Obs' and 'SASCode'. The first row shows '1' under 'Obs' and 'Hello World' under 'SASCode'.

Obs	SASCode
1	Hello World

Interested in exploring more features
of SAS window environment?



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