

(PART 3)

RASPBERRY PI IN THE SHACK

GETTING STARTED WITH
REMOTE STATION OPERATION

Jack Weaver – AA5VZ

I love this hobby! Where else can you sit in a hotel room in Pittsburgh PA and enjoy a digital QSO on a laptop with a fellow Ham in France, using your transmitter & antenna in Texas via a Raspberry Pi computer connected to the internet? A strange thing to consider one's own signals passing overhead on their way to Europe and back!

December, 2017

INTRODUCTION

The Raspberry Pi Alternative for WSJT-X

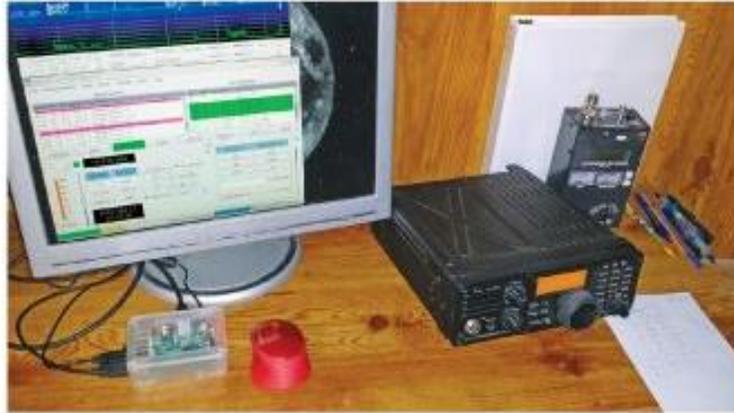
Turn an inexpensive microcomputer into a digital communication machine.

Thomas Kocourek, N4FWD

In the "Eclectic Technology" column in the April 2017 issue of QST, Chuck Kelly, W9MDO/VE1MDO, described a portable option for running WSJT-X digital mode software with a Raspberry Pi 3 microcomputer and a miniature LCD touchscreen. In this article, Thomas Kocourek, N4FWD, presents a similar solution, but with the emphasis on using the Pi as a dedicated home station computer for JT65, JT9, and WSPR — Ed.

As we slide into the oncoming solar minimum, it's no surprise that we're seeing an uptick in popularity for digital modes, such as JT65 and JT9, as well as the WSPR digital beacon mode. JT65 and JT9 can support contacts on the HF bands under conditions that would render other modes unusable. And for those interested in HF propagation studies, WSPR is ideal.

All three modes are available in the free WSJT-X software package, created by Dr. Joe Taylor, K1JT. In addition to



The author's station, with his Raspberry Pi 3 microcomputer at lower left, in its transparent case.

around your ham shack. However, here is a list for those starting from scratch:

- **A Raspberry Pi 3 microcomputer.**

For beginners, I strongly recommend a "kit," such as those offered by CanaKit (see Amazon and other sources), because these packages include almost everything you'll need, often including a case and power supply. Prices range

your monitor. Considering the small size of the Raspberry Pi, I'd recommend a lightweight cable to keep everything mechanically stable.

- **A USB "A-B" style cable.** This cable will link your Raspberry Pi to your interface or transceiver.

- **A keyboard and mouse.** To keep cabling to a minimum, I recommend a

WHERE IT ALL STARTED

QST Article, July 2017
Thomas Kocourek,
N4FWD

WHERE IT ALL STARTED

- ▶ My resulting station in 2017
- ▶ Raspberry Pi-3B shown



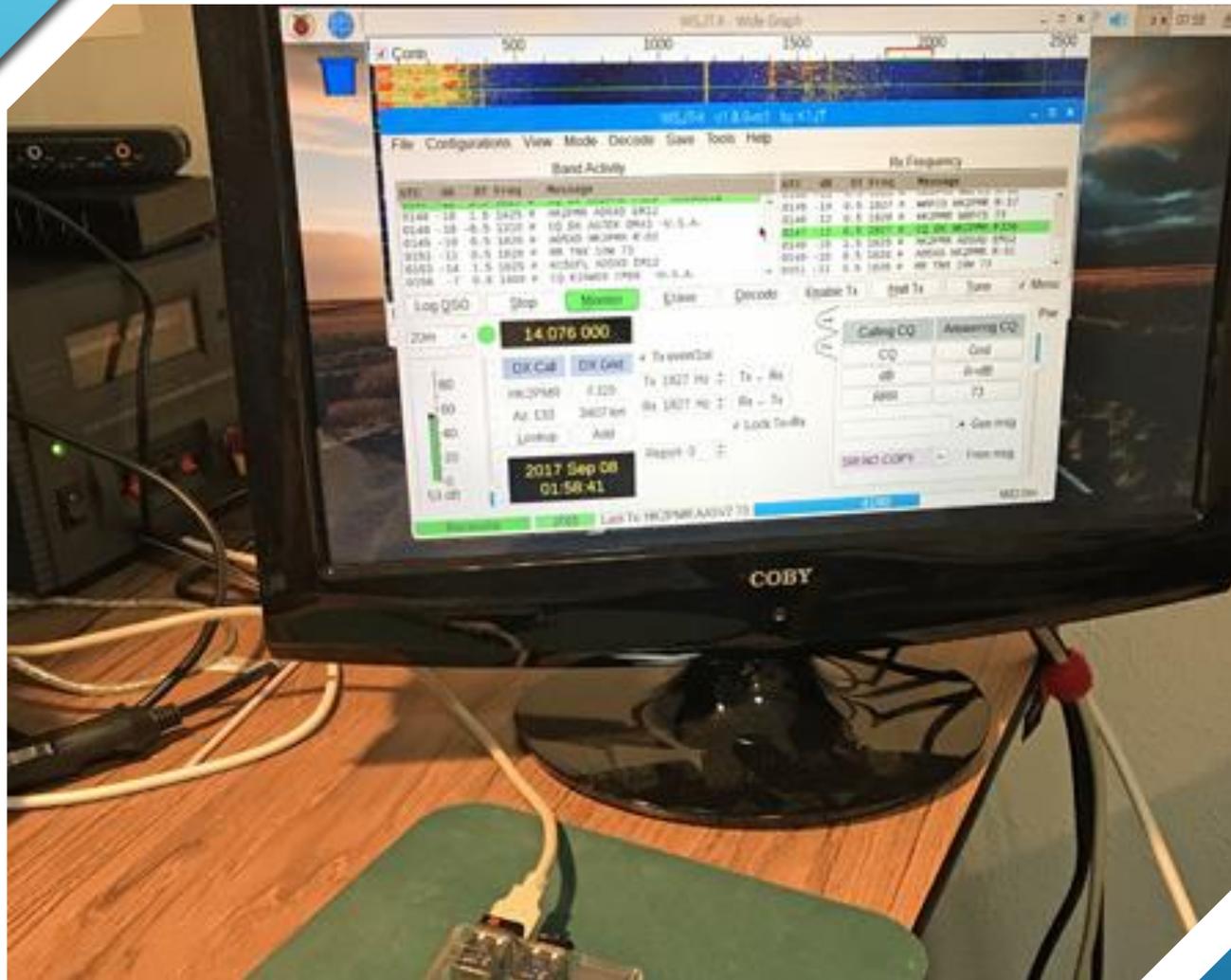


WHERE IT ALL STARTED

- ▶ Wireless Keyboard with Touchpad
- ▶ Kenwood TS-590
- ▶ JT-65 Operating Mode

WHERE IT ALL STARTED

► Successful Operation with JT-65, using equipment shown on previous slides.



The screenshot shows a web browser window displaying the Arlington Amateur Radio Club website. The URL is www.k5sld.com/presentations.shtml. The page features a dark red header with the club's logo and name, "Arlington Amateur Radio Club". Below the header is a navigation menu with buttons for Home, About Us, Calendar, Newsletter, Presentations, Nets, Pay Dues, Licenses, Bylaws, and Join. The main content area is titled "Presentations" and contains a list of links to various presentation topics. The link "2021 - May - Part 2 - Getting Started with RPI for the Shack" is circled in red. The browser's taskbar at the bottom shows several open applications and the system tray with a weather forecast of 71°F.

www.k5sld.com/presentations.shtml

of/tools my.jetpack PET Photoshop Element... Dan Antonielli GFC ACCESS Index of /FSM/Versa... Callsign Database b... Login to account V. completa: "Habla...

Arlington Amateur Radio Club

Home About Us Calendar Newsletter Presentations Nets Pay Dues Licenses Bylaws Join
Links Repeater Etiquette

Presentations

Click any active link to view the Presentation for that month.

Presentations

- [2022_Propagation_of_Radio_Waves_-_Lon_Lease_-_NL7LE](#)
- [2022_March_Public_Safety_Using_Amateur_Radio_-_KG5CVO_-_AF5XS](#)
- [2022_February_Beginning_and_Stealth_Antennas_for_HF](#)
- [2022_January_-_Building_a_Satellite_Ground_Tracking_Station](#)
- [2021_October_-_Introduction_to_Contesting_-_Brian_Schoenefeld_-_WX5FTS](#)
- [2021_September_-_Getting_Started_Handling_NTS_Traffic_WX5FTS](#)
- [2021_July_Getting_Started_in_CW_NV5F](#)
- [2021 - May - Part 2 - Getting Started with RPI for the Shack](#)
- [2021 - April - Part 1 - Getting Started with RPI for the Shack](#)
- [2021 - March - Getting Started with HF - TALKING POINTS](#)
- [2021 - April - Part 1 - Getting Started with RPI for the Shack video, use passcode "NWbgO5%", no quotes.](#)
- [2021 - February - Getting Started with Solar Backup Power in the Shack](#)
- [2021 - January - Getting Started with FM Satellites](#)
- [June 2020 Field Day](#)

Desktop 71°F Mostly cloudy

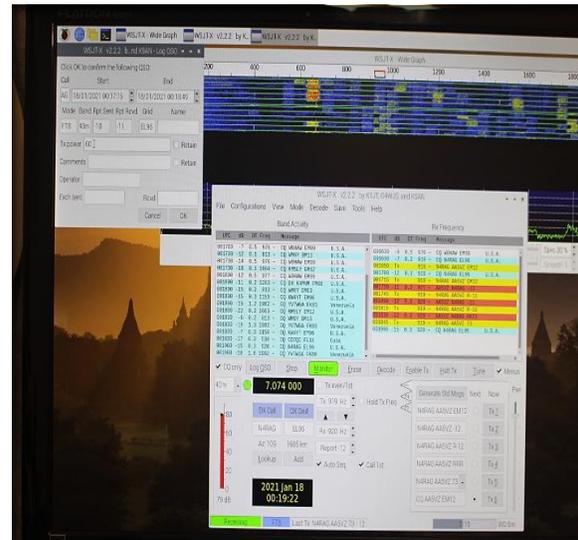
BACKGROUND

- ▶ www.k5sld.com
- ▶ Presentations Tab
- ▶ Updates expected for Parts 1 and 2
- ▶ Part 3 will be added

GETTING STARTED...

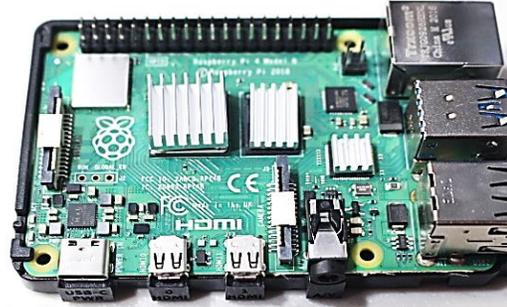
MOVING FORWARD

- ▶ Assemble a Raspberry Pi-4 Workstation
 - ▶ Load the base Operating System (O/S)
 - ▶ Install and Configure Ham Radio Apps
 - ▶ Interface the Pi with your Station
 - ▶ Get on the Air!
-
- ▶ **3A - Add LAN Remote Operation Capability**
 - ▶ **3B - Add WAN Remote Operation Capability**





Roll over image to zoom in



PART 1 (REVIEW)

- ▶ Procured a Pi-4 kit
- ▶ Assembled the components
- ▶ Assembled a Pi-4 work-station
- ▶ Installed NOOBS
- ▶ Installed/Updated the O/S
- ▶ Backed up our System SD Card(s)
- ▶ Allowed time for familiarization



PART 1 (REVIEW)

- ▶ Recommended add'l tools and free software to format and back up SD cards and System Files (see below)
- ▶ <https://www.sdcard.org/>
- ▶ Download / Install “SD Memory Card Formatter for Windows”
- ▶ <https://sourceforge.net/projects/etcher.mirror/>
- ▶ Download / Install “Etcher”

Overall Pick 



CanaKit Raspberr



400+ bougl

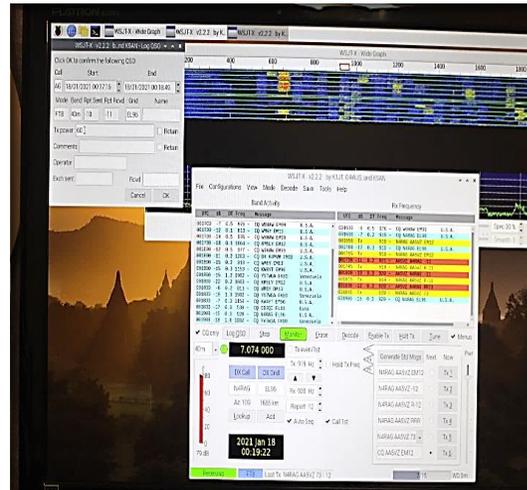
\$119⁹⁹

 Or
FREE delive

Add to Ca

BTW...

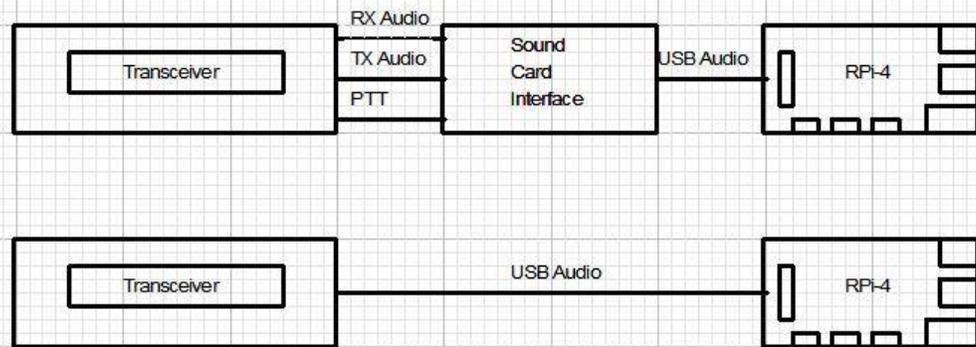
- ▶ Current price of typical Raspberry Pi-4B kit, purchased on-line today.
- ▶ About the same price as Pre-Covid era.
- ▶ Down from more than \$250.00, and nearly non-existent, two years ago.



PART 2 (REVIEW)

- ▶ Install WSJT-X (FT-8, JT-65, and others)
- ▶ Interface the Pi-4 to your Radio
 - ▶ Audio Sound Card
 - ▶ Direct (USB)
- ▶ Configure the Interface
- ▶ Configure WSJT-X App
- ▶ Configure your Radio
- ▶ Get on the Air
- ▶ Have Fun!

PI TO RADIO INTERFACE



Radio to Pi Interface Configurations

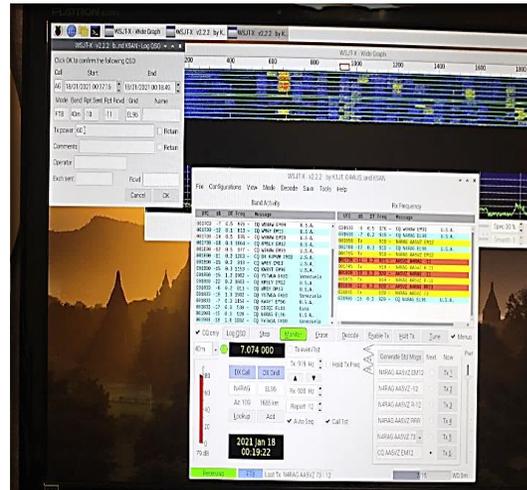
- ▶ Depending on the radio, you will use one of these two connections.
- ▶ Ex:
- ▶ TS-940 and FT-818 use top method
- ▶ FT-991A and TS-590 use bottom method

DEMONSTRATION



PART 3-A (TODAY)

- ▶ Configure the Pi-4 for “Headless” LAN operation
- ▶ Obtain Connection Parameters from the Pi-4
- ▶ Install “RealVNC Viewer” on Laptop or other Remote Computer
 - ▶ Create an Account (optional)
- ▶ Establish REMOTE connection via LAN
- ▶ Reminder on having radio and interface connected to the Pi-4 and configured accordingly. (from Part 2)
- ▶ Open the WSJT-X App (previously installed)
- ▶ Get on the Air
- ▶ Have Fun!

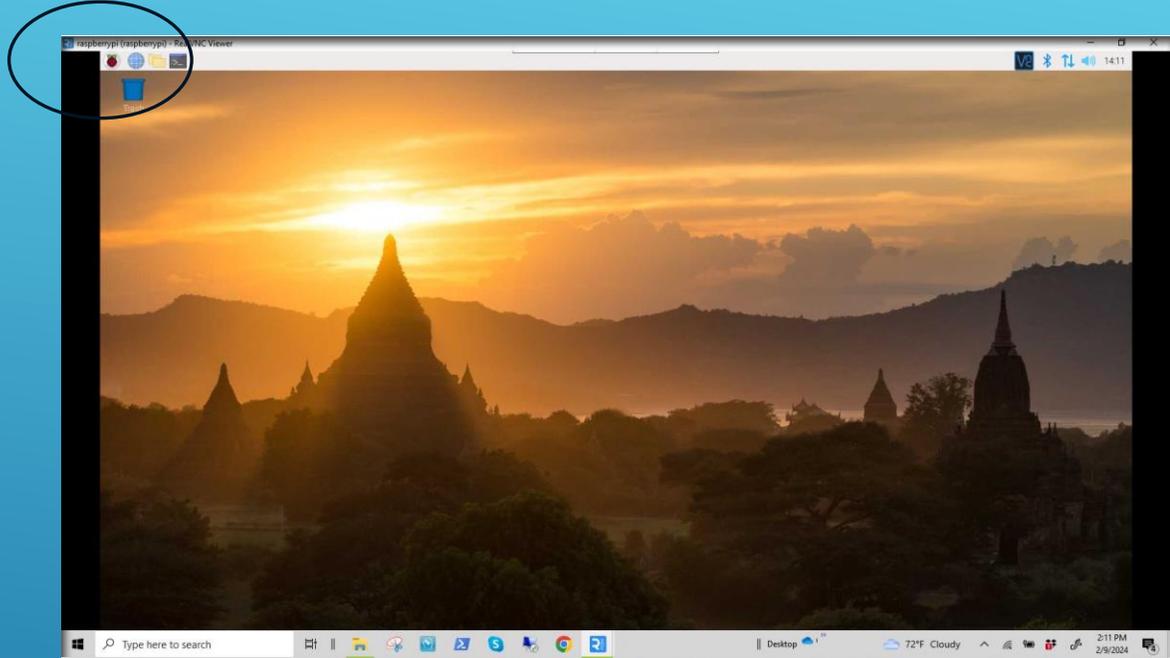


PART 3-B

- ▶ Configure system for WAN operation
- ▶ Install “RealVNC CONNECT” on Laptop or other Remote Computer
 - ▶ Create an Account (required)
- ▶ Configure Pi-4 for Remote Cloud Connections
- ▶ Establish REMOTE connection via Internet
- ▶ Open the WSJT-X App
- ▶ Get on the Air
- ▶ Have Fun!

...OFF WE GO

STEP 1

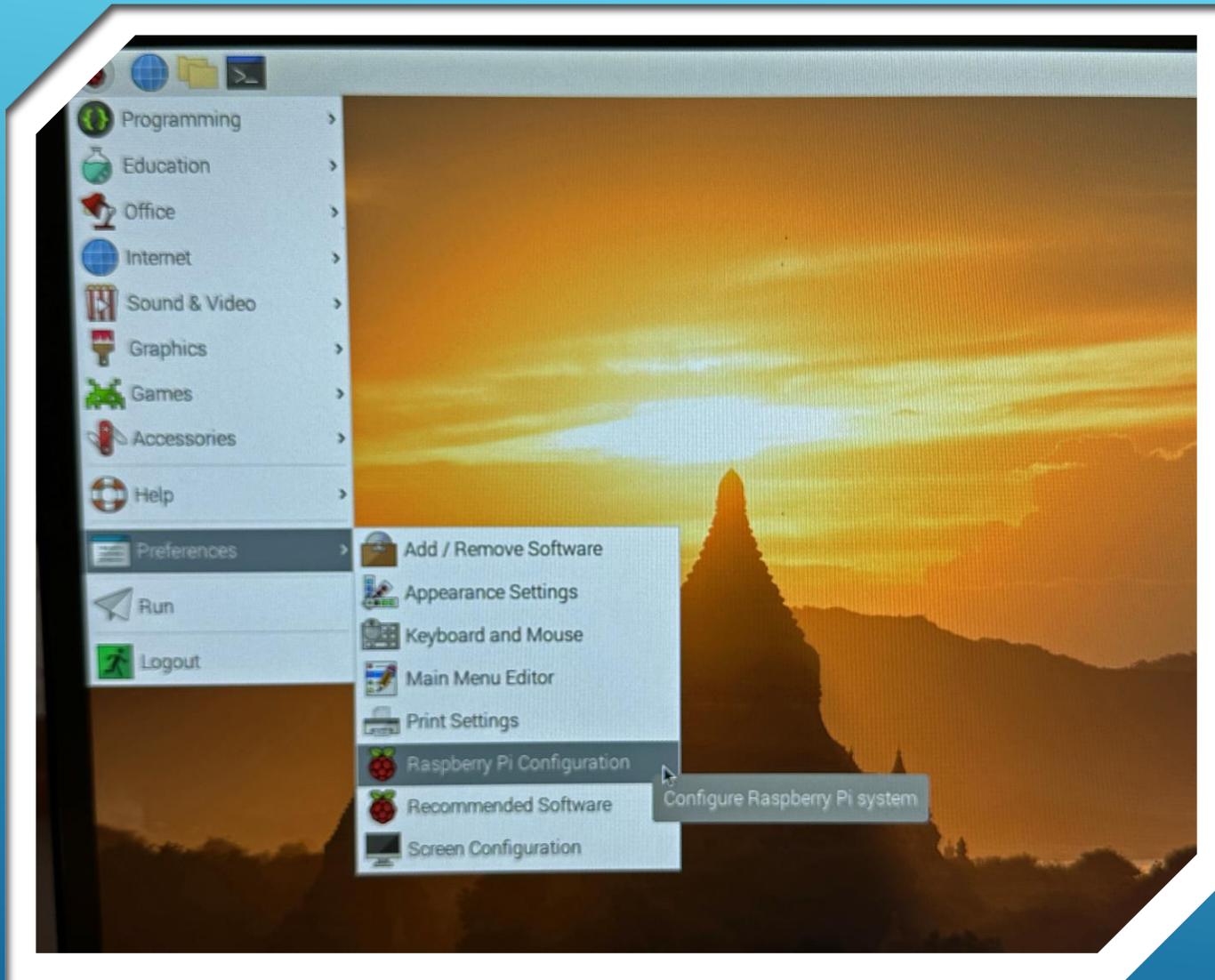


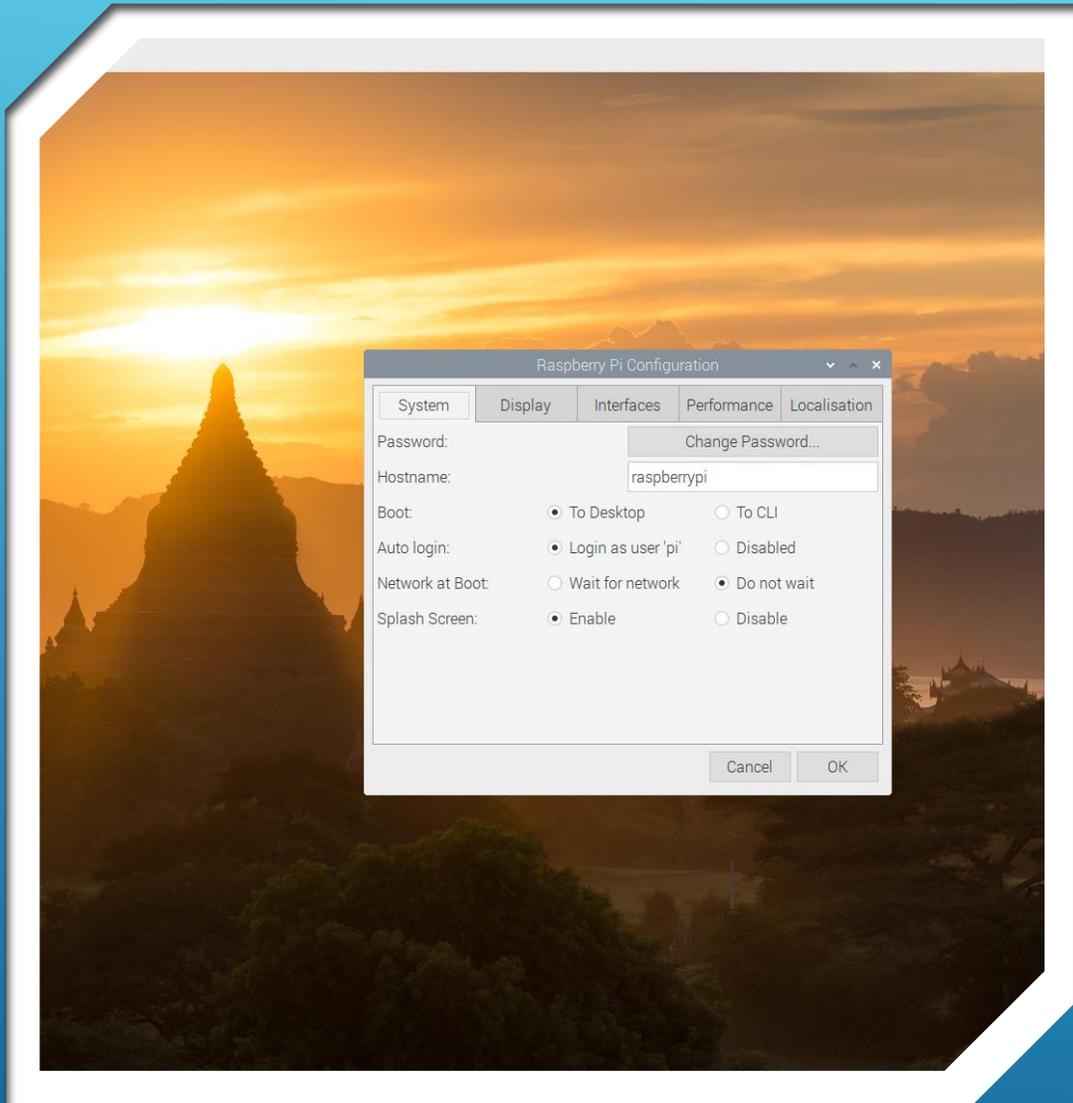
- ▶ Ensure Raspberry Pi-4 workstation is powered up and the home screen is displayed on the workstation monitor.
- ▶ Open the Raspberry Pi drop-down menu by clicking on the raspberry icon (upper left).

CONFIGURE THE RASPBERRY PI-4 FOR “HEADLESS” OPERATION

CONFIGURE THE RASPBERRY PI-4 FOR “HEADLESS” OPERATION

- ▶ Go to the Configuration Screen by scrolling down to “Preferences” and clicking on “Raspberry Pi Configuration”.





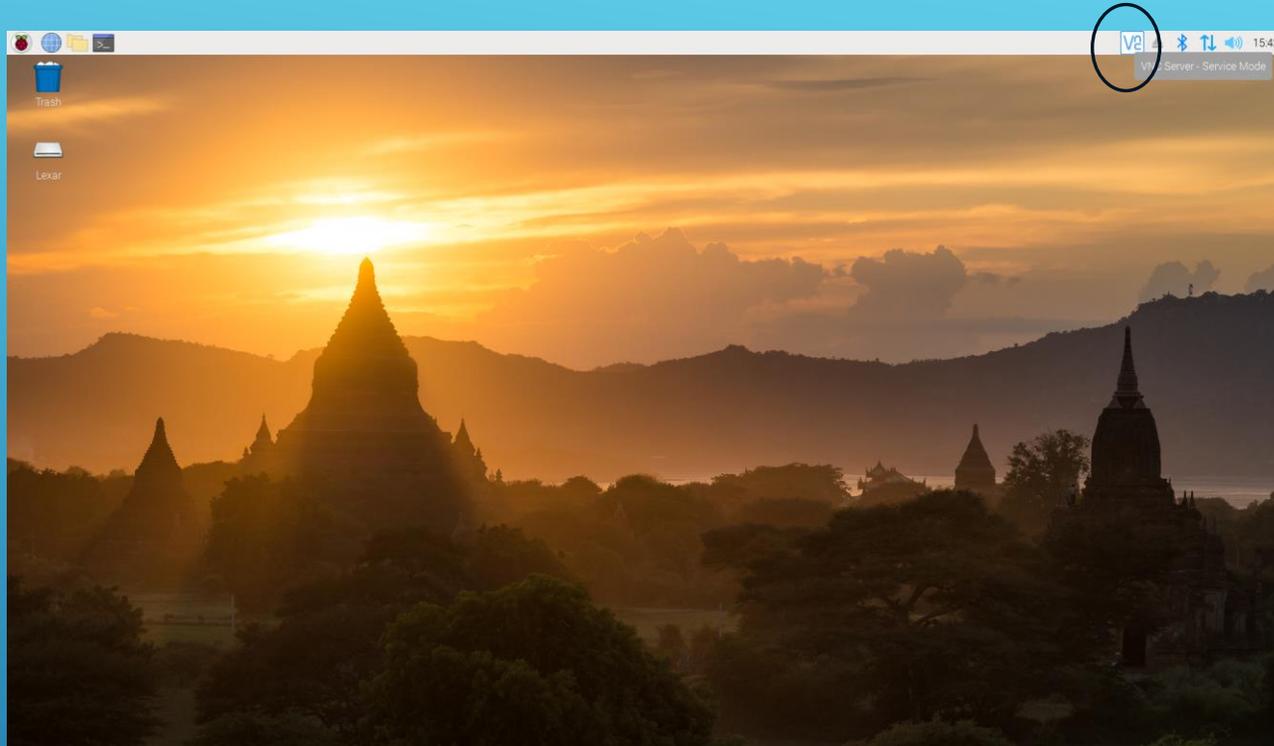
- ▶ **“System” config. screen is displayed.**
- ▶ **Write down the default Hostname shown, “raspberrypi” in this case. You will use this information later.**
- ▶ ***Ensure “Login as user ‘pi’ ” is enabled.**
- ▶ **DO NOT click “OK” yet.**
- ▶ **Rather, click on the “Interfaces” tab.**

CONFIGURE THE
RASPBERRY PI-4 FOR
“HEADLESS” OPERATION



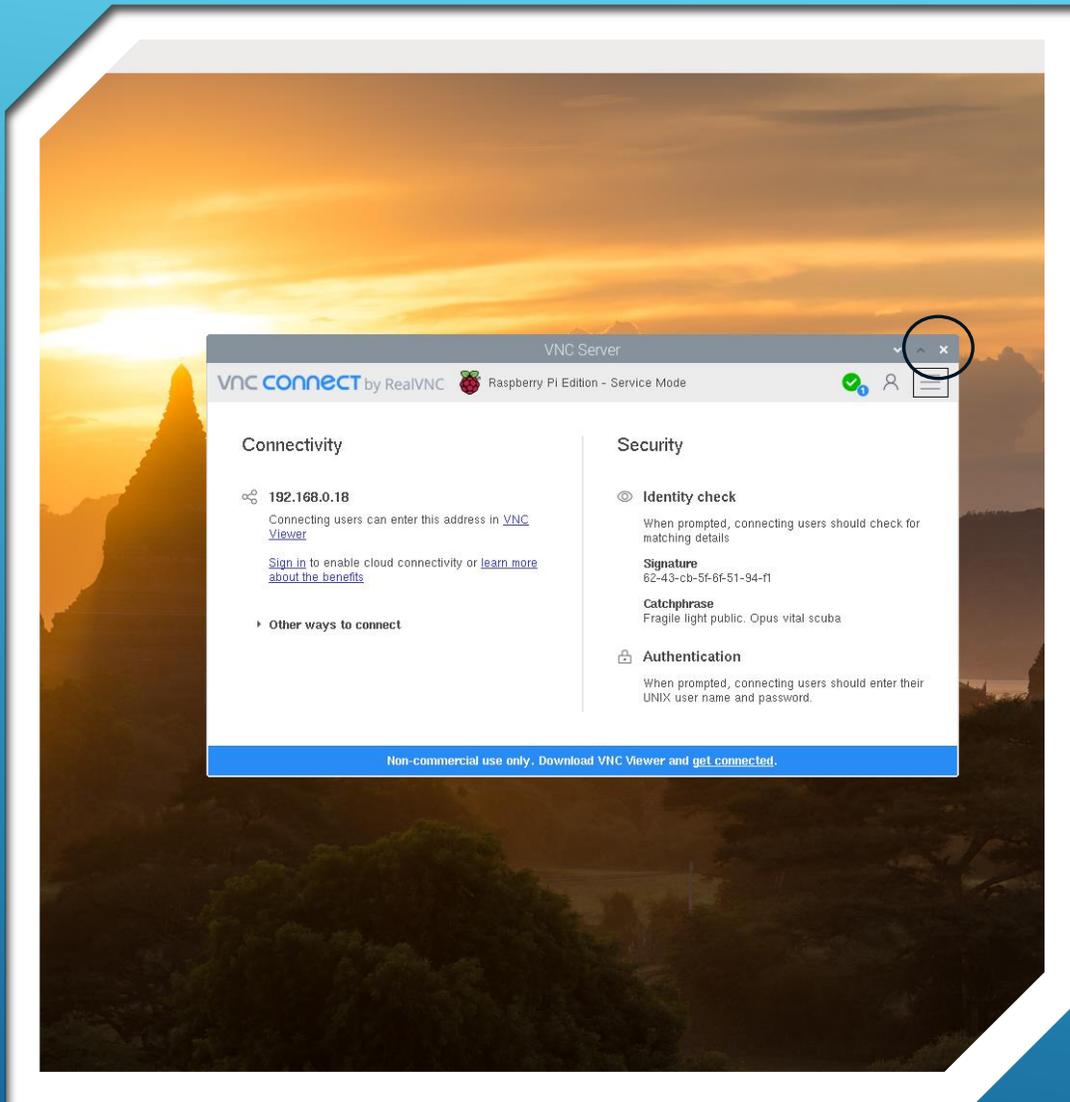
- ▶ “Interfaces” configuration screen is displayed.
- ▶ Ensure “SSH” and “VNC” buttons indicate “Enabled”.
- ▶ Click “OK”.
- ▶ Display returns to the home screen.

CONFIGURE THE
RASPBERRY PI-4 FOR
“HEADLESS” OPERATION



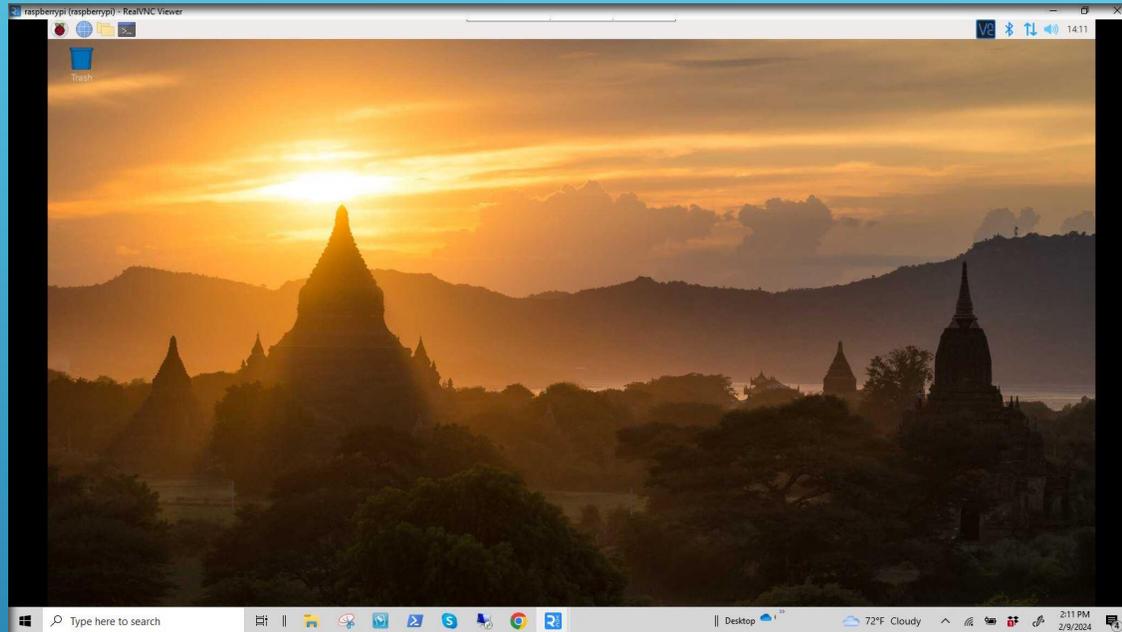
- ▶ Finally, Open the VNC Server screen by clicking on the VNC Icon (upper right area).

CONFIGURE THE RASPBERRY PI-4 FOR “HEADLESS” OPERATION



- ▶ Under the “Connectivity” title, the IP address for the raspberry pi device is displayed in the format, 192.168.x.yy.
- ▶ Write down the number-string shown, for future reference.
- ▶ This is the address to access the Raspberry pi device for connectivity on the local (LAN) network.
- ▶ Close the screen by clicking the “X” in the upper RH corner of the text screen.

CONFIGURE THE
RASPBERRY PI-4 FOR
“HEADLESS” OPERATION



- ▶ That's it for configuring the Pi for remote connectivity as the "Server".
- ▶ Keep the Raspberry Pi Workstation powered up and set on the home screen.
- ▶ Now we will configure the laptop for remote connectivity to the Pi, as the "Viewer".

CONFIGURE THE RASPBERRY PI-4 FOR "HEADLESS" OPERATION

STEP 2



- ▶ Go to RealVNC Homepage
- ▶ www.realvnc.com
- ▶ Click on “Download”

INSTALL REAL_VNC VIEWER ON LAPTOP

RealVNC.com/en/connect/download/combined/

of /tools myjetpack PET Photoshop Element... Dan Antonielli GFC ACCESS Index of /FSM/Versa... Callsign Database b... Login to account V. completa: "Habla...

[Read RealVNC's Response To The Latest AnyDesk Security Breach](#)

Just need RealVNC[®] Viewer or RealVNC[®] Server?

Should you need to install RealVNC Viewer or RealVNC Server as individual applications, you can download them below.



RealVNC[®] Viewer for Desktop

Install on the devices you will connect from.

[Download Viewer](#)



RealVNC[®] Server for Desktop

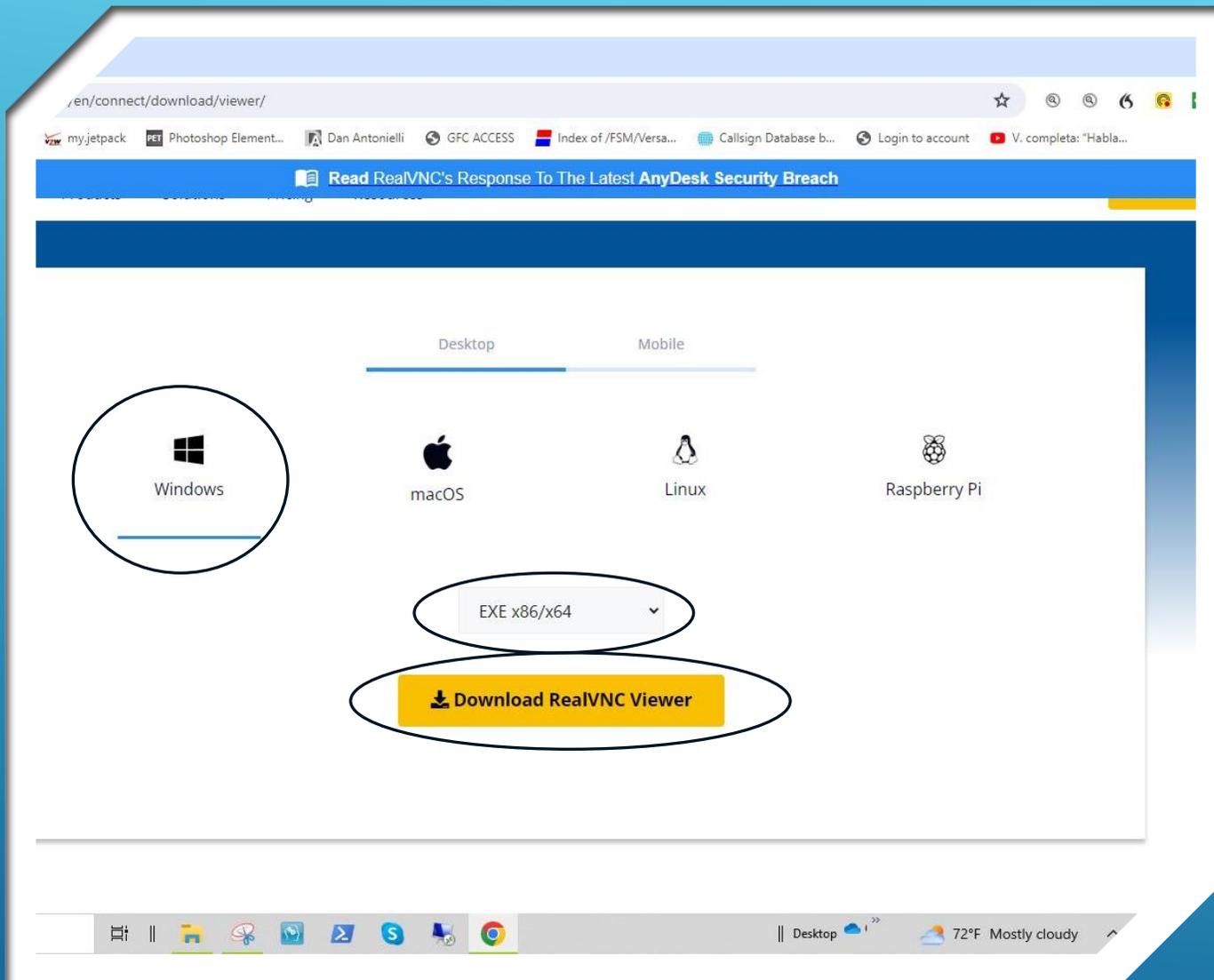
Install on your remote devices.

[Download Server](#)

Desktop NASDAQ +1.2

INSTALL REAL_VNC VIEWER ON LAPTOP

- ▶ Scroll down to “RealVNC Viewer for Desktop”
- ▶ Click “Download Viewer”

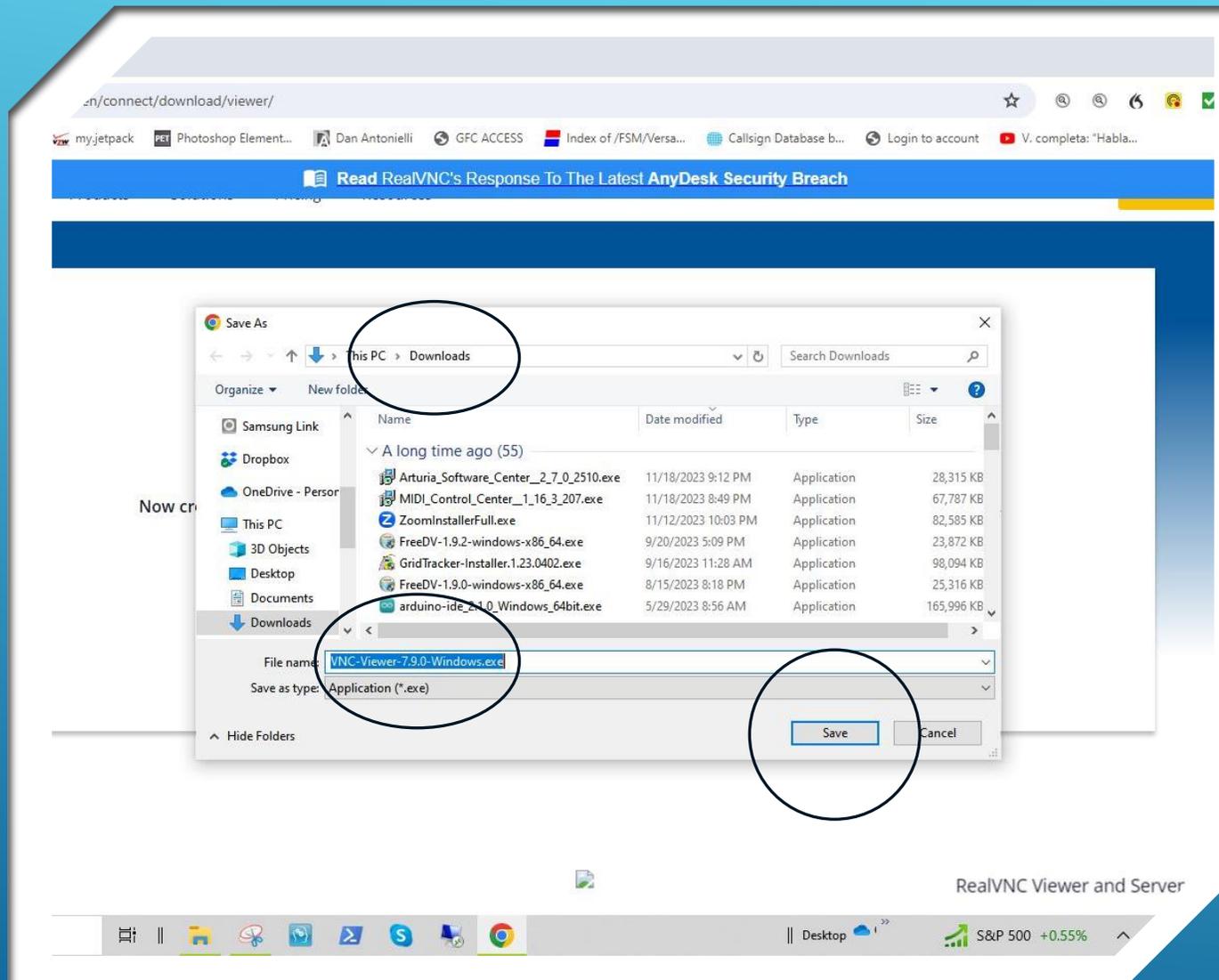


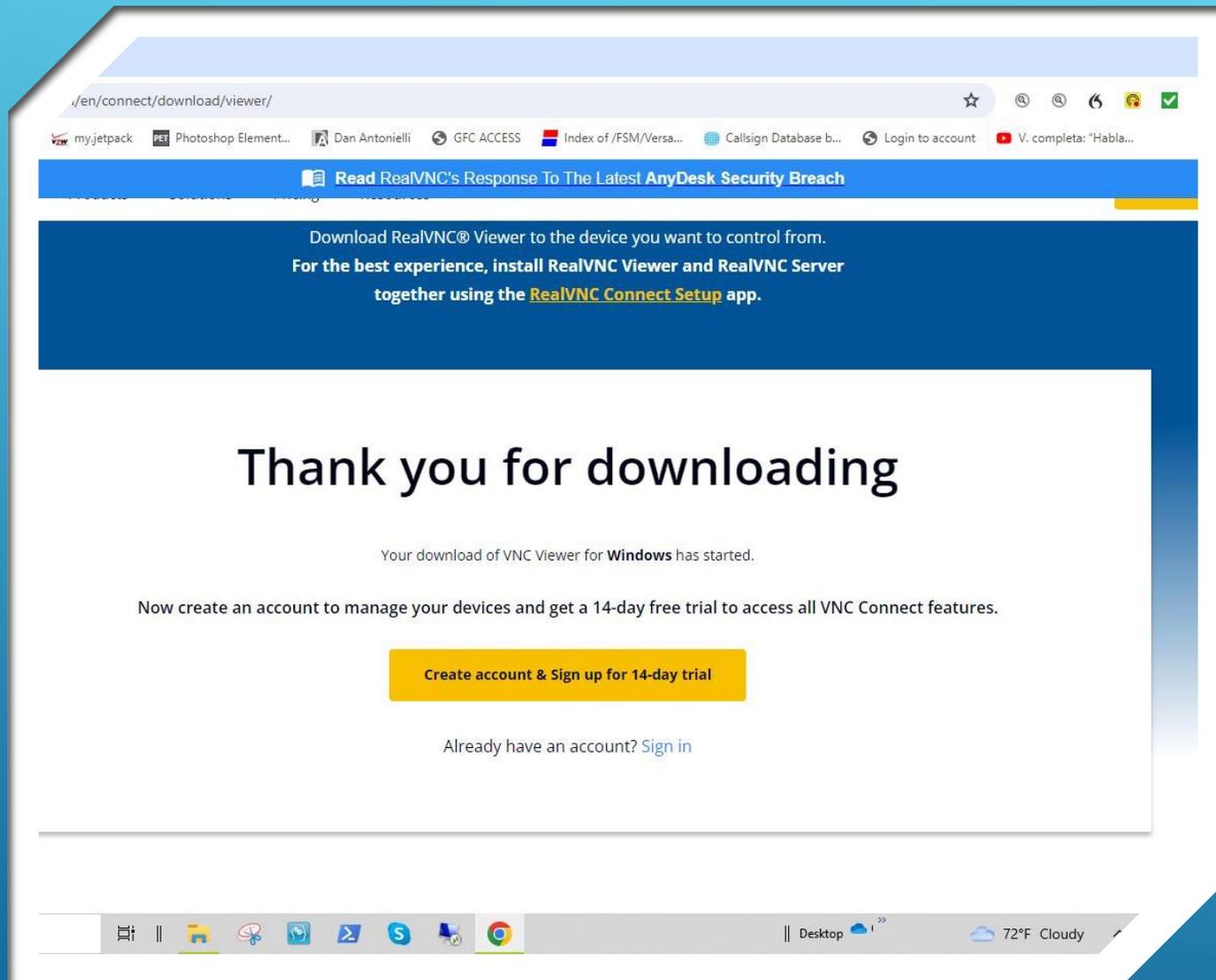
INSTALL REAL_VNC VIEWER ON LAPTOP

- ▶ Choose computer type to download to...
- ▶ Windows, EXE x86/x64 in my case
- ▶ Click "Download RealVNC Viewer"

INSTALL REAL_VNC VIEWER ON LAPTOP

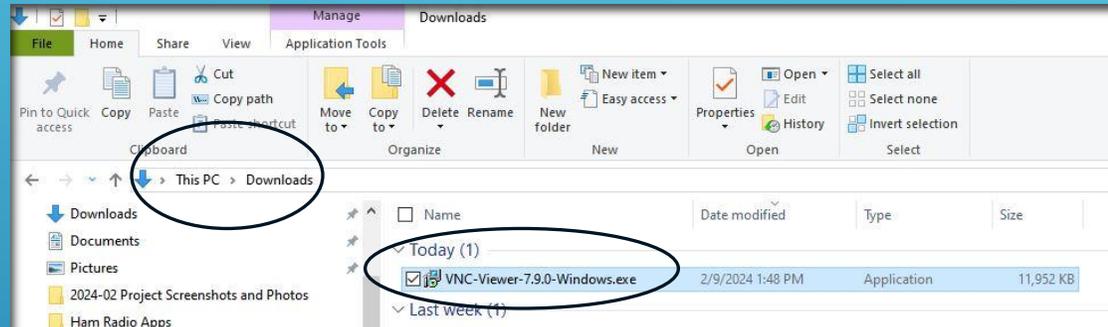
- ▶ Verify destination to save the file being downloaded
- ▶ Press “Save”





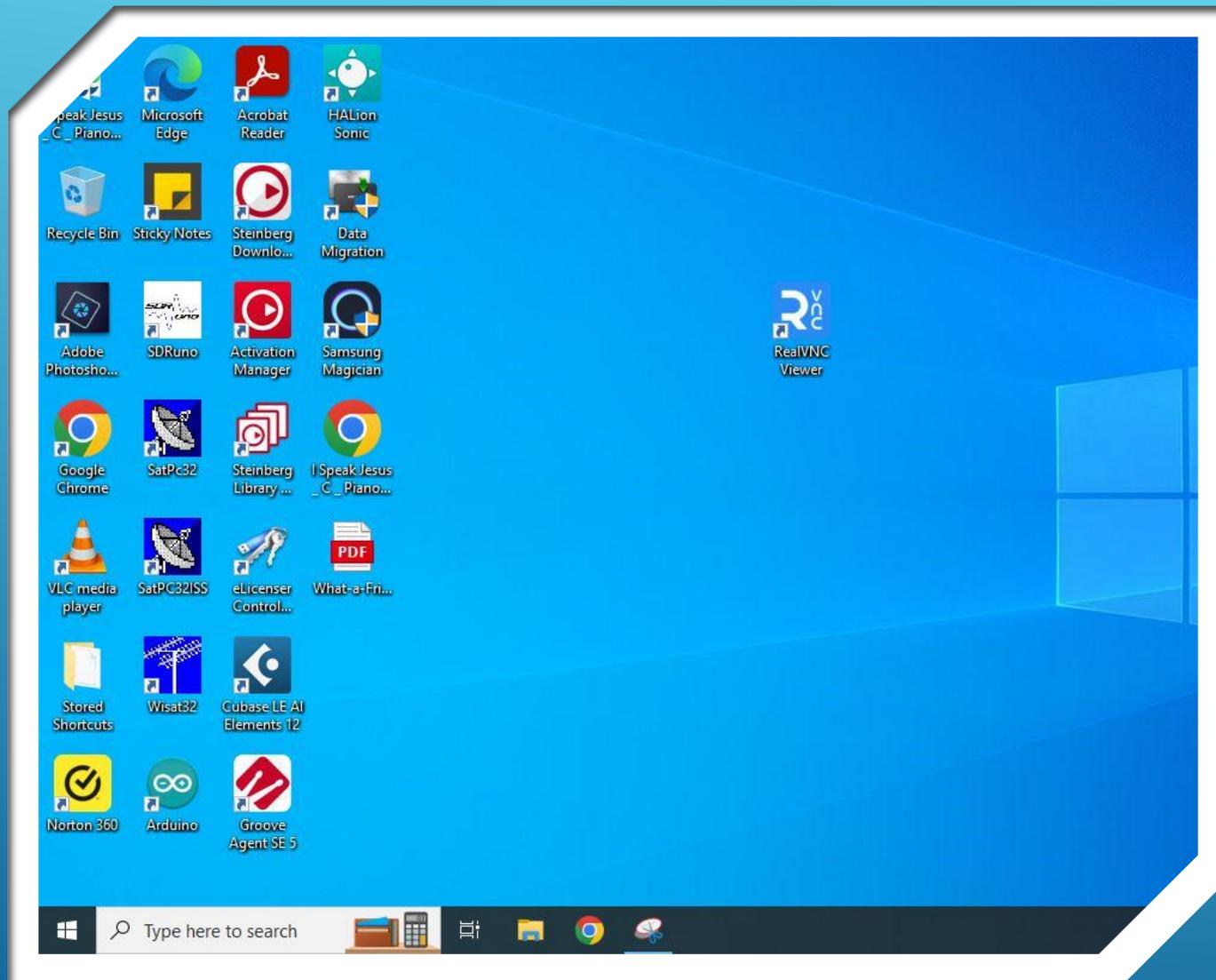
INSTALL REAL_VNC VIEWER ON LAPTOP

- ▶ Download is COMPLETE
- ▶ Creating an account with Real VNC is Optional for now...
- ▶ But, required later for Part 3-B



- ▶ To Install RealVNC Viewer
- ▶ Open the Downloads directory on the laptop.
- ▶ Double-click on the VNC Viewer .exe file you just downloaded.
- ▶ Follow the prompts to complete the installation

INSTALL REAL_VNC VIEWER ON LAPTOP

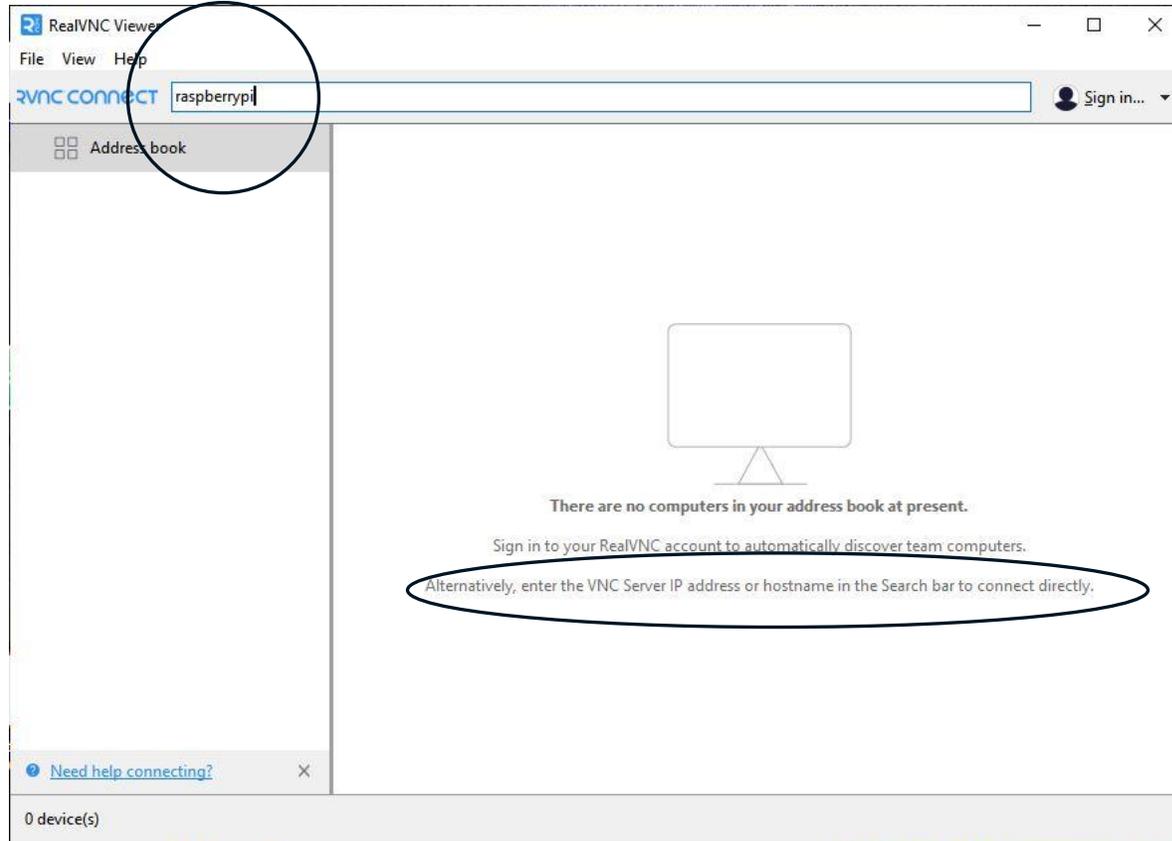


INSTALL REAL_VNC VIEWER ON LAPTOP

- ▶ Place “RealVNC Viewer” Icon on the desktop
- ▶ Double-Click the Icon to open “RealVNC Viewer” on the laptop

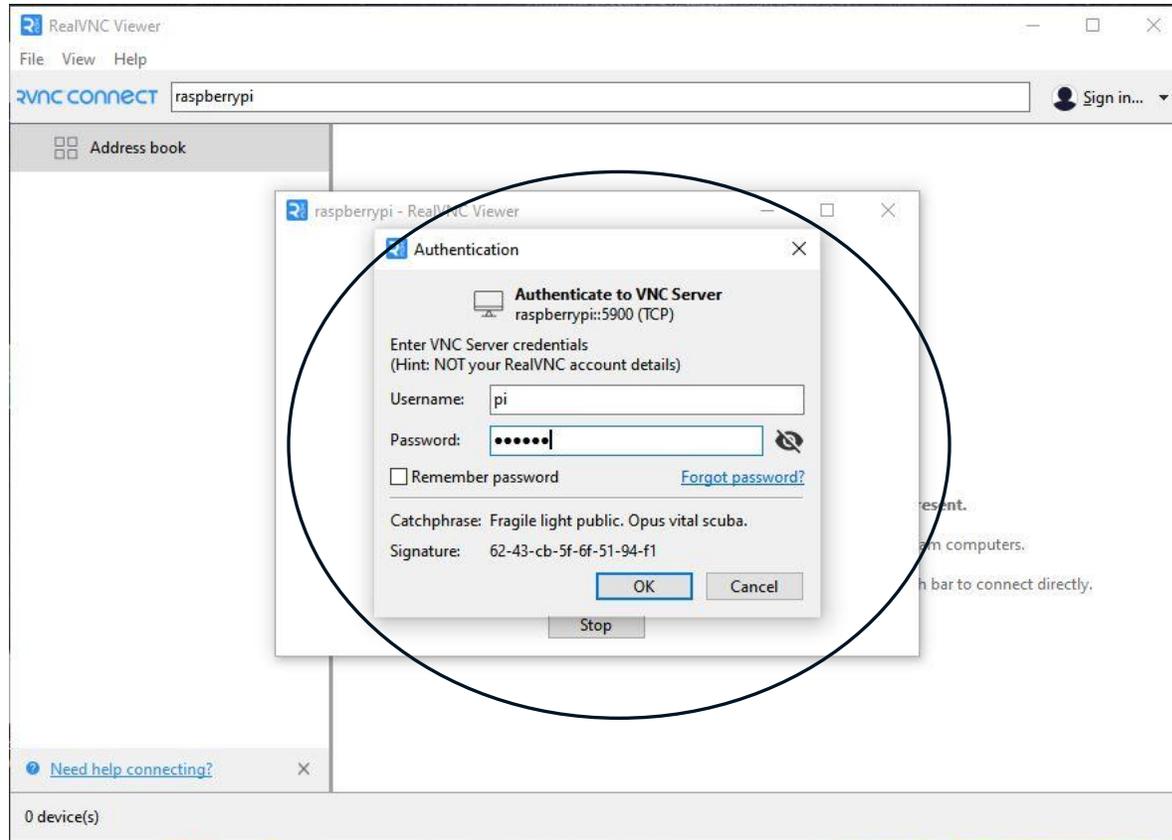
STEP 3

ESTABLISH REMOTE LAN CONNECTION TO THE RASPBERRY PI

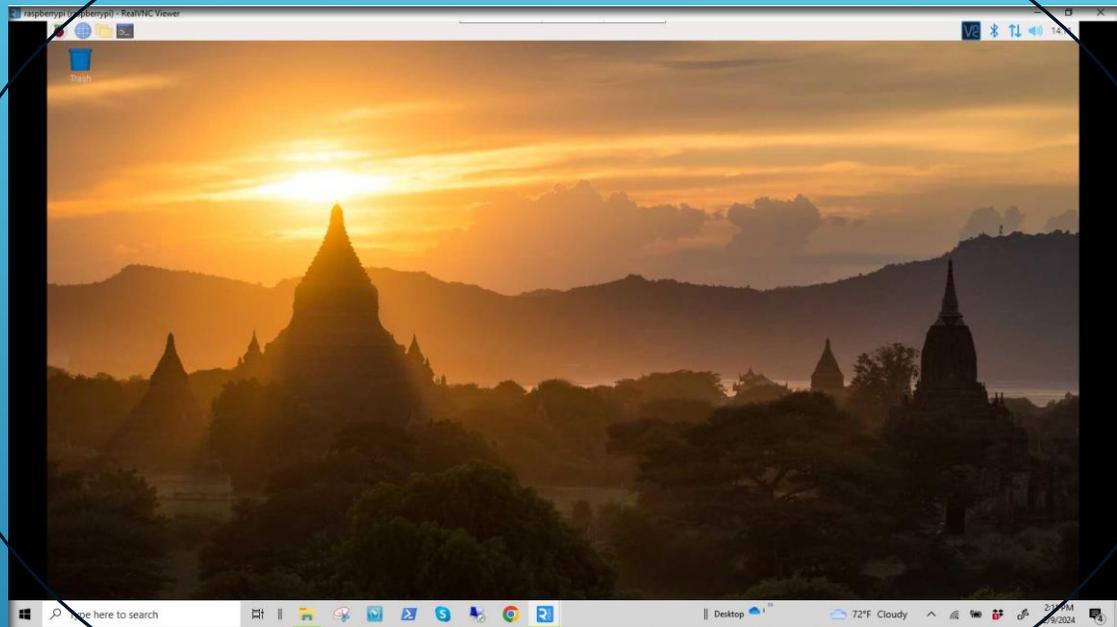


- ▶ Ensure Raspberry Pi is already booted to the Homepage and connected to the internet.
- ▶ Open “RealVNC Viewer” on the Laptop
- ▶ Type in the RPI Hostname “raspberrypi”, or the PI’s IP address (derived earlier).

ESTABLISH REMOTE CONNECTION TO THE RASPBERRY PI



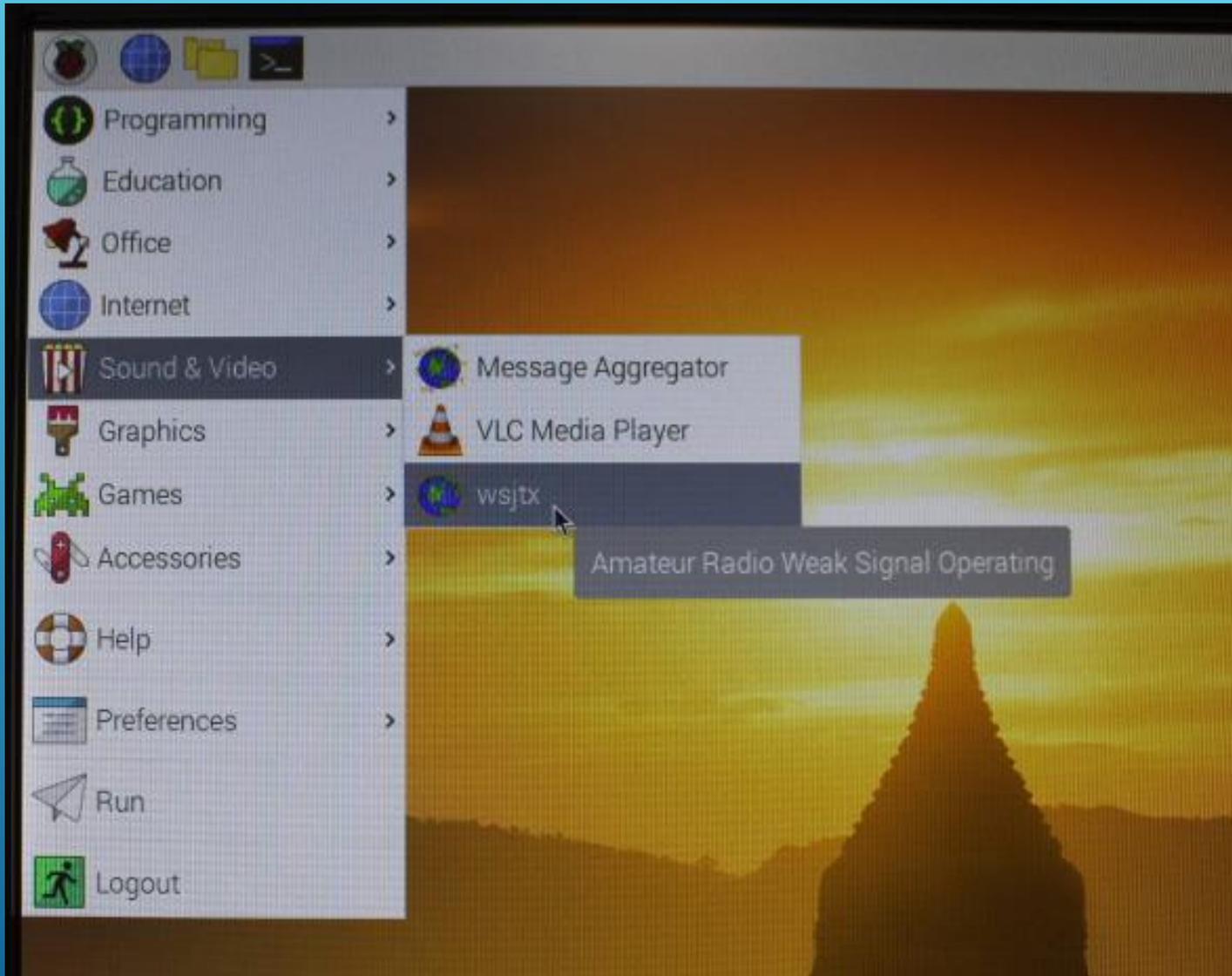
- ▶ An “Authentication” window appears when the pi device has been located.
- ▶ Type in the Raspberry Pi’s sign-in credentials and click “OK”
- ▶ Username is “pi”
- ▶ Password is either the Pi’s default password “raspberrypi”, or a different password if you had changed it previously.



- ▶ Remote connection is successful if you see the Pi home screen on the laptop.
- ▶ All corresponding mouse and keyboard commands from this screen on the laptop are now controlling the Pi.
- ▶ The Pi workstation monitor is no longer needed at this stage.
- ▶ This feature is also known as “headless” operation.
- ▶ The laptop remains connected, and the Pi can be controlled from anywhere within reception range of the network’s WiFi router.
- ▶ Think of the implications!!!

SUCCESS!!! LAPTOP SCREEN MIRRORS THE PI-4 SCREEN. THE PI CAN NOW BE CONTROLLED BY THE LAPTOP.

STEP 4



GETTING ON THE AIR - REMOTE

- **Reminder to have radio and interface connected to the Pi-4 and configured accordingly. (from Part 2 Presentation)**
- Open the WSJT-X Program from the menu screen

WSJT-X v2.3.1 by K...

WSJT-X - Wide Graph

500 1000 1500 2000

WSJT-X v2.3.1 by K1JT, G4WJS, and K9AN

File Configurations View Mode Decode Save Tools Help

Band Activity Rx Frequency

UTC	dB	DT	Freq	Message	UTC	dB	DT	Freq	Message
120315	7	0.2	706	- CQ KI0J DM79	120315	-5	0.2	1082	- CQ KF9KV EN52
120315	-5	0.2	1082	- CQ KF9KV EN52	120332	Tx		1082	- KF9KV AA5VZ EM12
120315	-12	0.0	2658	- CQ WA4PTZ EM65	120345	-4	0.1	1082	- AA5VZ KF9KV +02
120315	-17	0.1	2730	- CQ XE2JX DL96	120400	Tx		1082	- KF9KV AA5VZ R-04
120345	-4	0.1	961	- CQ KI0EB EM88	120415	-2	0.1	1082	- AA5VZ KF9KV RR73
120345	-14	0.1	2731	- CQ XE2JX DL96	120430	Tx		1082	- KF9KV AA5VZ 73
120415	-9	0.3	2017	- CQ N7UVH DM17					
120415	-8	-0.2	1191	- CQ CO7QC FL11					
120415	-6	0.1	2731	- CQ XE2JX DL96					
120415	-10	0.0	2683	- CQ WA4PTZ EM65					
120415	-17	-0.1	1278	- CQ K9DEB EN52					
120415	-18	0.3	1955	- CQ W7CD CN87					

CQ only Log QSO Stop **Monitor** Erase Decode Enable Tx Halt Tx Tune Menus

40m **7.074 000** Tx even/1st Hold Tx Freq

DX Call DX Grid Tx 1082 Hz Rx 1082 Hz Report -2 Auto Seq Call 1st

KF9KV EN52 Az: 30 1315 km **2021 May 19 12:04:45**

Generate Std Msgs Next Now Pwr

KF9KV AA5VZ EM12	<input type="radio"/>	Tx 1
KF9KV AA5VZ -02	<input type="radio"/>	Tx 2
KF9KV AA5VZ R-02	<input type="radio"/>	Tx 3
KF9KV AA5VZ RRR	<input type="radio"/>	Tx 4
KF9KV AA5VZ 73	<input type="radio"/>	Tx 5
CQ AA5VZ EM12	<input checked="" type="radio"/>	Tx 6

Receiving FT8 Last Tx: KF9KV AA5VZ 73 17 0/15 WD:6m

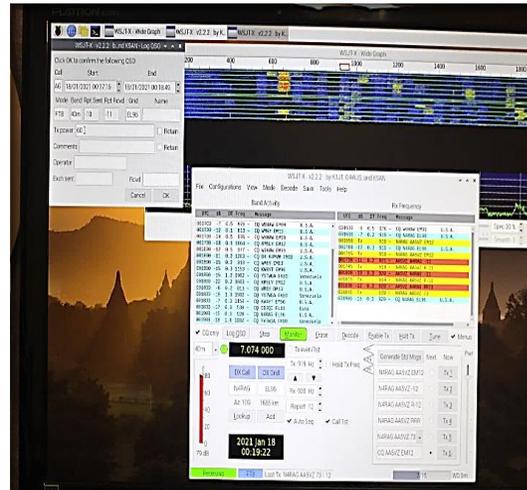
Bins/Pixel 2 Start 0 Hz Palette Adjust... Flatten Ref Spec Spec 30 %

Split 2500 Hz N Avg 5 Digipan Cumulative Smooth 1

GET ON THE AIR...
HAVE FUN!

DEMONSTRATION

NEXT...

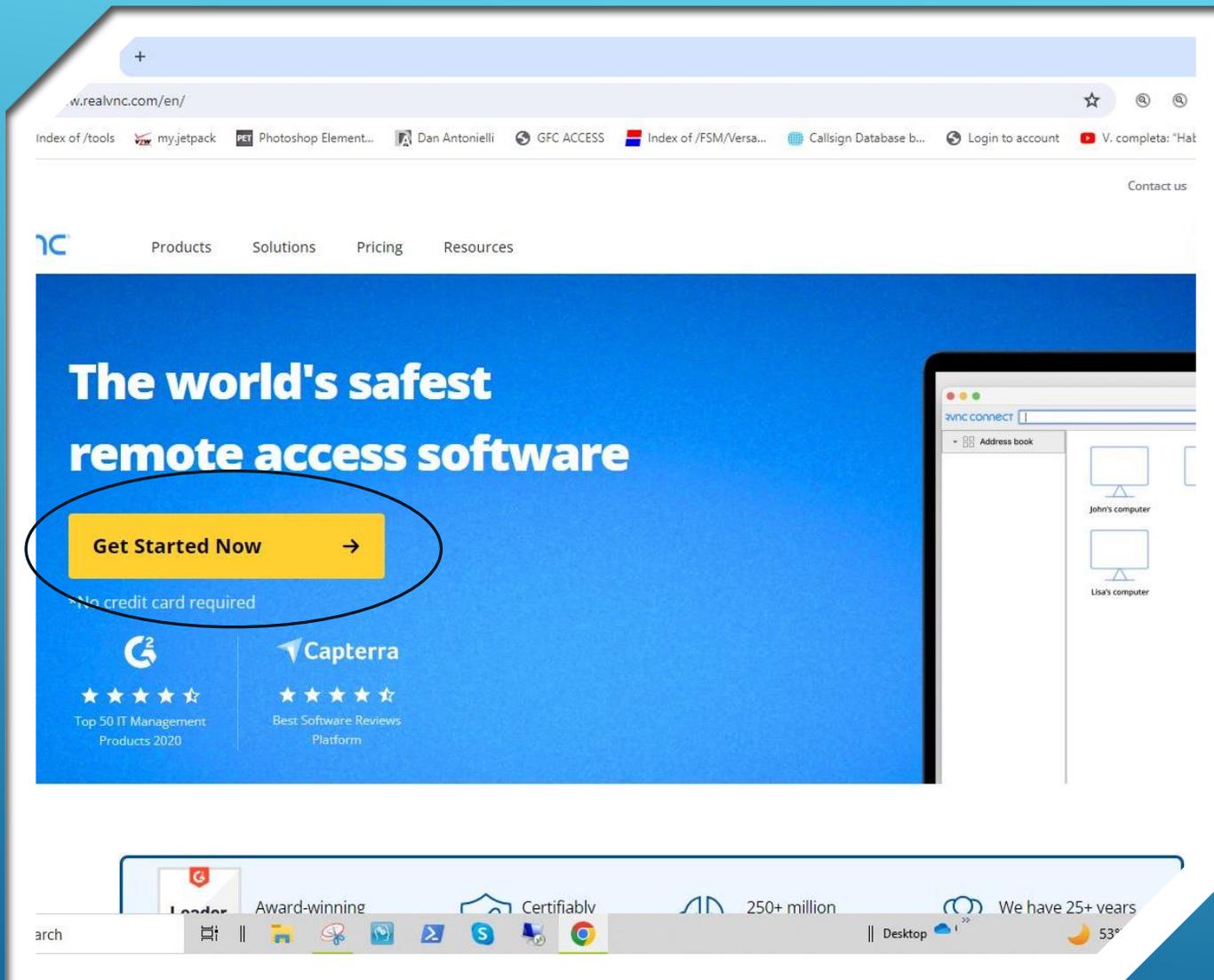


PART 3-B

- ▶ Configure system for remote wide area connectivity
- ▶ Install “RealVNC CONNECT” on Laptop or other Remote Computer
 - ▶ Create an Account (required)
- ▶ Establish REMOTE cloud connection from anywhere via Internet
- ▶ Open the WSJT-X App
- ▶ Get on the Air
- ▶ Have Fun!

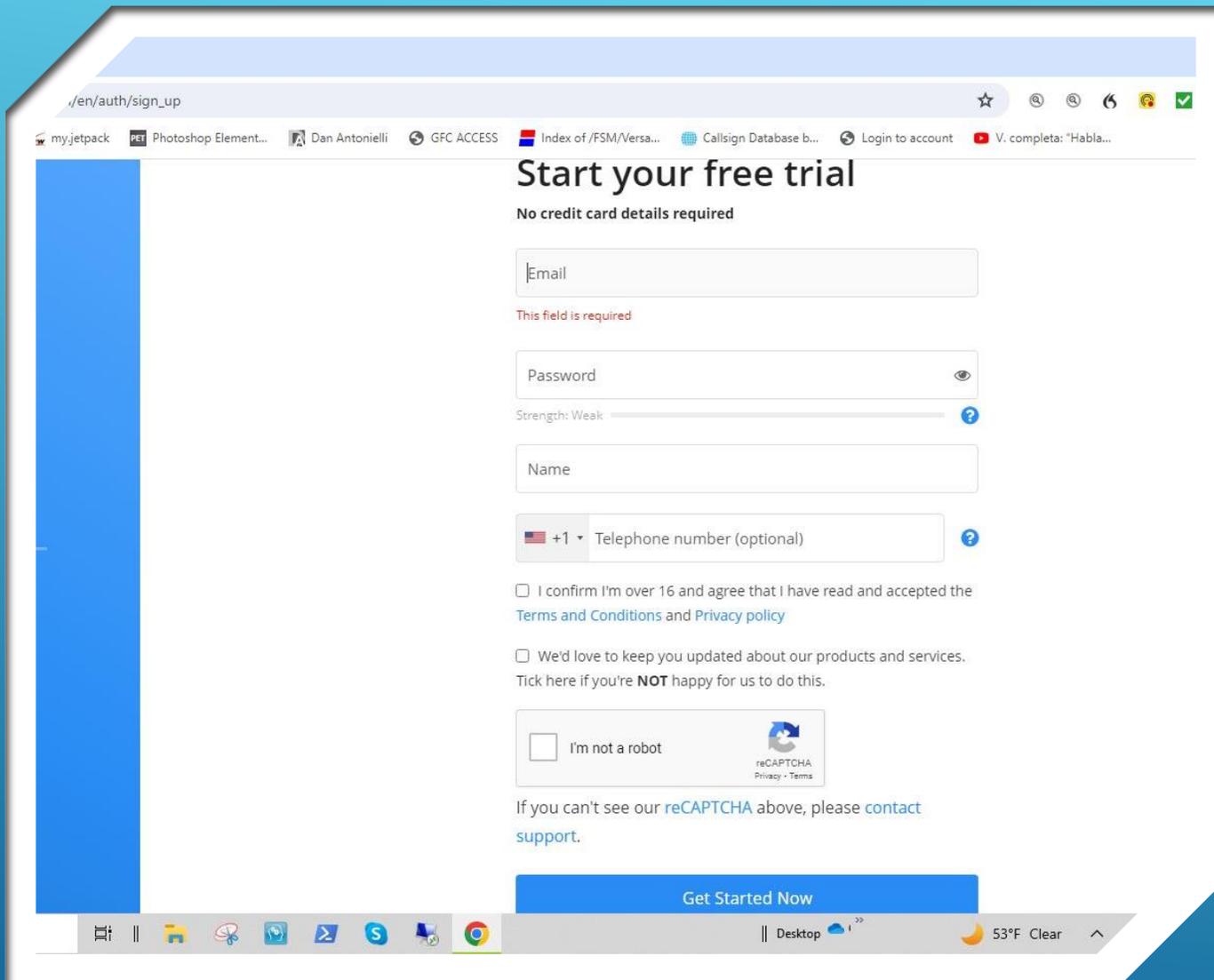
...OFF WE GO
AGAIN!

STEP 1



INSTALL “VNC CONNECT” ON LAPTOP

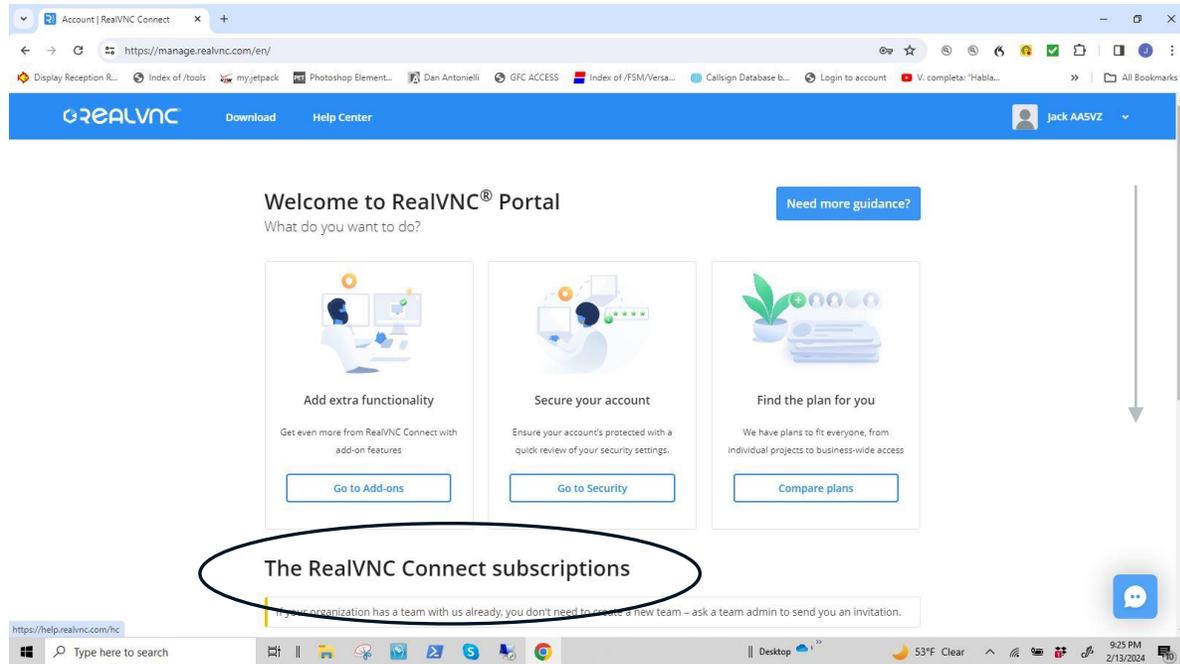
- ▶ Go to RealVNC Homepage
- ▶ www.realvnc.com
- ▶ Click on “Get Started Now”



INSTALL "VNC CONNECT" ON LAPTOP

- ▶ Fill out the form accordingly
- ▶ Check "I'm not a robot"
- ▶ Click on "Get Started Now"

INSTALL “VNC CONNECT” ON LAPTOP



The screenshot shows a web browser window displaying the RealVNC Portal. The page title is "Welcome to RealVNC® Portal" and it asks "What do you want to do?". There are three main sections: "Add extra functionality", "Secure your account", and "Find the plan for you". A blue button labeled "Need more guidance?" is located at the top right. A black oval highlights the text "The RealVNC Connect subscriptions" at the bottom of the page. The browser's address bar shows "https://manage.realvnc.com/en/". The Windows taskbar at the bottom shows the time as 9:25 PM on 2/13/2024.

Account | RealVNC Connect

https://manage.realvnc.com/en/

REALVNC Download Help Center Jack AASVZ

Need more guidance?

Welcome to RealVNC® Portal
What do you want to do?

Add extra functionality
Get even more from RealVNC Connect with add-on features
Go to Add-ons

Secure your account
Ensure your account's protected with a quick review of your security settings.
Go to Security

Find the plan for you
We have plans to fit everyone, from individual projects to business-wide access
Compare plans

The RealVNC Connect subscriptions

https://help.realvnc.com/hc

Desktop 53°F Clear 9:25 PM 2/13/2024

- ▶ “The Welcome to RealVNC Portal page appears”
- ▶ Scroll down to view “The RealVNC Connect Subscriptions” area.

INSTALL "VNC CONNECT" ON LAPTOP

- ▶ In the "Essentials" block, click on "Start a 14 day trial"...Not "Buy Now"

The screenshot shows the RealVNC Connect website with the following content:

Browser tabs: myjetpack, Photoshop Element..., Dan Antonielli, GFC ACCESS, Index of /FSM/Versa..., Callsign Database b..., Login to account, V. completa: "Habla..."

The RealVNC Connect subscriptions

If your organization has a team with us already, you don't need to create a new team – ask a team admin to send you an invitation.

Essentials	Plus	Most Popular Premium	Enterprise
For individuals needing remote access for a handful of desktop devices	For businesses needing with enhanced features	For organizations with specific legislative and compliance requirements	For organizations that require advanced security, privacy, and access management
<ul style="list-style-type: none">Up to 3 Managed DevicesCross platform connectivity2FA and log-in alerts	<ul style="list-style-type: none">Up to 25 Managed DevicesCloud onlyManage account via API Access	<ul style="list-style-type: none">Up to 150 Managed DevicesCloud and direct connectivityAdvanced permissions management	<ul style="list-style-type: none">Custom pricing for your company
Buy now Start a free 14 day trial	Buy now Start a free 14 day trial	Buy now Start a free 14 day trial	Contact Sales

If you have a Raspberry Pi for non-commercial use and want to know about extra features you're entitled to, [click here](#).

Taskbar: Desktop, 53°F Clear

INSTALL “VNC CONNECT” ON LAPTOP

- ▶ Click “Download for Windows”
- ▶ Note: Do Not Click “Next Step” at this time.

Download Help Center Trial ends in 14 days Purchase now

Jack's Team (1 Business Premium)

Device A

On-Dema

People

Team Ma

Add-ons

Help widget using the y to Friday.

Great news, your account is ready to use

Get a quick start to remote access

Download for Windows Next step

Skip and proceed to your account

You can return here anytime from the Profile icon in the title bar

Don't show this on start up

Trial

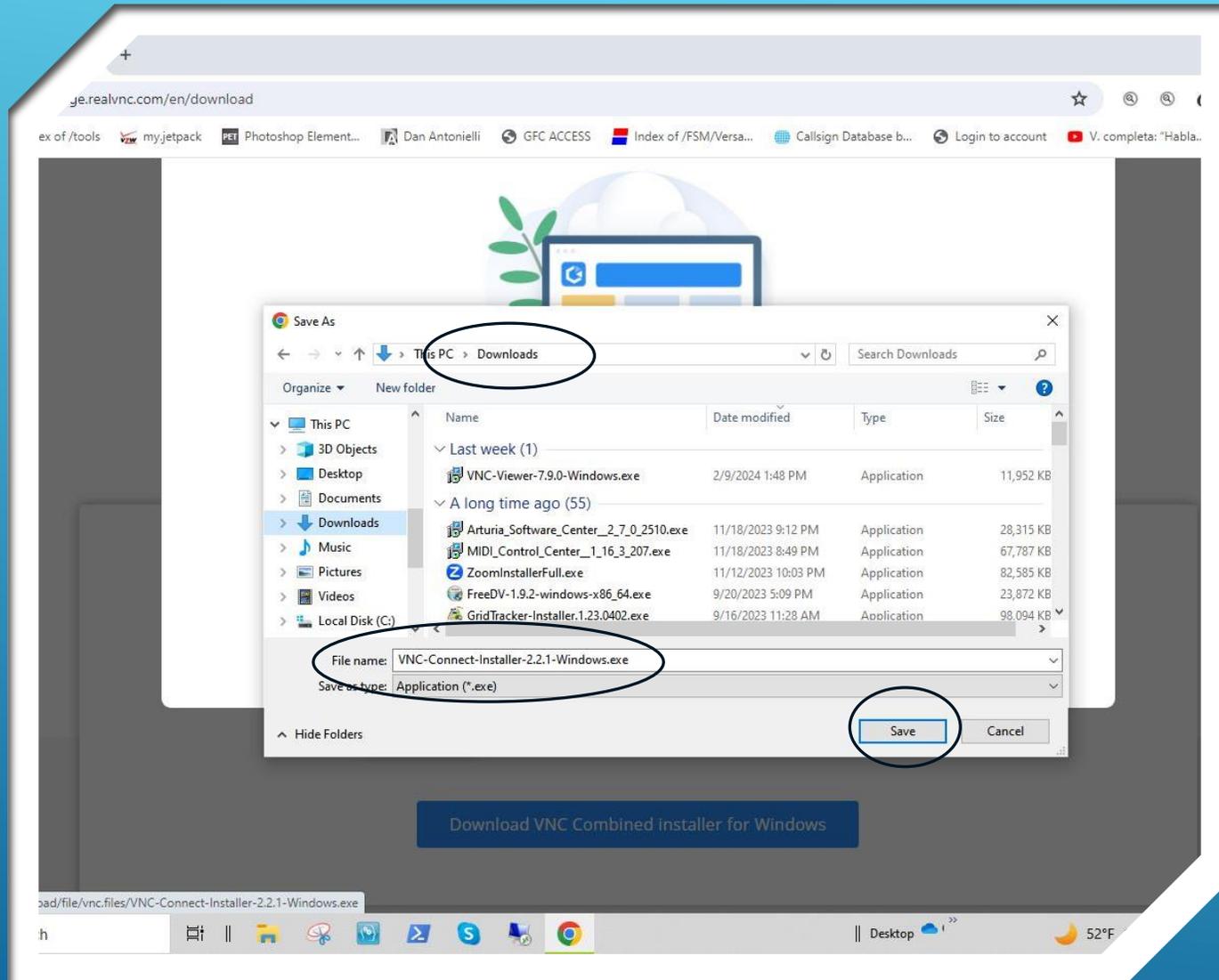
Trial ends in 14 days. You must subscribe at the end of

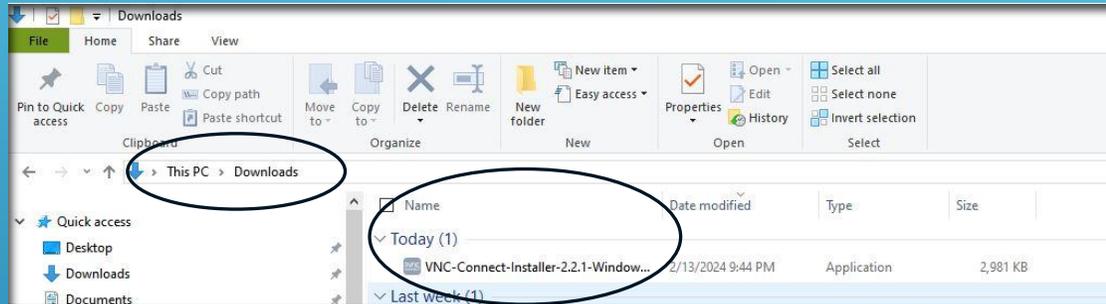
11 am-10 pm CET

52°F Clear

INSTALL "VNC CONNECT" ON LAPTOP

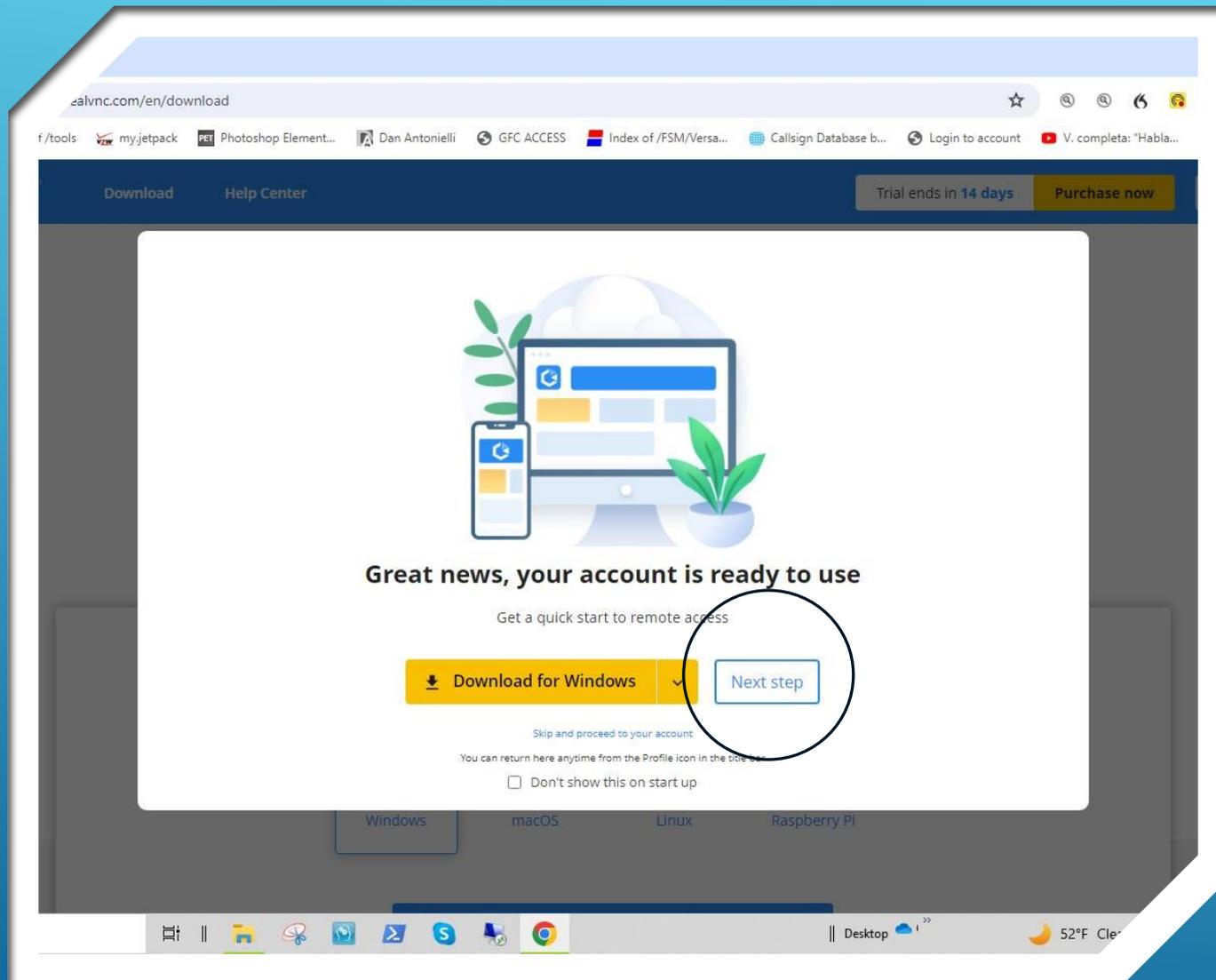
- ▶ Verify destination to save the file being downloaded
- ▶ Click "Save"





- ▶ Check “Download” directory to confirm it is there

INSTALL “VNC CONNECT” ON LAPTOP



INSTALL "VNC CONNECT" ON LAPTOP

- ▶ Download was successful!
- ▶ Now Click "Next Step"

INSTALL "VNC CONNECT" ON LAPTOP

- ▶ Follow instruction in step "2/3"
- ▶ To complete the installation, go to your download directory and "double-click" on the RealVNC connect.exe file you just downloaded

The screenshot shows a web browser window displaying the RealVNC website. The main content is a white dialog box titled "Now, let's get you connected". It contains two steps:

- Step 2/3:** "Complete the installation and click the 'Sign in to continue' button". This step is circled in black. Below the text is an illustration of a person sitting at a desk with a laptop.
- Step 3/3:** "To make a remote access connection install RealVNC® Connect onto another device". It lists three options:
 - Option 1:** Connect to another computer by signing in to Portal and download VNC Connect from the [download page](#)
 - Option 2:** Download VNC Viewer to your mobile device from [AppStore](#) or [Google Play](#)
 - Option 3:** Provide instant help via On-Demand Assist. End user needs to download the disposable app from [realvnc.help](#)

At the bottom of the dialog, there are two buttons: "Previous step" and "Done". Below the buttons, there is a checkbox labeled "Don't show this on start up".

The browser's address bar shows ".alvnc.com/en/". The top navigation bar includes "Download", "Help Center", "Trial ends in 14 days", and "Purchase now". The bottom of the screen shows a Windows taskbar with various application icons and a system tray displaying "Desktop" and "52°F Clear".

INSTALL "VNC CONNECT" ON LAPTOP

- ▶ Steps Completed?
- ▶ Click "Done"

realvnc.com/en/

Download Help Center Trial ends in 14 days Purchase now

Now, let's get you connected

Step 2/3
Complete the installation and click the 'Sign in to continue' button



Step 3/3
To make a remote access connection install RealVNC[®] Connect onto another device

Option 1: Connect to another computer by signing in to Portal and download VNC Connect from the [download page](#)

Option 2: Download VNC Viewer to your mobile device from [AppStore](#) or [Google Play](#)

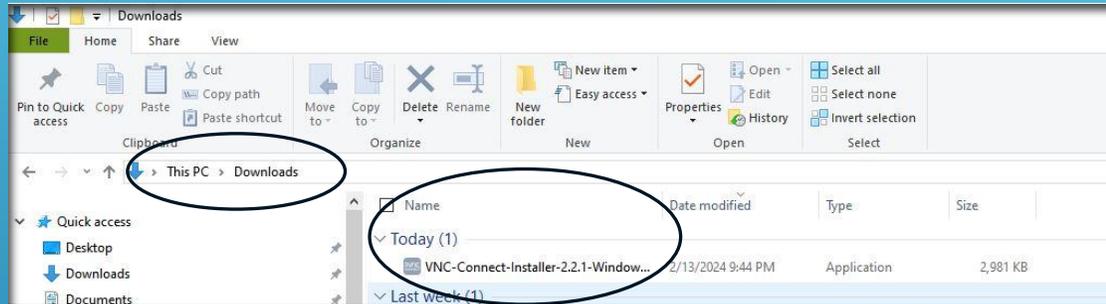
Option 3: Provide instant help via On-Demand Assist. End user needs to download the disposable app from [realvnc.help](#)

Previous step **Done**

You can return here anytime from the Profile icon in the side bar

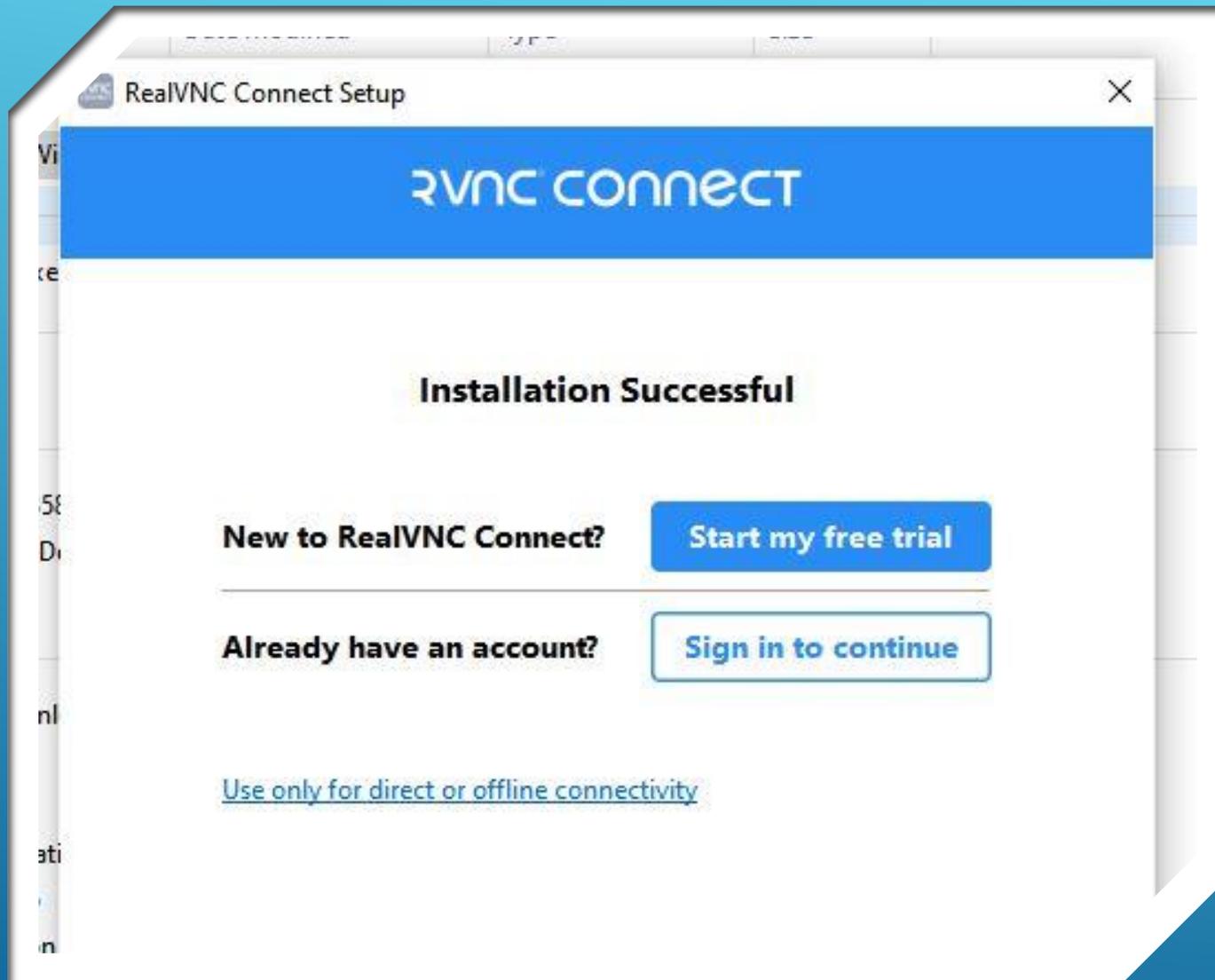
Don't show this on start up

Taskbar: Desktop 51°F Clear



- ▶ To install VNC Connect, go to your download directory and “double-click” on the VNC Connect Installer.exe file you just downloaded.
- ▶ Follow the prompts during installation.

INSTALL “VNC CONNECT” ON LAPTOP

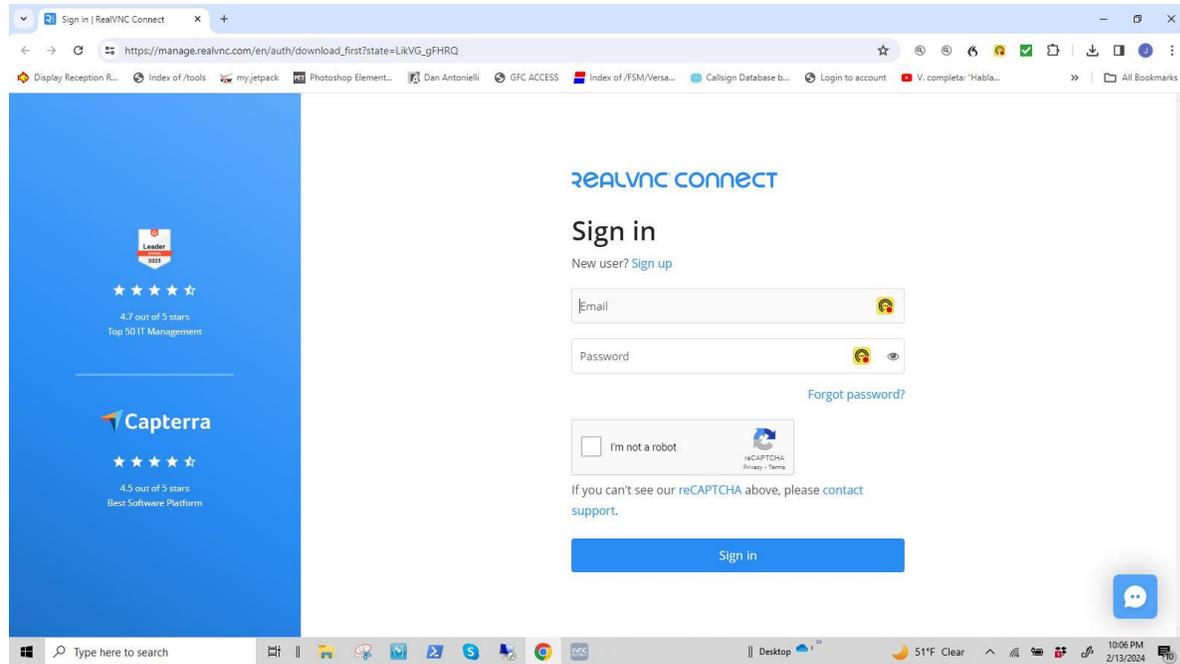


INSTALL "VNC
CONNECT" ON
LAPTOP

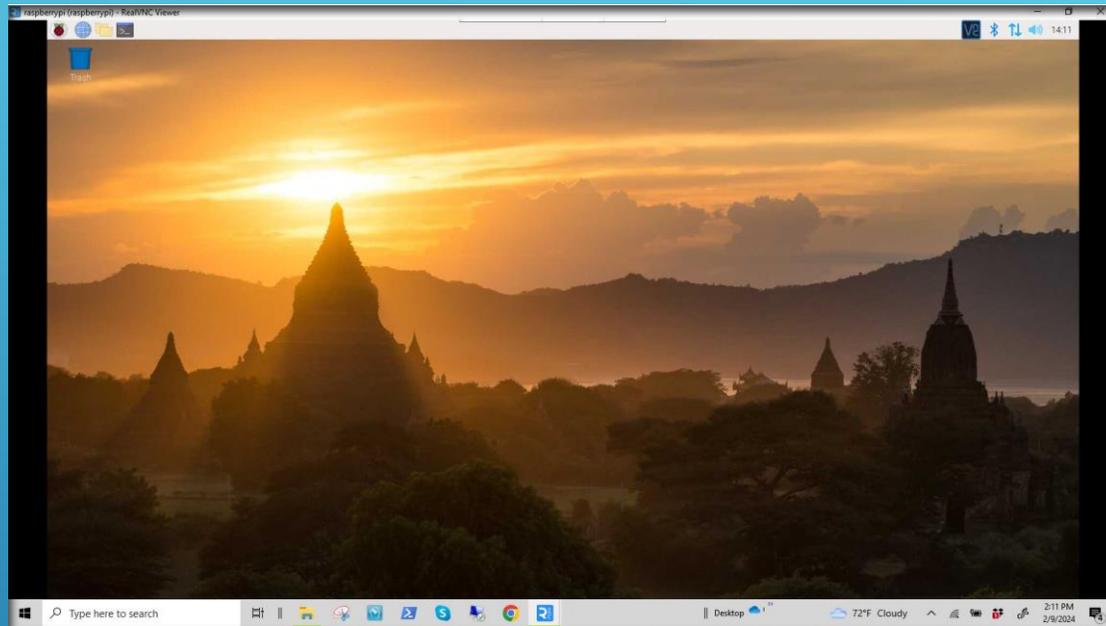
► **Success!**

INSTALL "VNC CONNECT" ON LAPTOP

- ▶ Sign in page for VNC Connect

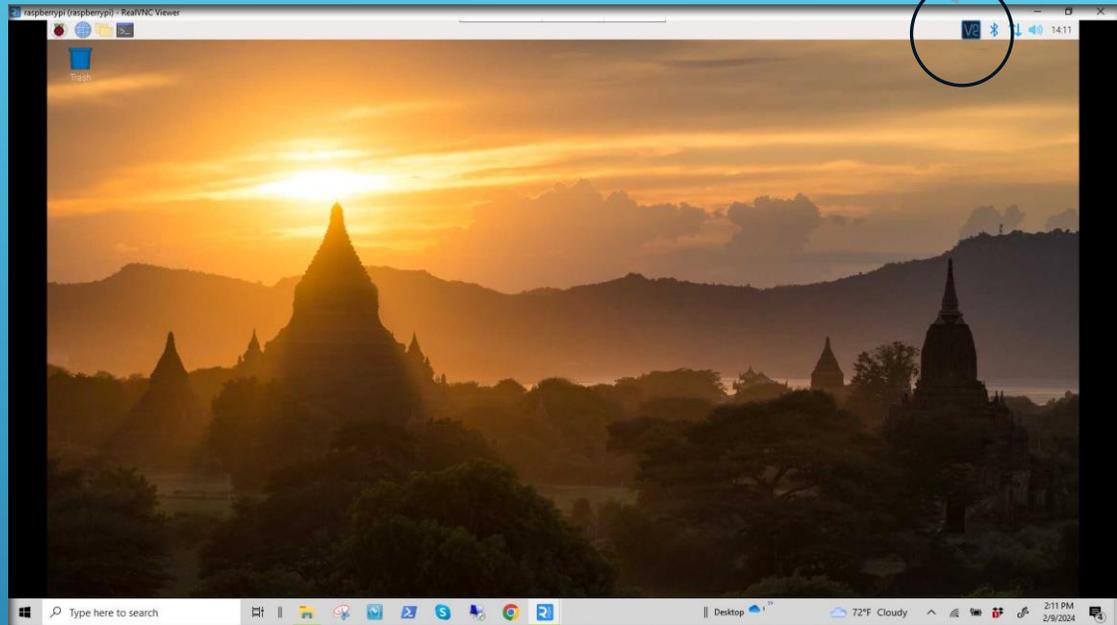


STEP 2



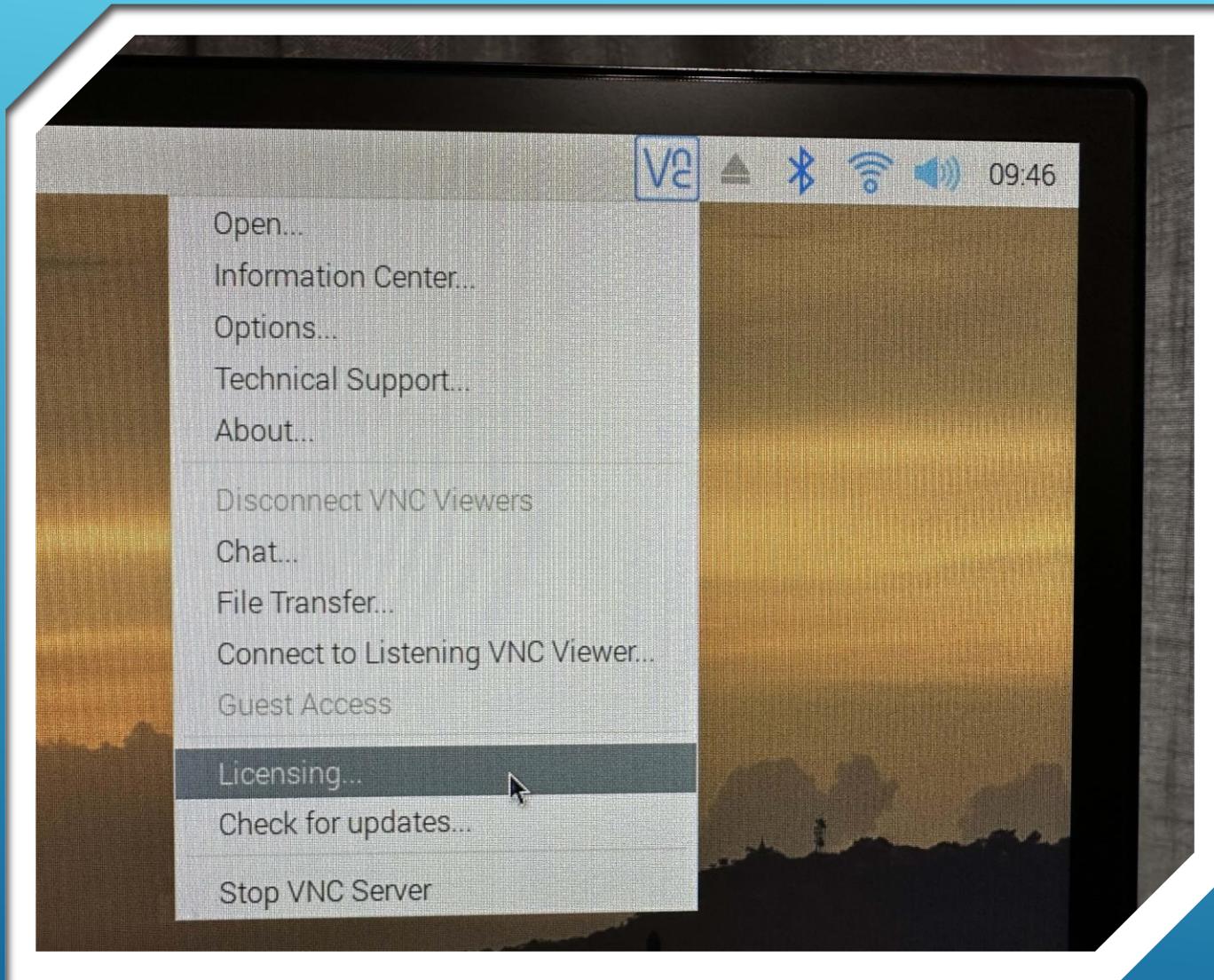
- ▶ Ensure Raspberry Pi-4 workstation is:
- ▶ Powered up,
- ▶ Connected to the internet, and
- ▶ The home screen is displayed on the workstation monitor.

CONFIGURE THE RASPBERRY PI-4 FOR INTERNET “CLOUD” CONNECTIVITY



- ▶ “Right-Click” on the VNC icon.
- ▶ This will open the VNC Status drop-down menu

CONFIGURE THE RASPBERRY PI-4 FOR INTERNET “CLOUD” CONNECTIVITY

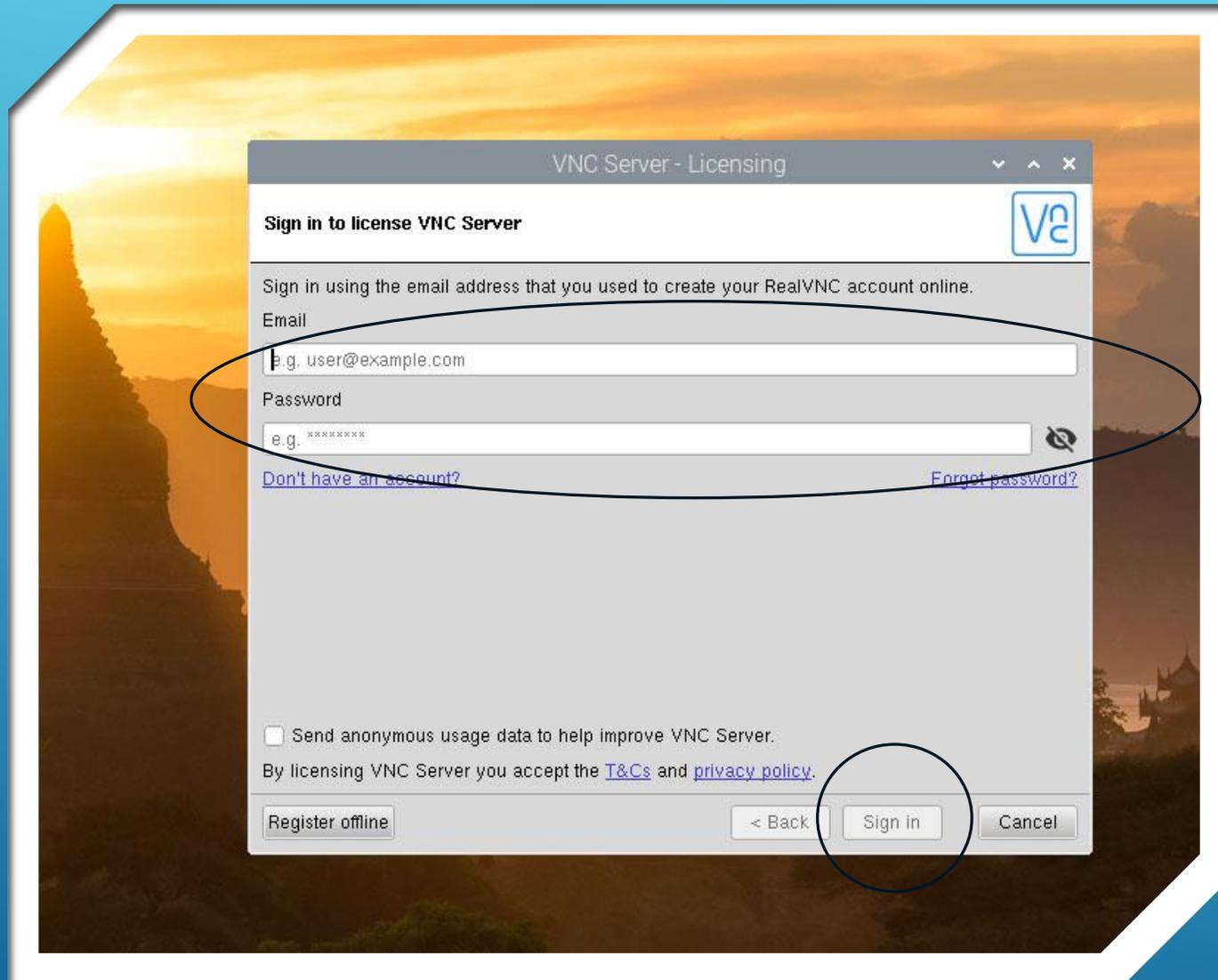


CONFIGURE THE RASPBERRY PI-4 FOR INTERNET “CLOUD” CONNECTIVITY

- ▶ Click on “Licensing”

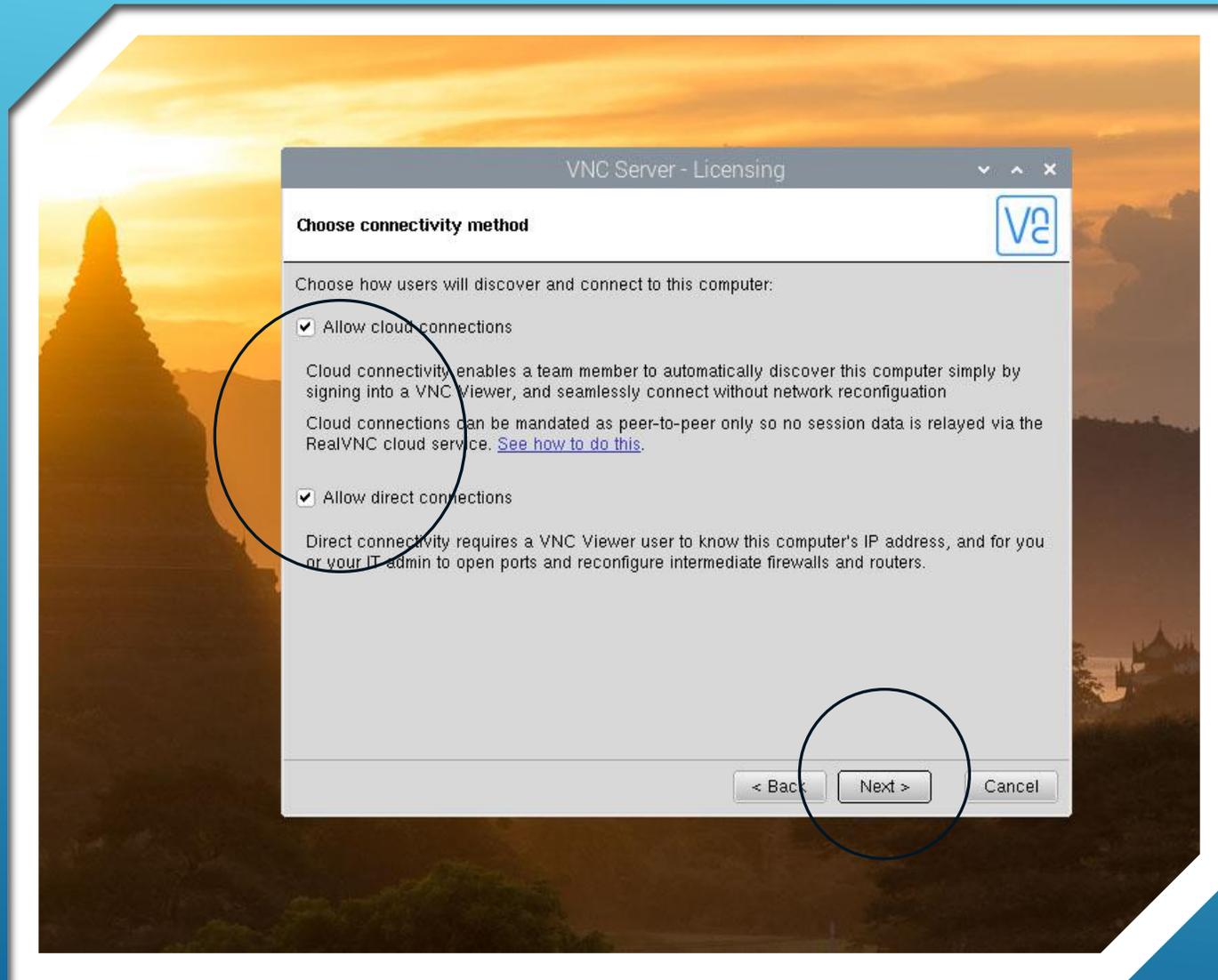
CONFIGURE THE RASPBERRY PI-4 FOR INTERNET “CLOUD” CONNECTIVITY

- ▶ Sign in to your RealVNC account.
- ▶ Supply your sign-in credentials and click the “Sign in” button



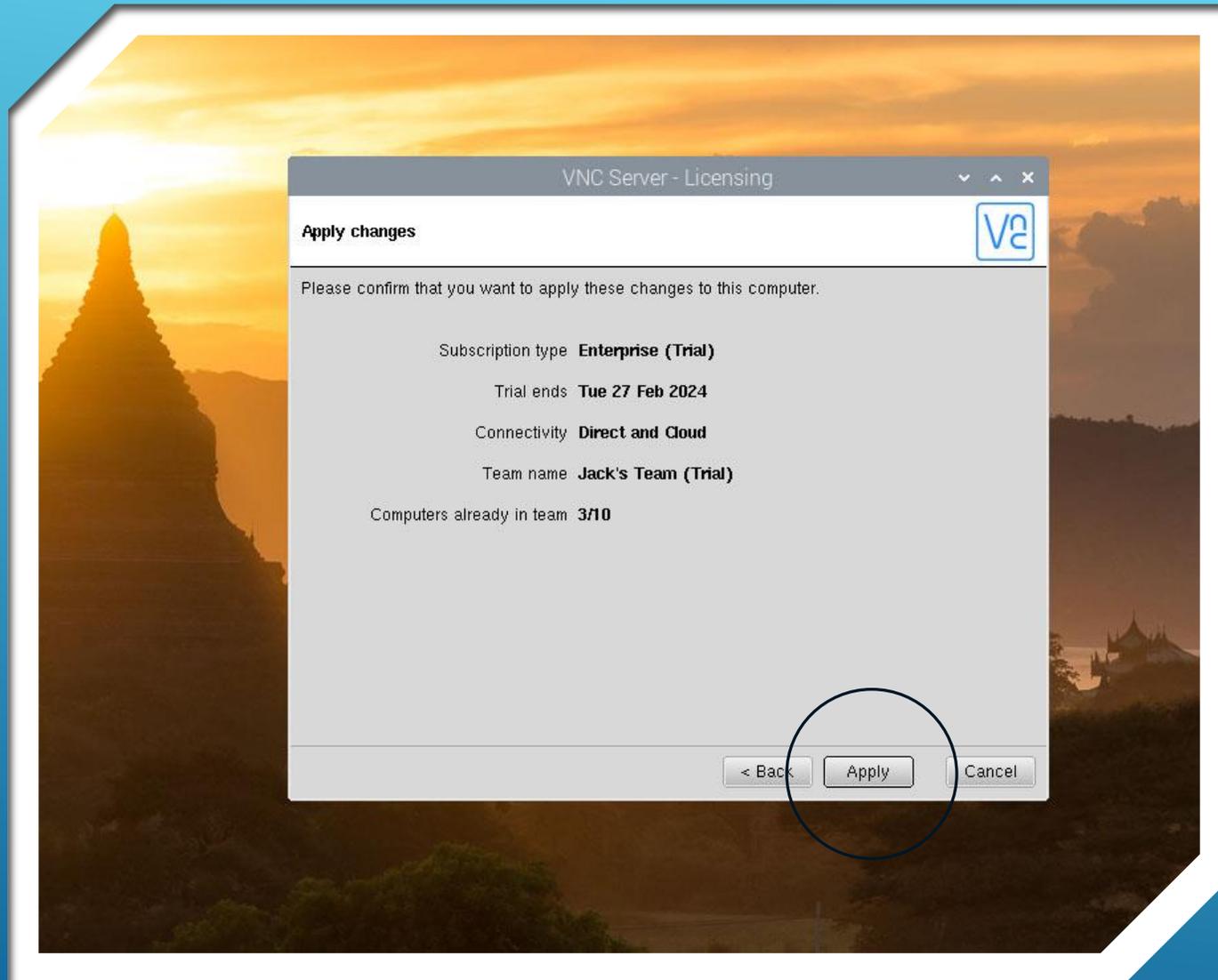
CONFIGURE THE RASPBERRY PI-4 FOR INTERNET “CLOUD” CONNECTIVITY

- ▶ Choose desired connectivity method(s)
- ▶ Click “Next >”

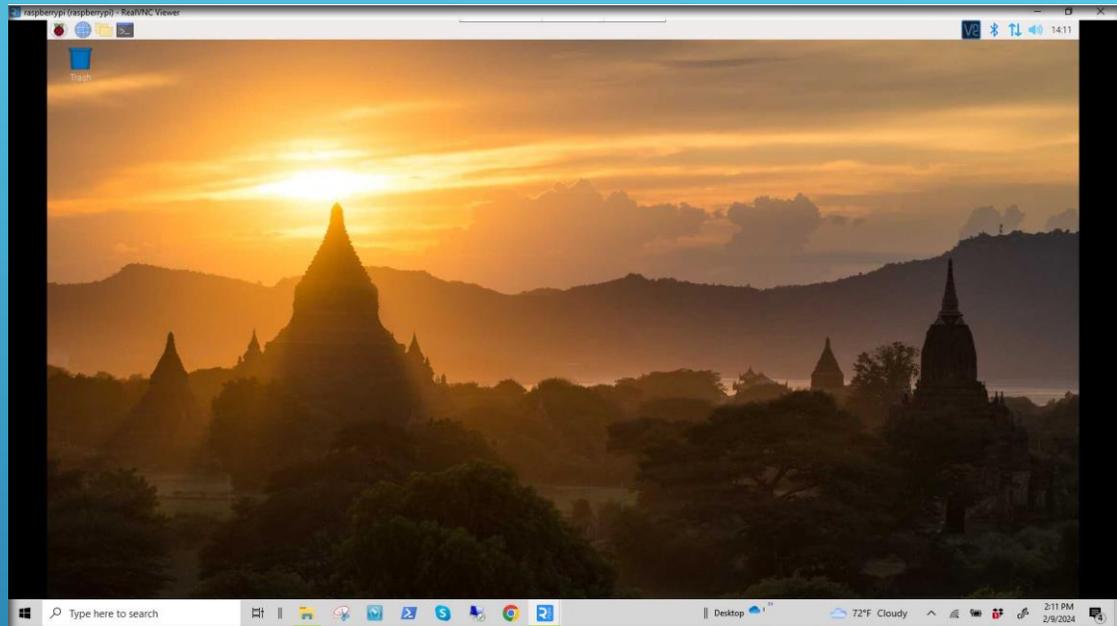


CONFIGURE THE RASPBERRY PI-4 FOR INTERNET “CLOUD” CONNECTIVITY

- ▶ Review screen information
- ▶ Click “Apply”
- ▶ Next screen should confirm changes are in effect.
- ▶ Return to your home screen
- ▶ You are now ready to connect to your Pi-4 from any location via the internet



STEP 3



- ▶ Remember to have radio and interface powered up, connected to the Pi-4 and configured accordingly. (from Part 2 Presentation)
- ▶ Have the Pi-4 workstation powered up, displaying the Home Screen, and connected to the internet through your local router.

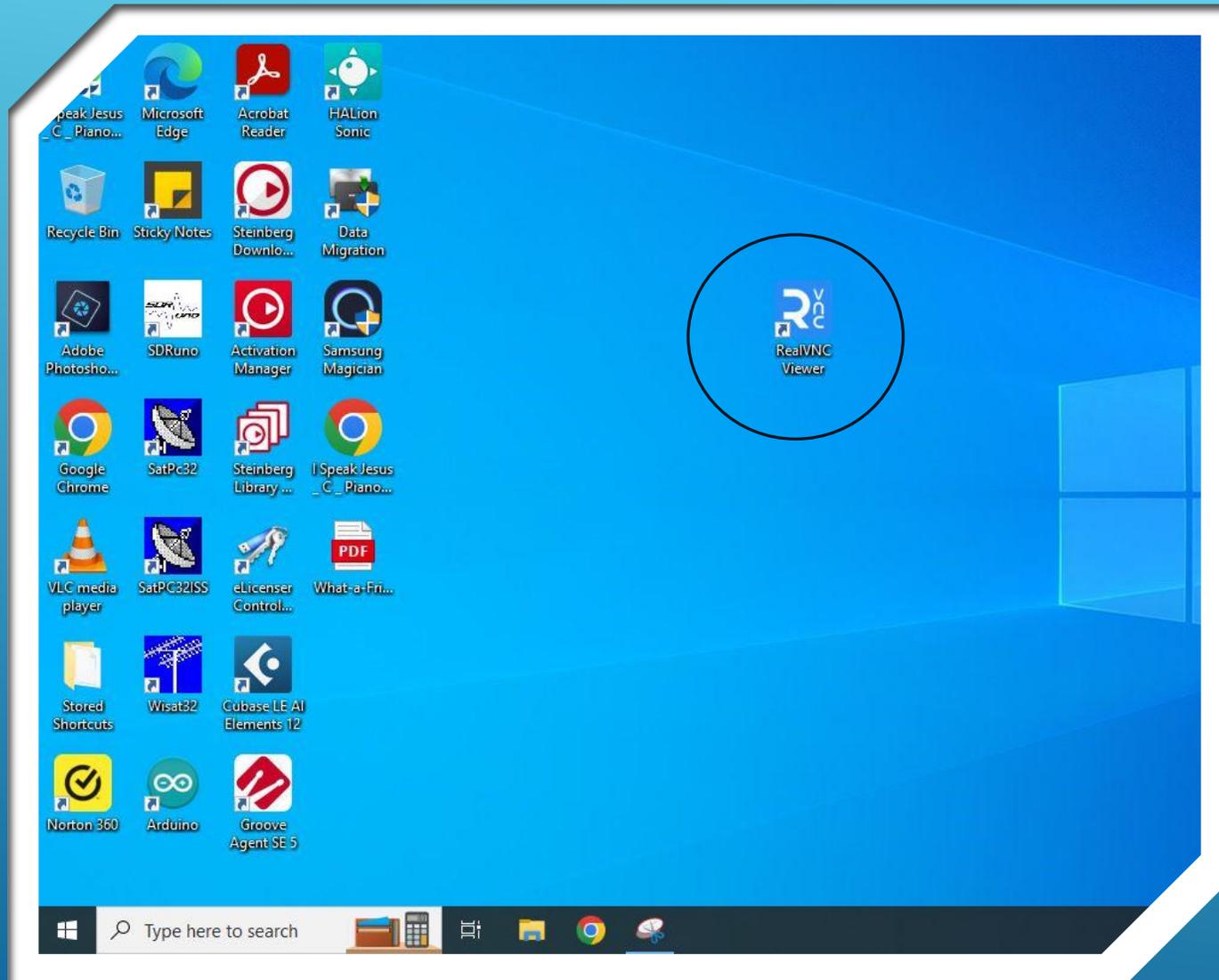
GETTING ON THE AIR - REMOTE

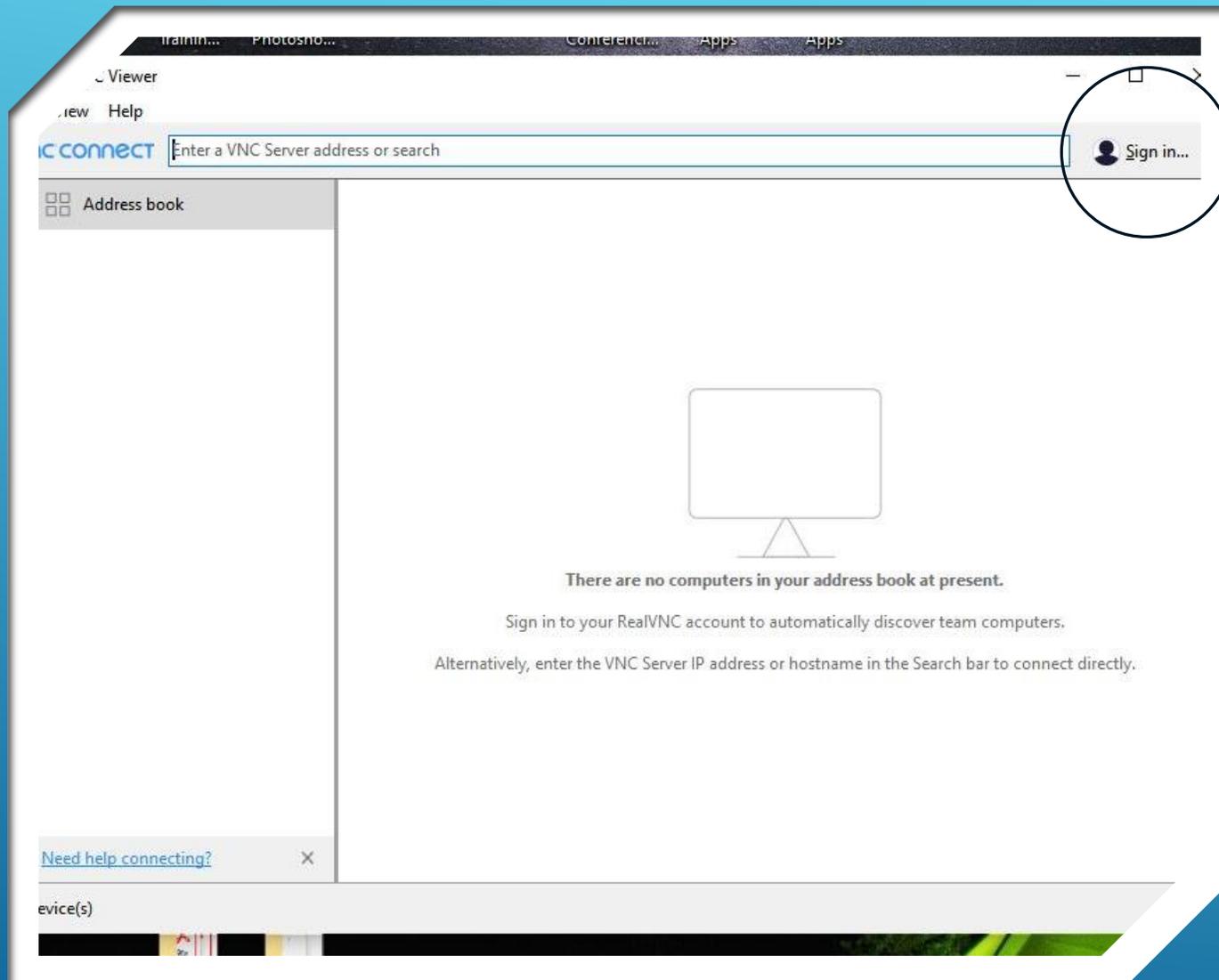
GETTING ON THE AIR – REMOTE

▶ ON THE LAPTOP...

▶ Have the Laptop computer powered up, displaying the Home Screen, and connected to the internet through a remote router or a smartphone or tablet serving as a HOTSPOT .

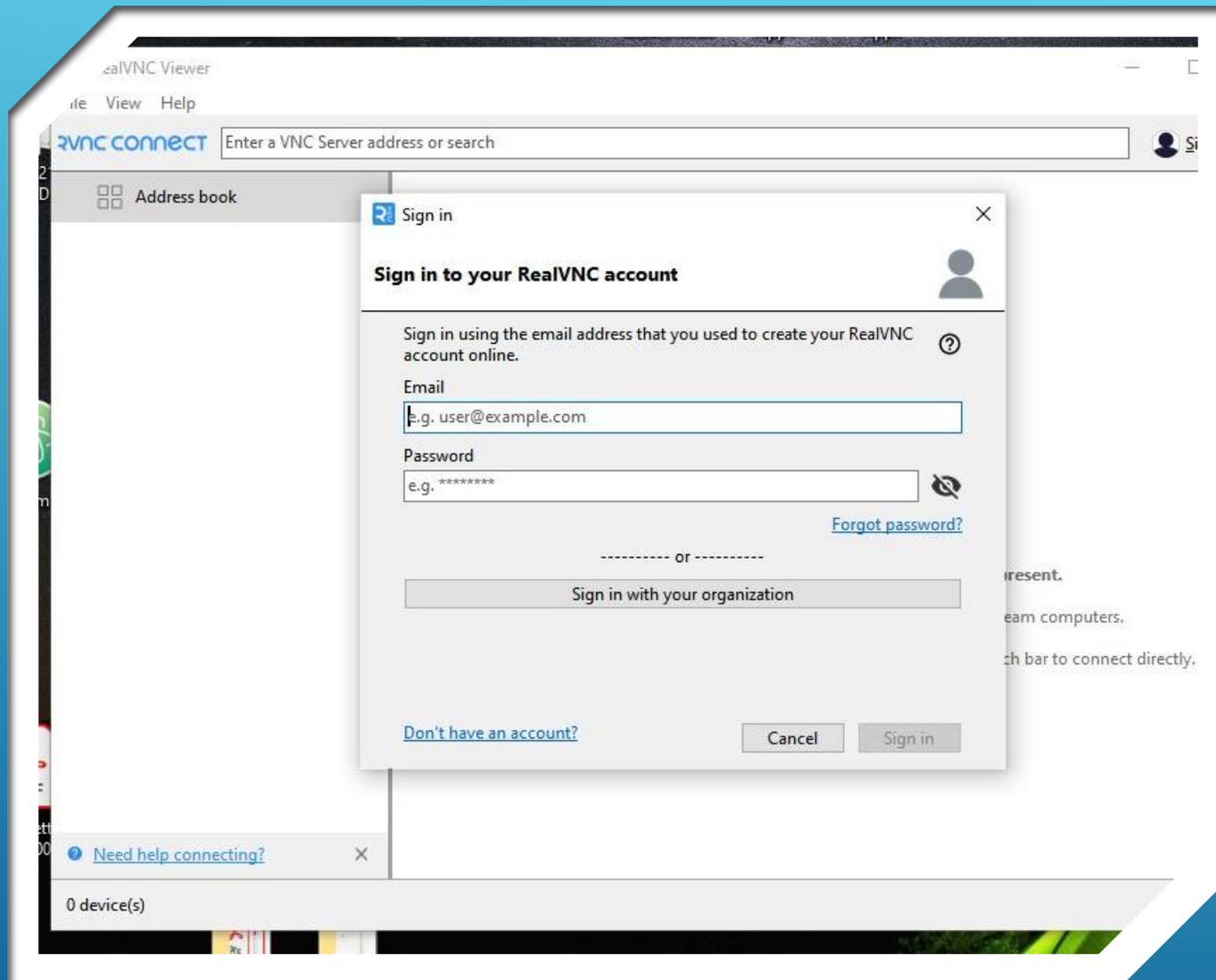
▶ Double-click the RealVNC Viewer icon to open VNC Viewer on the laptop.





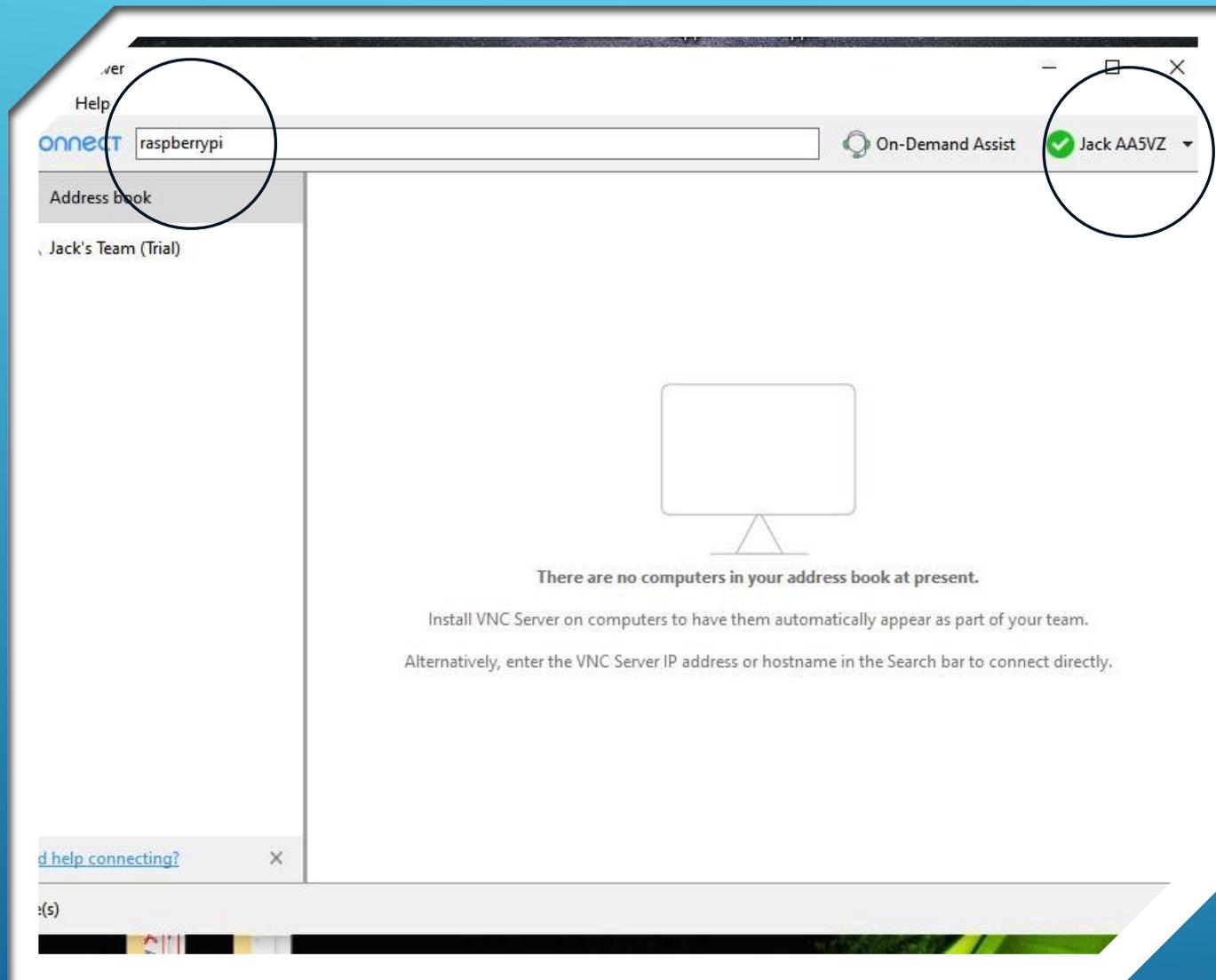
GETTING ON THE AIR – REMOTE

- ▶ ON THE LAPTOP...
- ▶ To establish a remote connection via internet **YOU MUST** sign in to your Real VNC account.
- ▶ Click the “Sign in” button.



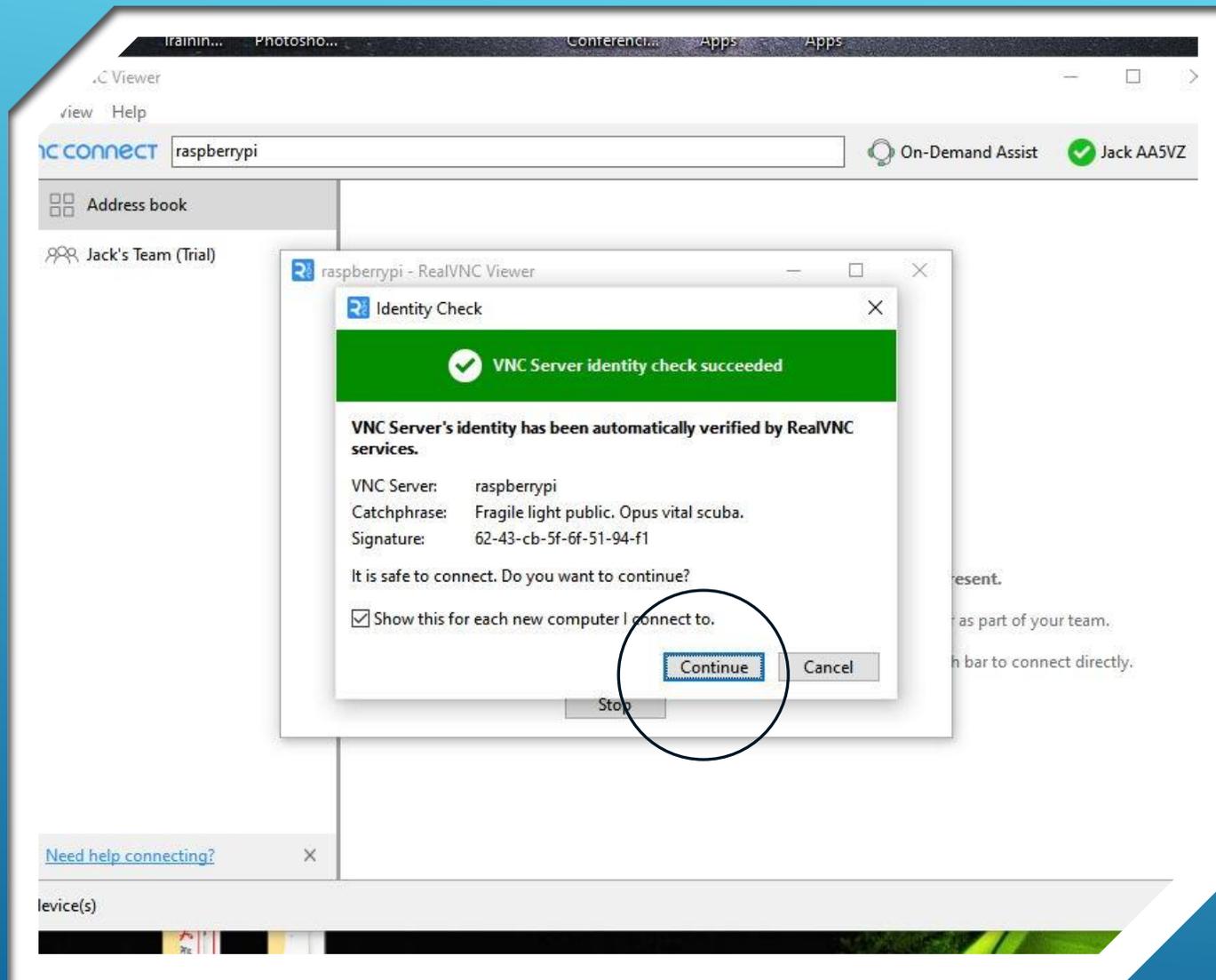
GETTING ON THE AIR – REMOTE

- ▶ ON THE LAPTOP...
- ▶ Supply your RealVNC sign-in credentials on the form



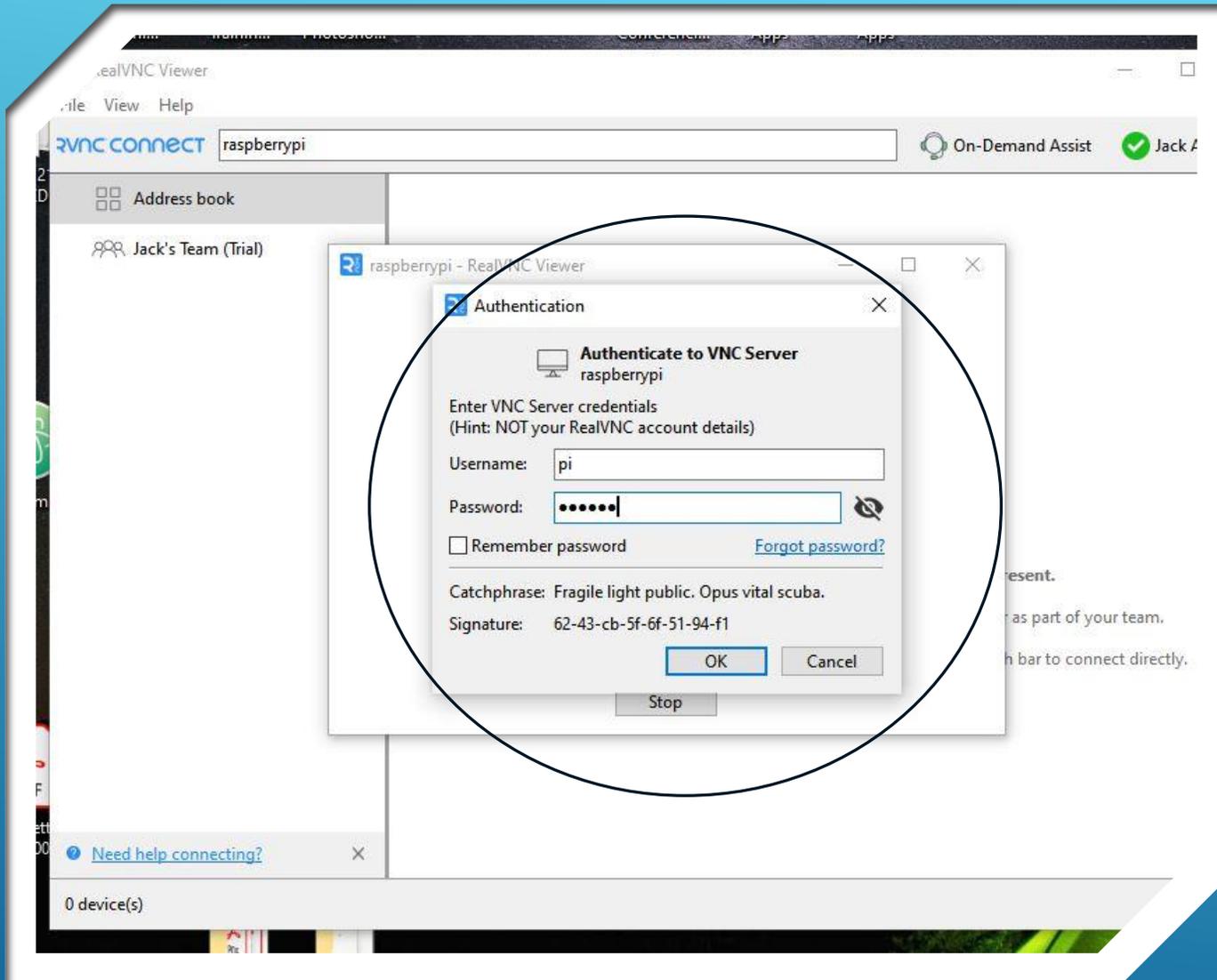
GETTING ON THE AIR – REMOTE

- ▶ **ON THE LAPTOP...**
- ▶ **Green Checkmark indicates you are properly signed in to VNC Connect.**
- ▶ **To connect to the Pi-4 enter the device hostname (“raspberrypi” in this case) in the Connect address line.**
- ▶ **Press “Enter” on the keyboard.**



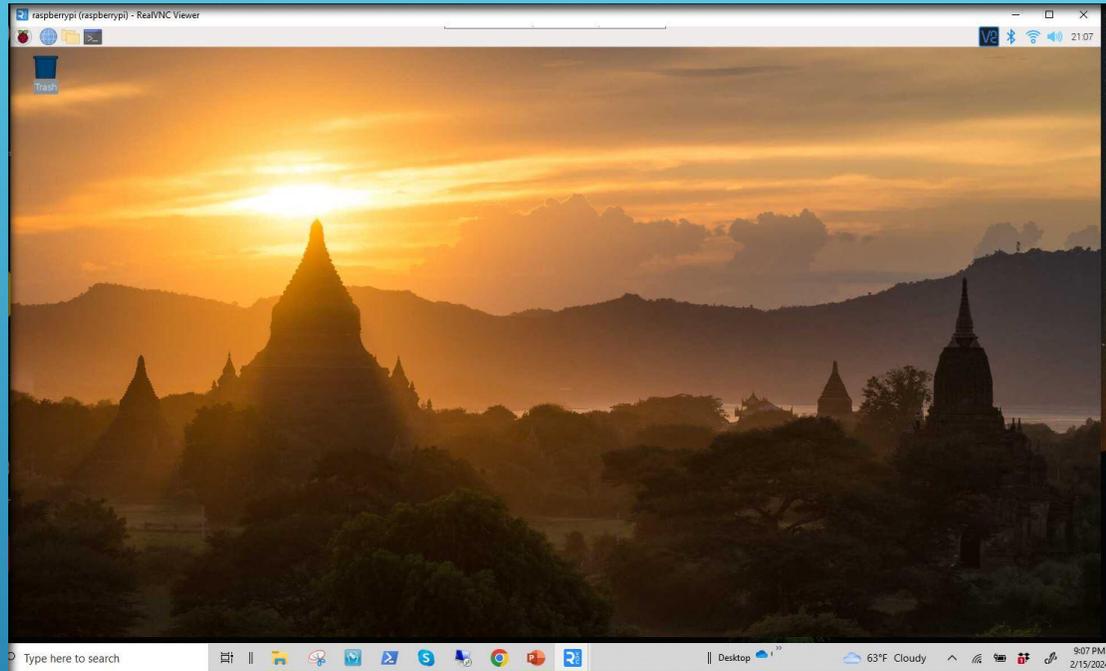
GETTING ON THE AIR – REMOTE

- ▶ ON THE LAPTOP...
- ▶ Pop-up screen indicates the server device (raspberrypi) was identified and located.
- ▶ Click “Continue” on the screen



GETTING ON THE AIR – REMOTE

- ▶ ON THE LAPTOP...
- ▶ Fill in form using the Pi-4's logon credentials
- ▶ Click “OK” to connect



- ▶ **ON THE LAPTOP...**
- ▶ **SUCCESS!!!**
- ▶ **You are now connected to your Raspberry Pi computer, remotely, via the world-wide-web.**
- ▶ **The rest you have already done.**
- ▶ **Now GET ON THE AIR!...and,**
- ▶ **Have fun!**

GETTING ON THE AIR – REMOTE

DEMONSTRATION

QUESTIONS OR TESTIMONIALS?

1. Link to configure WSJT-X for operation with Icom IC-7300

<https://www.k0pir.us/icom-7300-wsjt-x-ft8-easy-way/>

2. WSJT-X Home Page

3. <https://www.tigertronics.com/slusbmain.htm>

4. www.google.com

5. www.youtube.com

REFERENCES

(PARTS 3A AND 3B)

RASPBERRY PI IN THE SHACK

GETTING STARTED WITH
REMOTE STATION OPERATION

Jack Weaver – AA5VZ

RECOMMENDED READING

- ▶ **WSJT-X User Guide – Available On-Line**
- ▶ **https://physics.princeton.edu/pulsar/k1jt/wsjt-x-doc/wsjt-x-main-2.3.1_en.html#NEW_FEATURES**

- ▶ **FL-Digi User Guide – Available On-Line**
- ▶ **<http://www.w1hkj.com/FldigiHelp-3.21/html/index.html>**