EC-Council Capture-the-Flag (CTF)
Connectivity, Whitelisted Domains, and Browser Specifications

Connectivity Requirements

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The following information describes the system requirements for the product. System requirements are the criteria that a device or software needs to meet in order to function properly. They include hardware, software, network, and performance aspects. System requirements can be classified as minimum or recommended, depending on the desired level of quality or performance. The following sections provide more details on each type of system requirement and the specific requirements for the product.

Launch the Lab Orientation & Connectivity Check

Select the following link to launch a test lab: Launch the Lab Orientation & Connectivity Check. This will allow you to see if you are able to connect and function within the lab environment.

Speed Test

If you are experiencing frequent disconnects or lag when controlling your machines, you may run a speed test. This page allows you to run a connection assessment test. A connection assessment test is a very deep and thorough test that measures throughput speed, capacity, and packet quality to assess the user experience of a connection to their respective data center. This includes efficiency, data loss, recovery, duplication of data, retransmissions and even corruption.

General Requirements

Requirement	Details
Use a supported operating system	- Windows 7 or later - Ubuntu 14.04 or later (or comparable distribution) - macOS 10.12 or later
Have a supported browser. Edge, Chrome, Firefox, Safari.	- Latest version is preferred, but full support details can be found below - Chromium based browsers such as Opera or Vivaldi can connect, but default hotkeys they set may interfere with lab inputs
Be connected to a network that allows at least one of the following	- Secure Web sockets on HTTPS port 443 and 43443 - RDP over port 21xxx or 443 (Enhanced control) - For more information see Browser/Controller Support below

Bandwidth Requirements

In addition to the software requirements above we recommend the following:

Requirement	Details
Minimum 200kbps consistent bandwidth with 1mbps burst per student	- Machine controller bandwidth consumption is based on the rate onscreen content changes, some scenarios (i.e. web browsing inside the lab) may require more - For optimal experience, we recommend at least 1mbps per student
When utilizing the instructions interface, bandwidth needs may increase based on what features are utilized, examples include	- Embedded audio - Embedded video - Large numbers of embedded images - Bandwidth usage is highly dependent on the media being used. An embedded MP3 may fit into 1mbps burst capacity, while a 1080P video can require up to 10mbps for its Duration
When using Cloud Slice labs where the target environment is a website additional bandwidth may be required	- For the Azure and AWS management portals, we recommend at least 512kbps per student

Firewall Exception Rule Information

For those that need to create a firewall exception rule to allow connectivity to the Skillable Studio servers (this isn't common), the following information can be used to create a limited destination rule to only allow the above protocols and ports from your network to the Skillable Studio cloud.

Domain Names	*.skillable.com *.labondemand.com *.learnondemand.net *.holsystems.com
Authentication domains	learnondemandsystemsb2c.b2clogin.com
IP Addresses	40.119.12.82 13.66.38.99

Certain lab environments utilize GitHub; therefore, the following URL should be added as a firewall exception: https://githubusercontent.com

The Skillable Studio system is a cloud platform that automatically provisions and connects the learner with private sandboxed resources. There is no way to predict which IP address in the cloud the learner will connect to for the provisioning of their virtual machines. Therefore, we provide a range of IP addresses and only a second level domain name.

For Hyper-V and Hyper-V w/RDP only labs, the domains and IP addresses in the table below may also be required as firewall exceptions. We strongly encourage using names, and not IP addresses, for firewall and proxy configuration if possible, as the IP addresses may change without warning (and without documentation update). This allows access even in network failover and future geographic targeting scenarios.

If specific IP addresses are required, use the following table as a guide for IP addresses:

DNS name	IP Address 1	IP Address 2
labondemand.com	20.114.65.34	104.214.106.31
LMS.learnondemand.net	13.66.39.88	
rds01.eu.learnondemandsystems.com	185.254.59.3	
console.eu.learnondemandsystems.com	185.254.59.8	
sea-rds.labondemand.com	163.47.101.8	163.47.101.9
sea-console.labondemand.com	163.47.101.13	

When Connections Traverse a Proxy

When connecting to a lab over a proxy, there are several restrictions to keep in mind. Depending on your proxy setup, certain remote controllers may fail to connect. In general, anything that alters traffic may interfere with connections to our environments. We recommend whitelisting Lab instance traffic and ensuring all required ports are open.

To connect to a lab over a proxy, the following requirements must be met for each remote controller.
HTML5:

1. Secure websocket connections over port 443 must be supported.
2. Websocket connection upgrade request (ws:// or wss://) headers must not be altered.
3. Certificates must not be altered or repackaged.

When Using Windows Server Operating Systems

When connecting to our Skillable Training Management System (TMS) portals with a computer having Windows Server operating systems on it, you may experience difficulty in connecting to the sign-in page or selecting some buttons.

If this occurs, ensure that you are signed on to your machine as a user with administrative privileges and do the following to turn off IE Enhanced Security Configuration (IE ESC):

1. Close any open Internet Explorer windows.
2. Open Server Manager, if not already open.
3. Select the Local Server.
4. On the right side of the Properties pane, select IE Enhanced Security On.
5. Select Off for both Administrators and Users.
6. Select OK.
7. Open Internet Explorer.
8. Navigate to the TMS.
9. Sign in normally.

In-Lab Software Whitelisting Information for Lab Developers

Software that communicates with remote servers outside of the lab environment may need addresses whitelisted with the vendor to work.

Address Ranges used by NAT Internet Access Labs

IP addresses	103.18.87.250 103.18.87.251 103.18.87.252 103.18.87.253 103.18.87.254 163.47.101.4 163.47.101.130 163.47.101.134 185.254.56.125 199.101.110.1 199.101.110.20 199.101.110.32
IP Ranges	103.18.87.240 - 103.18.87.249 163.47.101.118 - 163.47.101.126 168.245.203.241 - 168.245.203.254 185.254.59.118 - 185.254.59.127

Address Ranges are used by Public IP Internet Access Labs

Scope	103.8.28.0/24
Scope	103.152.3.0/24
Scope	103.177.46.0/25
Scope	103.177.47.0/24
Scope	168.245.200.0/23
Scope	168.245.202.0/24
Scope	168.245.203.0/24
Scope	185.254.57.0/24
Scope	185.254.58.0/24
Scope	185.254.59.0/24
Scope	199.101.108.0/23
Scope	199.101.111.0/24

Browser Support

The majority of Virtual Machine or container-based labs can be accessed via HTML5 websocket controllers. ESX, Hyper-V, and Docker[1] labs all utilize this technology.

Docker labs that expose an external service port do so over ports 41952-65534. Connection requirements are dependent on the exposed service.

Custom Integrations and iFrames:

If a lab uses an Iframe Integration, 3rd party cookies must not be blocked by the web browser used to access the lab. If 3rd party cookies are blocked, an *Access Denied* message will be displayed when launching the lab. Most web browsers do not block 3rd party cookies by default. If your browser is blocking 3rd party cookies, please check with the browser's vendor to learn more about how third party cookies may be blocked.

All connections utilize secure WebSockets connections over port 443. No plugin installation is required.

Browser	Version
Chrome	16+
Firefox[1]	11+
Microsoft Edge	1+

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