

FVSONline Server Software Components, Installation, and Management

Nicholas Crookston^{1*} and Philip Radtke²

¹University of Maine, ²Virginia Tech University, *ncrookston.fs@gmail.com

Overview:

- FVSONline is an R-shiny (RStudio 2023) application used to build FVS (USDA Forest Service 2023) simulations, run, and display results. The system has a client-server architecture where the server is a specialized R (R Core Team. 2021) package that is running in an R session and the client is a graphical user interface running in a web browser.
- The installation at Virginia Tech was done with open-source software and is free of software license fees. The routine maintenance of the system is done with scripts that automatically update the software and management user projects with little day-to-day intervention. It takes about 8 hours per month to operate the system.
- The Virginia Tech installation does not include any special components that provide information security and is therefore most appropriately used for training and testing purposes. It is generally not suitable for the storage of proprietary information. It could be useful, however, to replicate the system described here for use on a private network where proprietary information can be safely stored.

Summary:

FVSONline runs in the free version of the R-Shiny server: <https://posit.co/download/shiny-server/>. That version does not support secure network traffic, that is, only http and not https protocols are supported. Therefore, we use the Apache web server to provide https service and enable Apache to route traffic between the public network and the R-Shiny server which is set to only accept connections from “localhost” (fig 1). The server we use is running Ubuntu Server 22.04 LTS on a 32 core Intel-based Dell computer. The management of software and a user’s project spaces is accomplished using bash scripts that run every night as scheduled using the Linux cron system. Contact the authors for copies of the scripts and configuration files that manage the system.

Key Concepts for FVS Users:

- You can use the Virginia Tech installation of FVSONline by creating an FVS project at <https://charcoal2.cnre.vt.edu/FVSONline/>¹
- The system will send you an Email with a link to your project. Anyone with the link can access the project. Using the features in FVSONline, you can load your own data, make

simulations, view and download the results without installing FVS on your own computer.

- Government agencies and other organizations are free to use this software for their own purposes.

Management Applications/Future Directions:

- We intend to maintain this service for the foreseeable future and will help others who wish to replicate our installation on other computer systems.

<pre>server { listen 3838; location /FVSwork { site_dir /home/shiny/FVSwork; log_dir /var/log/shiny-server; directory_index off; simple_scheduler 25; app_init_timeout 60; } ...some more lines for other purposes... }</pre>	<pre><Proxy *> Allow from localhost </Proxy> Redirect /FVSOnline /FVSOnline/ ProxyPass /FVSOnline/ http://localhost:3838/FVSOnline/ ProxyPassReverse /FVSOnline/ http://localhost:3838/FVSOnline/ Redirect /FVSwork /FVSwork/ ProxyPass /FVSwork/ http://localhost:3838/FVSwork/ ProxyPassReverse /FVSwork/ http://localhost:3838/FVSwork/</pre>
Tech details for Shiny web server (key additions):	Tech details (Apache):

Figure 1—Technical details for the (a) Shiny web server and (B) the Apache server.

¹ At the time of publication, FVS Online was not functioning on the Virginia Tech platform due to 3rd-party software issues. FVS Online functionality will be restored after the issues have been resolved. As an alternative, Climate-FVS data can be prepared using other functions at Climate-FVS Ready Data Requests (https://charcoal2.cnre.vt.edu/climate/customData/fvs_data.php) and downloaded for use with a local installation of FVS.

References:

R Core Team. 2021. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>

Rstudio. 2023. Shiny. <https://shiny.rstudio.com/> [Accessed 16 April 2023]

USDA Forest Service. 2023. The Forest Vegetation Simulator. <https://www.fs.usda.gov/fvs/index.shtml>