Configuring Your System for MV3500 Networked Graphics and Simulation

Setting up Java, Netbeans, Git, Wireshark, and Software Tools

THE MOVES INSTITUTE
NAVAL POSTGRADUATE SCHOOL

brutzman@nps.edu

Configuration Topics

Good collaboration setup is important!

This illustrated slideset covers

- Java OpenJDK and Javadoc
- NetBeans and NetBeans plugins
- Git and gitlab.nps.edu, tokens
- GIMP, Visio and other tools
- X3D-Edit
- Collaboration and Troubleshooting

Full configuration details are maintained online at Savage Developers Guide

Java install

Installing
Contributing
Sponsoring
Developers' Guide
Vulnerabilities
JDK GA/EA Builds

Mailing lists
Wiki · IRC

Bylaws · Census
Legal

Workshop

JEP Process

Source code
GitHub
Mercurial

Tools
Git
jtreg harness

Groups
(overview)
Adoption
Build
Client Libraries
Compatibility & Specification Review
Compiler
Conformance
Core Libraries
Governing Board
HotSpot
IDE Tooling & Support
Internationalization
JMX
Members
Networking
Porters
Quality
Security
Serviceability
Vulnerability
Web

Projects
(overview, archive)
Amber
Babylon
CRaC
Caciocavallo
Closures
Code Tools
Coin
Common VM Interface
Compiler Grammar
Detroit

OpenJDK

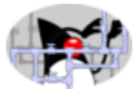
https://openjdk.org

What is this? The place to collaborate on an open-source implementation of the Java Platform, Standard Edition, and related projects.

Download and install the latest open-source JDK. Oracle's free, GPL-licensed, production-ready OpenJDK JDK 22 binaries for Linux, macOS, and Windows are available at **jdk.java.net/22**; Oracle's commercially-licensed JDK 22 binaries, based on the same code, are here.

Learn about the key active Projects in the Community including Amber (high-productivity language features), Loom (lightweight concurrency), Panama (foreign functions and foreign data), Valhalla (primitive types and specialized generics), and, of course, the next version of Java and the JDK.

If you want to learn how to use Java features that are available today, head over to **dev.java**.



Hack on the JDK itself, right here in the OpenJDK Community: Browse the code on the web, clone a repository to make a local copy, and contribute a patch to fix a bug, enhance an existing component, or define a new feature.

OpenJDK JDK 22.0.1 General-Availability Release

This page provides production-ready open-source builds of the Java Development Kit, version 22, an implementation of the Java SE 22 Platform under the GNU General Public License, version 2, with the Classpath Exception.

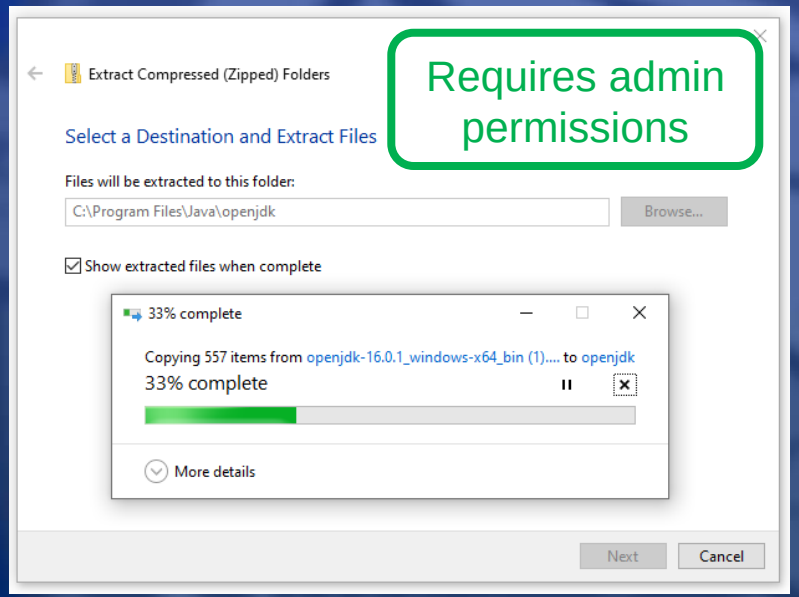
Commercial builds of JDK 22.0.1 from Oracle, under a non-open-source license, can be found here.

Documentation

- Features
- Release notes
- API Javadoc

Builds

Linux/AArch64	tar.gz (sha256)	200176007 bytes
Linux/x64	tar.gz (sha256)	202217886
macOS/AArch64	tar.gz (sha256)	195900042
macOS/x64	tar.gz (sha256)	198190735
Windows/x64	zip (sha256)	200536892



Requires admin permissions

SAVAGE

Javadoc

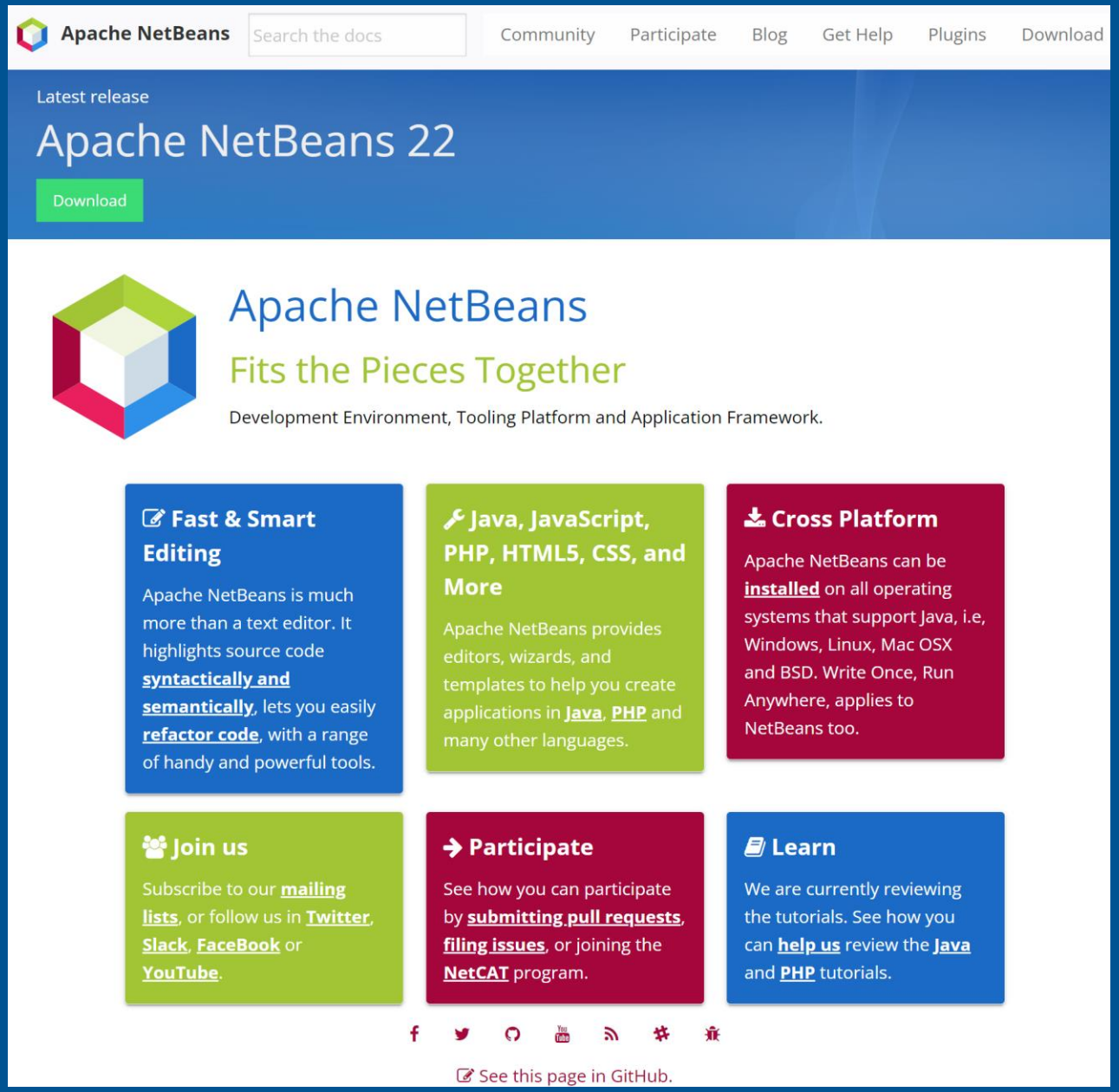
JDK 22 Javadoc Documentation describes all Java interfaces in full detail. Good to download local copy with your Java install.

You can go to *build.xml* and run *Javadoc* on your local projects for MV3500 *examples* and MV3500 *assignments*.

Be sure to update or add Javadoc entries in your programs. Having Javadoc available greatly aids understanding and will often uncover flaws that might otherwise go unnoticed.

Guidance: How to Write Doc Comments for the Javadoc Tool

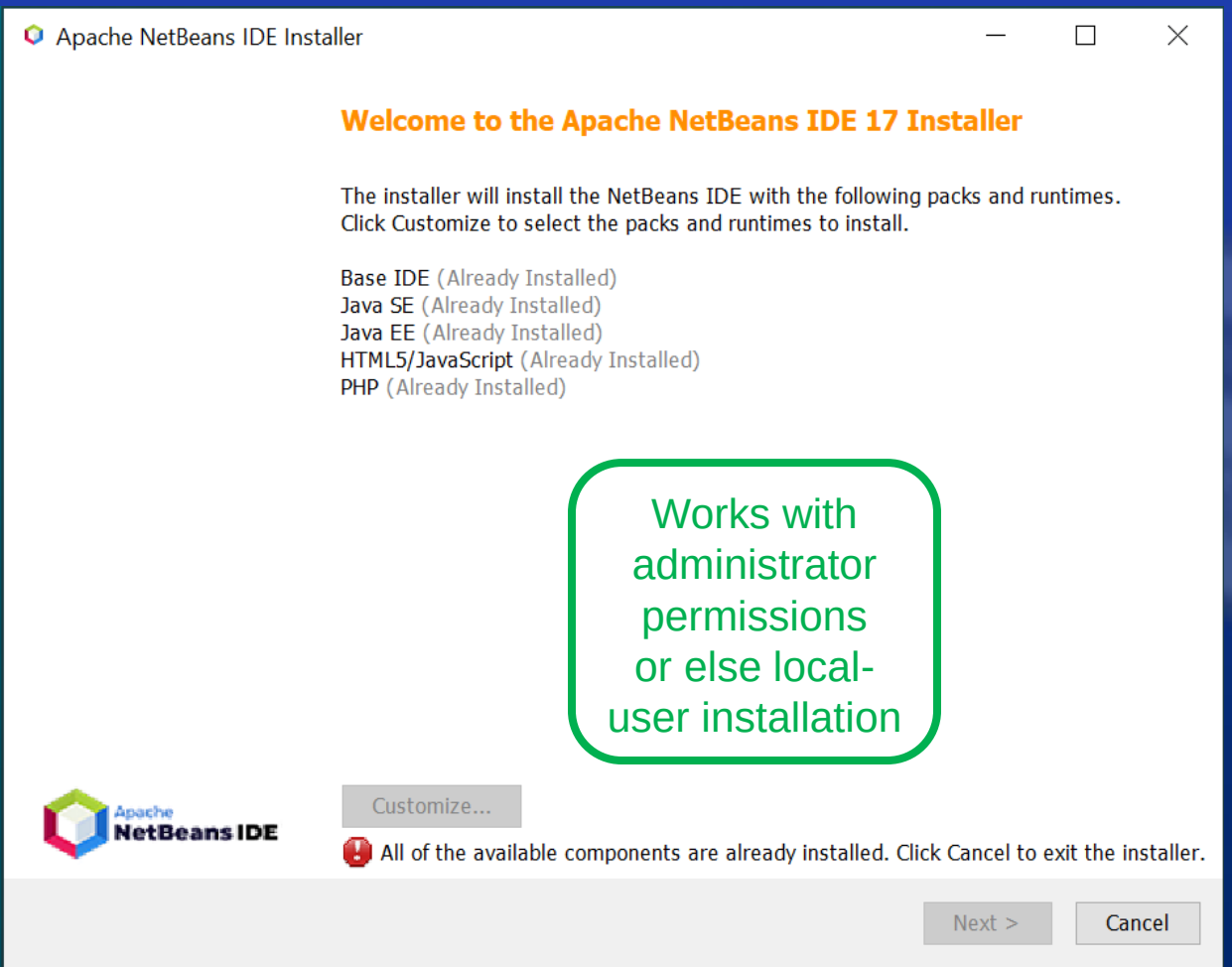
Apache Netbeans Installation



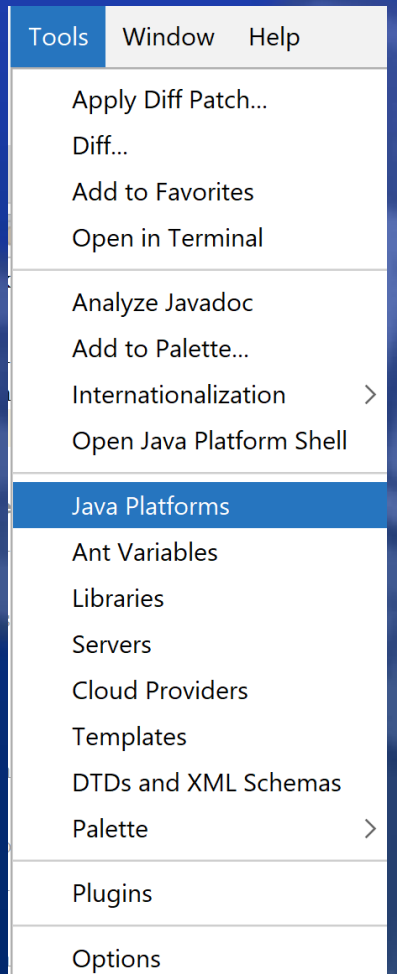
Now using version 22

Apache Netbeans Configuration

OS-specific installer or extract .zip version

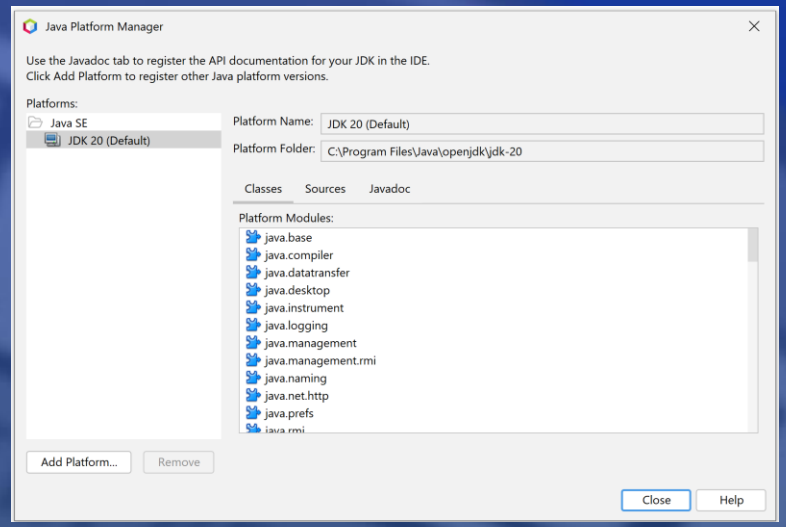


Once running NetBeans, can further adjust



Adjusting Java version:

- *Tools > Java Platforms*



SAVAGE

gitlab.nps.edu

NPS GitLab

NPS users

- Sign in using the "NPS account" button below.

External users

- Sign in using your email and password.

Manage Git repositories with fine-grained access controls that keep your code secure. Perform code reviews and enhance collaboration with merge requests. Each project can also have an issue tracker and a wiki.

By logging in, you agree to the terms described within the DoD Acceptable Use Policy.

External users

Username or email

Password

Remember me Forgot your password?

Sign in

By signing in you accept the Terms of Use and acknowledge the Privacy Policy and Cookie Policy.

NPS users

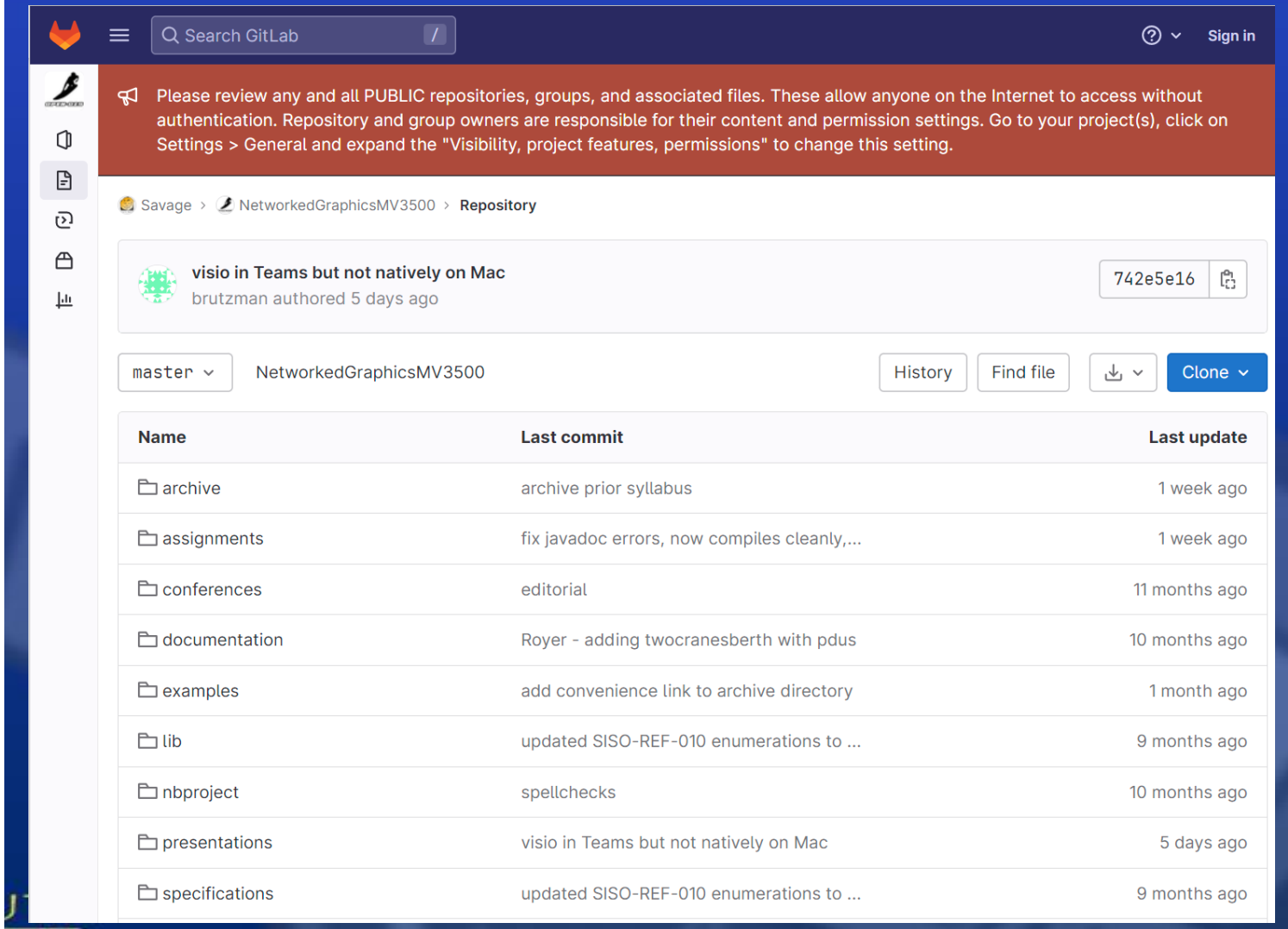
Sign in with

NPS account

Remember me

gitlab.nps.edu/Savage/NetworkedGraphicsMV3500

Connecting to gitlab.nps.edu

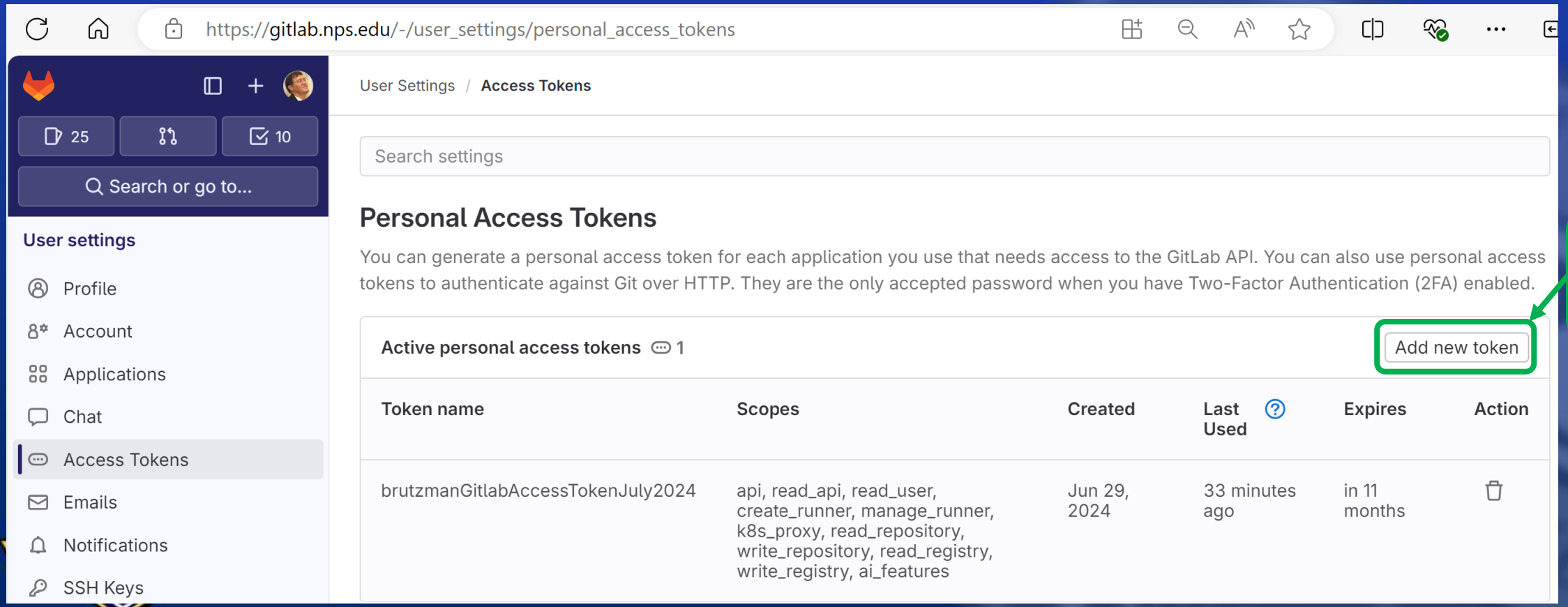


The MV3500 archive is publicly visible

Gitlab user account: Personal Access Tokens

Personal Access Token (PAT) is alternative to password access for git archive operations, avoiding password usage for better security

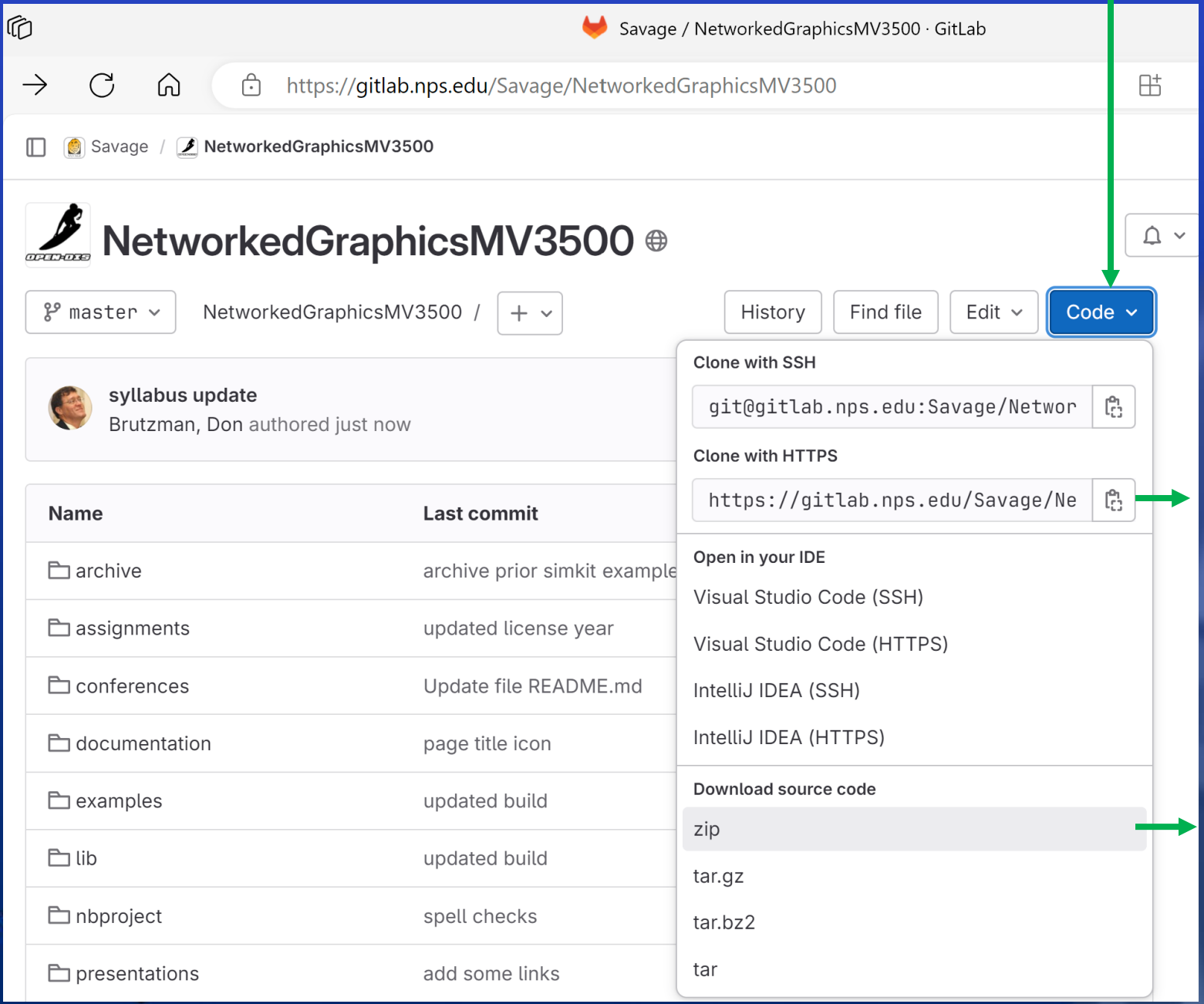
- https://gitlab.nps.edu/-/user_settings/personal_access_tokens



Create and save your own PAT

Save it!
If ever lost, just create another

MV3500 repository git clone address or zip download



https://gitlab.nps.edu/Savage/NetworkedGraphicsMV3500.git

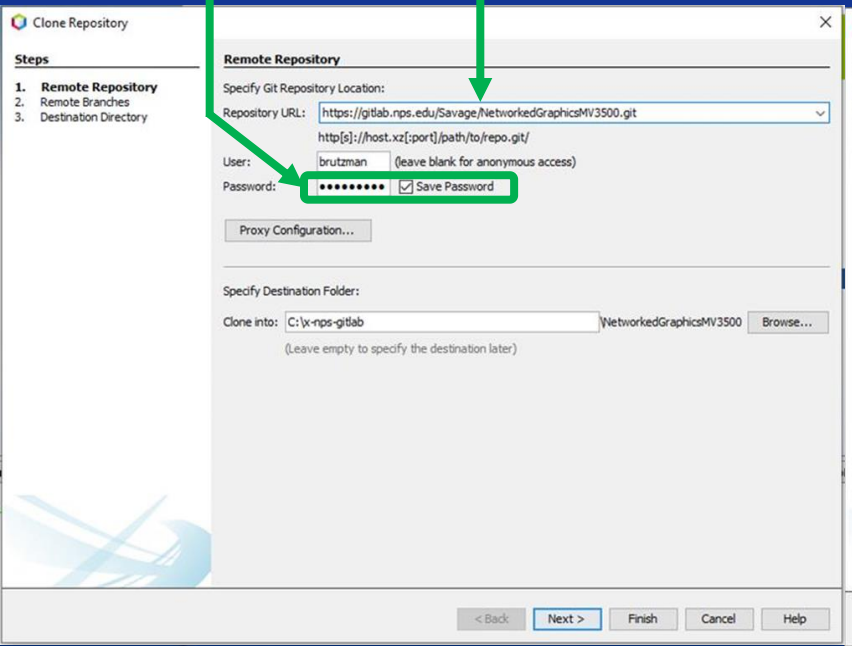
https://gitlab.nps.edu/Savage/NetworkedGraphicsMV3500/-/archive/master/NetworkedGraphicsMV3500-master.zip

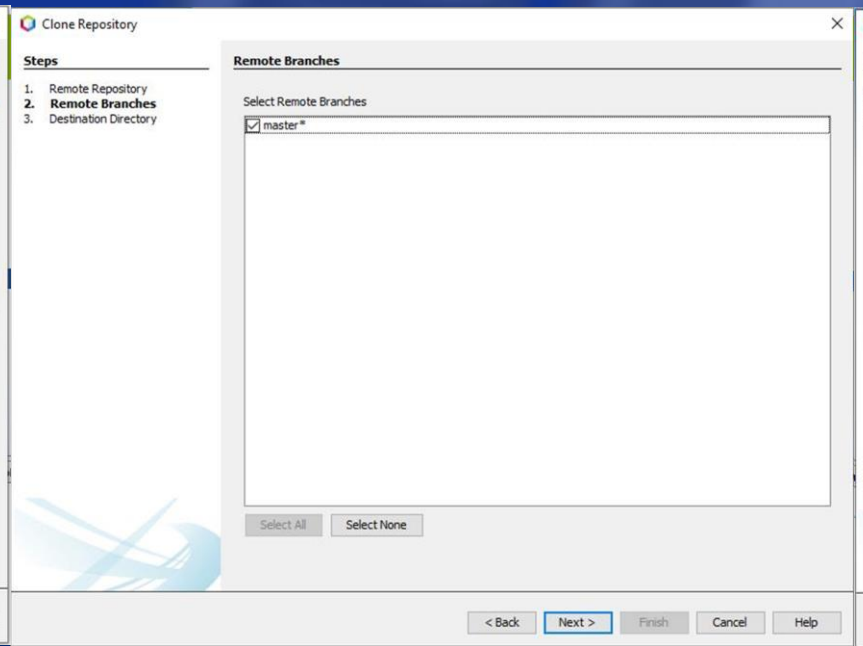
Cloning course projects using NetBeans git

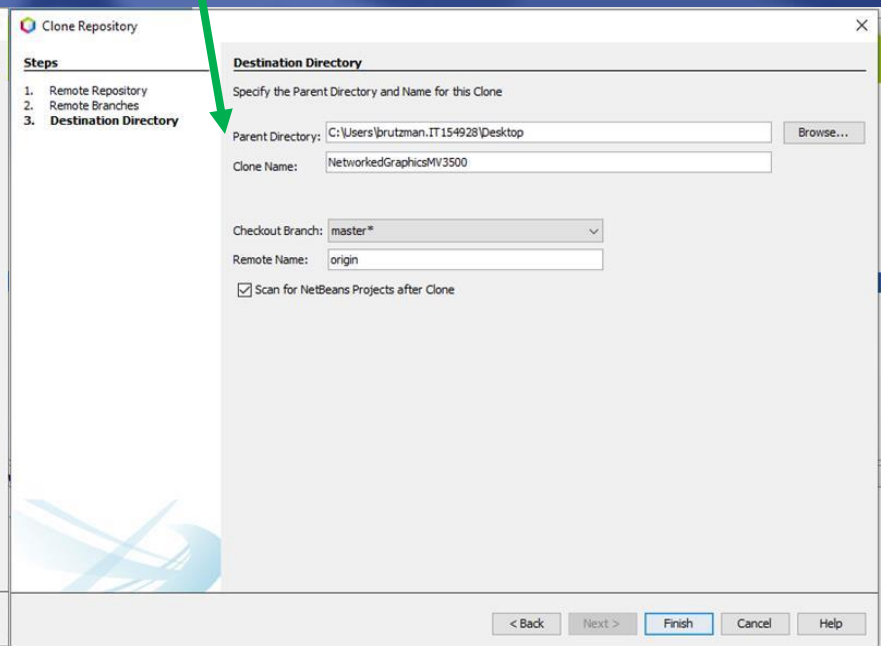
NetBeans can clone copies of git repositories and open projects:

- First select *Projects* tab (rather than *Files* tab), then
- NetBeans menu: *Team > Git > Clone …*
- Use your Personal Access Token in place of actual gitlab password
- Save your cloned repository in a convenient laptop local directory

https://gitlab.nps.edu/Savage/NetworkedGraphicsMV3500.git





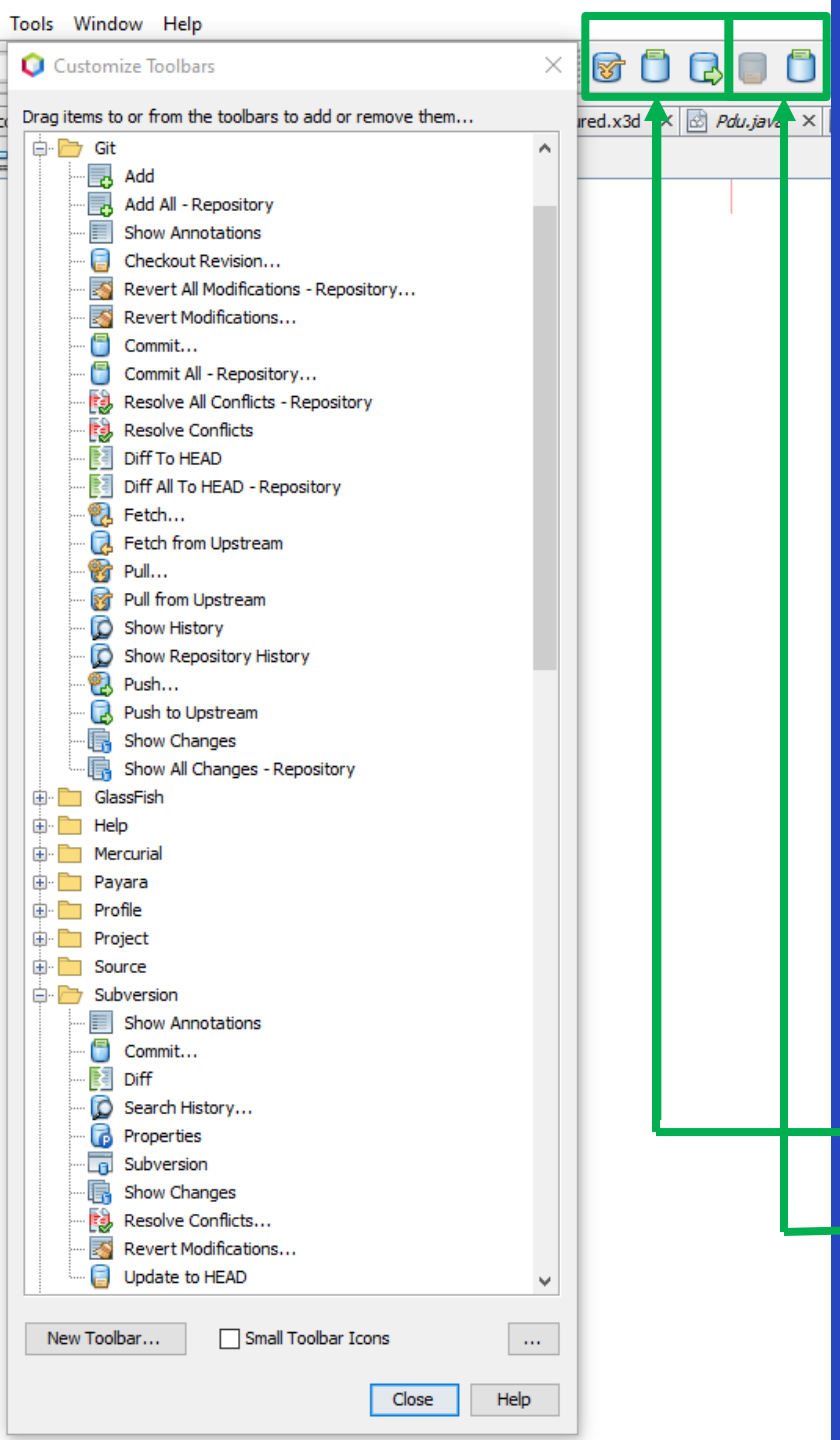


NetBeans timeout problems during initial clone?

Some NetBeans users might have trouble cloning with git due to annoying 45-second timeout problem for large repositories

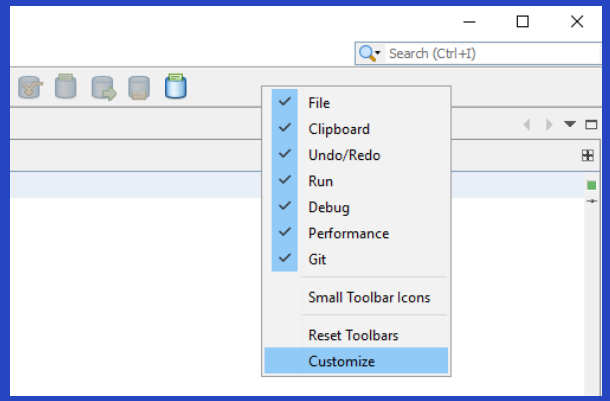
a. Try again, with higher bandwidth perhaps!
b. Can perform initial repository clone using alternate git tools
   - Windows: TortoiseGit shell interface
c. Can download .zip archive if not committing back to repository
d. Ask us! We will help you.

THE MOVES INSTITUTE
NAVAL POSTGRADUATE SCHOOL



NetBeans toolbar buttons (shortcuts) for git, subversion

NetBeans toolbar > right-click > Customize



Drag suggested buttons on/off the toolbar

- *git:* Pull from Upstream, Commit..., Push to Upstream
- *Subversion:* Update to head, Commit...

Additional git Tutorial References

Using Git in Apache NetBeans

- https://netbeans.apache.org/tutorial/main/kb/docs/ide/git

How to Use Git and GitHub from NetBeans

- https://www.youtube.com/watch?v=MbwHOw6JXI8

GitLab Tutorial For Beginners | What Is GitLab And How To Use It?

- https://www.youtube.com/watch?v=mX7lKoabmDw

GitLab Beginner Tutorial 1 | Introduction and Getting Started

- https://www.youtube.com/watch?v=Jt4Z1vwtXT0

NetBeans: Open Projects

Netbeans offers to open projects after git cloning.

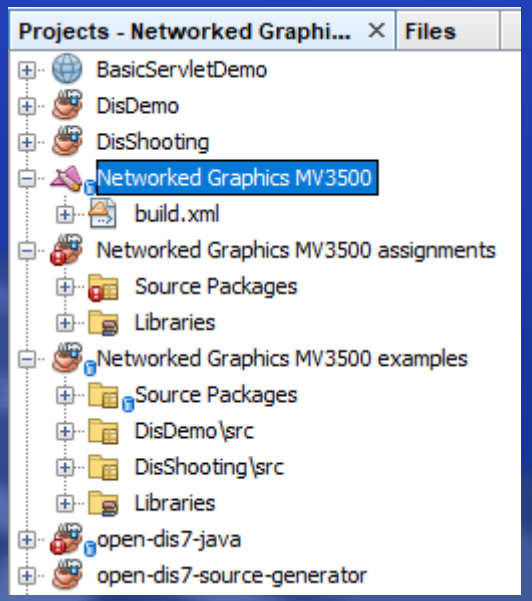
Alternative manual method:

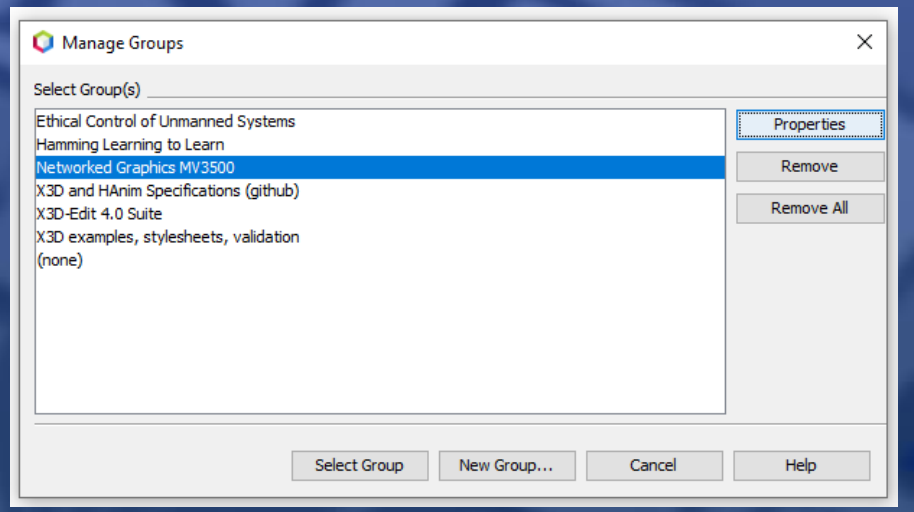
- Netbeans menu: *File > Open Project*
- Select directory for project you have cloned

Need to also select subprojects

- (so that project build.xml files work)

You can also create a *Project Group* for convenience when handling many projects.





NetBeans Debugger

Critical skill for you to test, understand, and improve source code

Using the Visual Debugger in NetBeans IDE

- https://netbeans.apache.org/tutorial/main/kb/docs/java/debug-visual

How to Use the NetBeans Debugger for Java

- https://www.youtube.com/watch?v=2Z9B8wYhKWw

NetBeans - Debugging Project

- https://www.youtube.com/watch?v=-ioCLAGrWGs

NetBeans Debugger Demos by Brandon Jones

THE MOVES INSTITUTE
NAVAL POSTGRADUATE SCHOOL

Cygwin Unix Tools on Windows

Utility tools in the Cygwin distribution provide a full repertoire of Unix command-line functionality for Windows systems.

- These Unix tools are already present on MacOS or Linux systems

Optional, can help NetBeans Windows users run **`terminal`** window

Administrator permissions required for installation, setting `PATH`.

Helps project development across multiple operating systems.

- Savage Developers Guide: Cygwin
- https://savage.nps.edu/Savage/developers.html#Cygwin

GIMP image editor

GNU Image Manipulation Program (GIMP) is an excellent open-source image editor for scaling, resizing, clipping, reformatting, applying special effects, etc.

- https://gimp.org

Currently 2.10.38

Visio drawing tool

Microsoft Visio is diagram editing software, usable standalone or as part of Microsoft Office suite. Licensed for use by NPS personnel.

- Directly in Teams, or else
- NPS Intranet > Technology > Software Downloads
- https://nps.edu/group/technology/software-download
- https://nps.edu/web/technology/-/visio-pro-2019-project-pro-2019
- Use UML styles to create sequence diagram (aka timing diagram)
- Viewing (but not editing) on MacOS, unless using a Windows VM

Wireshark

Wireshark lets you monitor traffic and inspect packet contents.

- https://www.wireshark.org
- "**Wireshark** is the world's foremost and widely-used network protocol analyzer. It lets you see what's happening on your network at a microscopic level and is the de facto (and often de jure) standard across many commercial and non-profit enterprises, government agencies, and educational institutions. Wireshark development thrives thanks to the volunteer contributions of networking experts around the globe and is the continuation of a project started by Gerald Combs in 1998."

Installation, configuration, references, and video links found at

- NetworkedGraphicsMV3500 > documentation > Wireshark > README
- https://gitlab.nps.edu/Savage/NetworkedGraphicsMV3500/-/blob/master/documentation/Wireshark/README.md

About Wireshark

About | **Awards and Accolades** | **Authors** | **SharkFest** | **SharkFest Sponsors**

Wireshark is the world's foremost and widely-used network protocol analyzer. It lets you see what's happening on your network at a microscopic level and is the de facto (and often de jure) standard across many commercial and non-profit enterprises, government agencies, and educational institutions. Wireshark development thrives thanks to the volunteer contributions of networking experts around the globe and is the continuation of a project started by Gerald Combs in 1998.

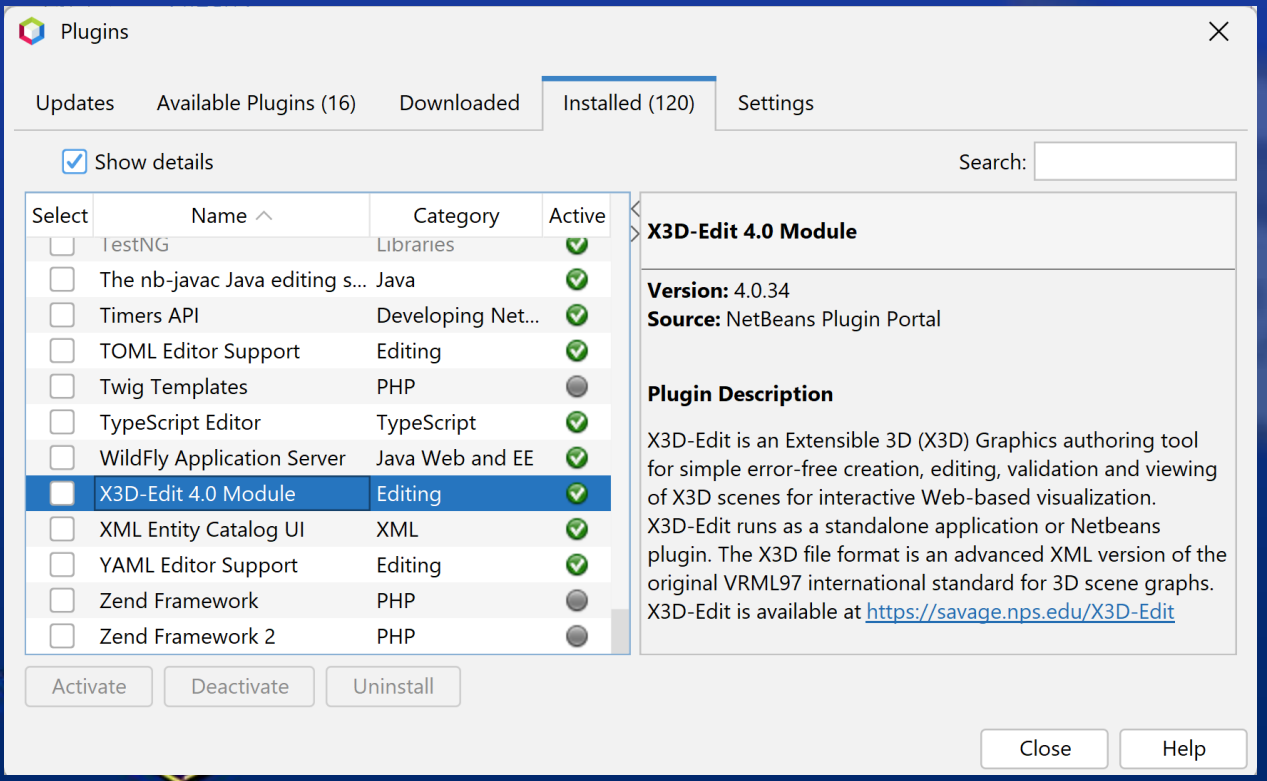
Wireshark has a rich feature set which includes the following:

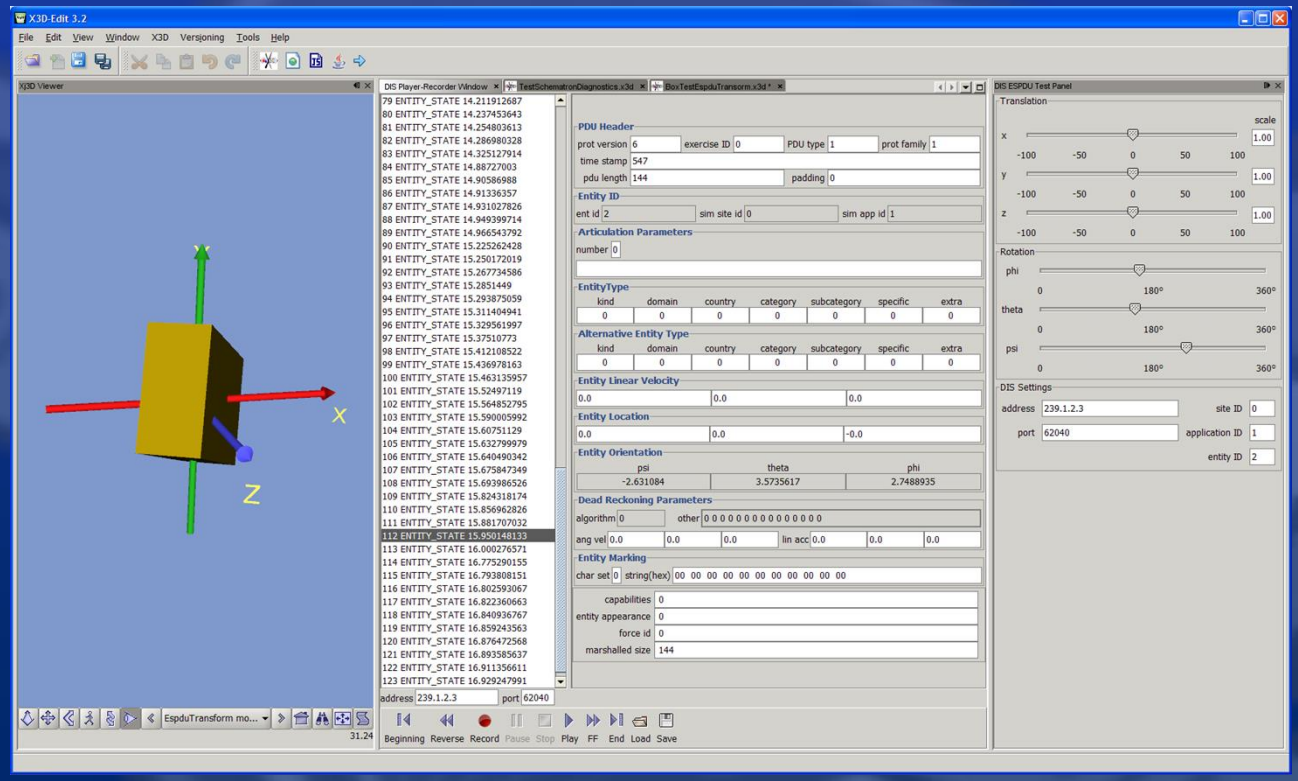
- Deep inspection of hundreds of protocols, with more being added all the time
- Live capture and offline analysis
- Standard three-pane packet browser
- Multi-platform: Runs on Windows, Linux, macOS, Solaris, FreeBSD, NetBSD, and many others
- Captured network data can be browsed via a GUI, or via the TTY-mode TShark utility
- The most powerful display filters in the industry
- Rich VoIP analysis
- Read/write many different capture file formats: tcpdump (libpcap), Pcap NG, Catapult DCT2000, Cisco Secure IDS iplog, Microsoft Network Monitor, Network General Sniffer® (compressed and uncompressed), Sniffer® Pro, and NetXray®, Network Instruments Observer, NetScreen snoop, Novell LANalyzer, RADCOM WAN/LAN Analyzer, Shomiti/Finisar Surveyor, Tektronix K12xx, Visual Networks Visual UpTime, WildPackets EtherPeek/TokenPeek/AiroPeek, and many others
- Capture files compressed with gzip can be decompressed on the fly
- Live data can be read from Ethernet, IEEE 802.11, PPP/HDLC, ATM, Bluetooth, USB, Token Ring, Frame Relay, FDDI, and others (depending on your platform)
- Decryption support for many protocols, including IPsec, ISAKMP, Kerberos, SNMPv3, SSL/TLS, WEP, and WPA/WPA2
- Coloring rules can be applied to the packet list for quick, intuitive analysis
- Output can be exported to XML, PostScript®, CSV, or plain text

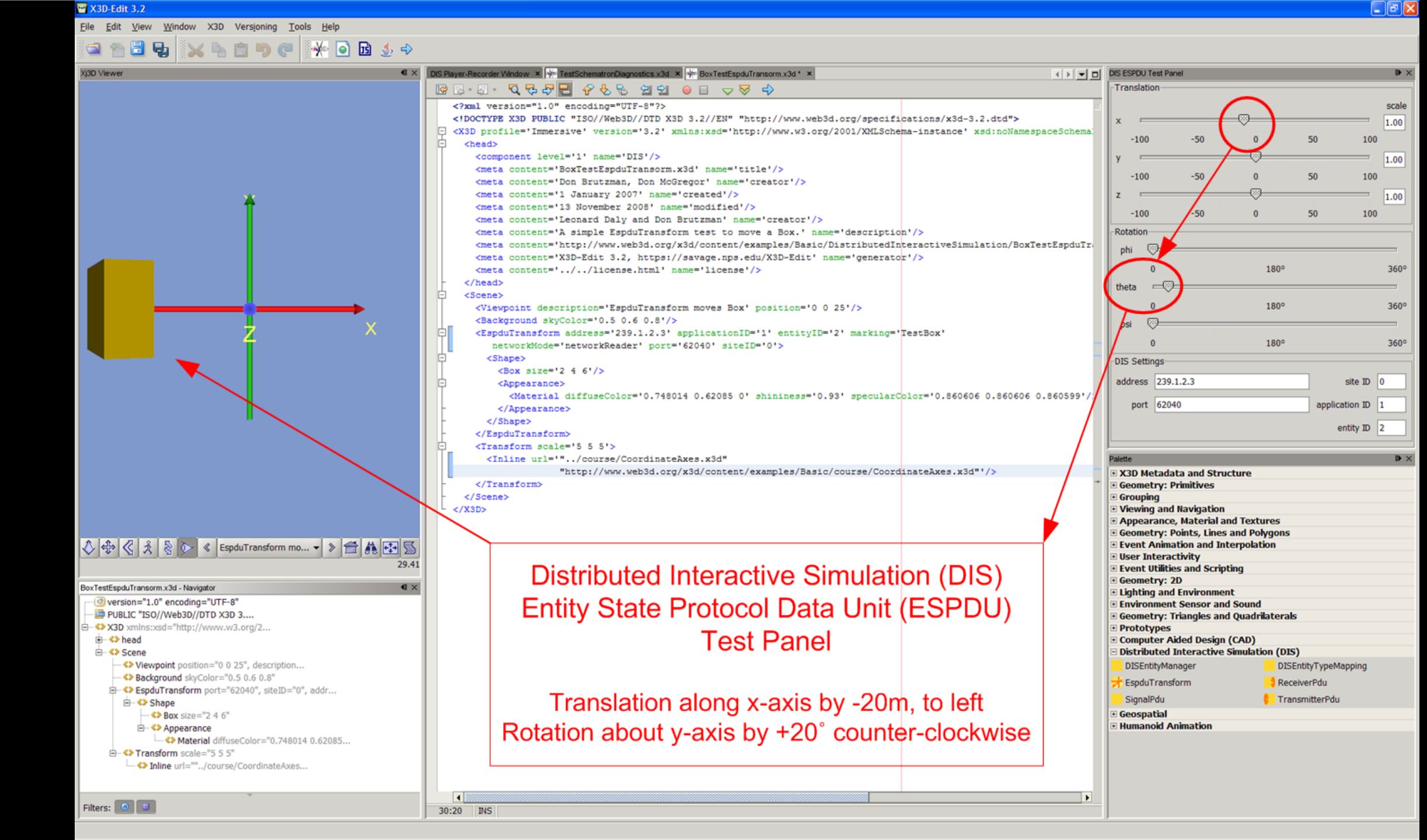
X3D-Edit 4.0 Authoring Tool for Extensible 3D (X3D) Graphics

To support recording, inspection and playback of DIS PDUs

- Produced by NPS MOVES! https://savage.nps.edu/X3D-Edit






X3D-Edit 3.2
File Edit View Window X3D Versioning Tools Help
X3D Viewer
DIS Player-Recorder Window
TestSchematronDiagnostics.x3d
BoxTestEspduTransorm.x3d *
DIS ESPDU Test Panel
Translation
scale
Rotation
phi
theta
psi
DIS Settings
address 239.1.2.3
site ID 0
port 62040
application ID 1
entity ID 2
Palette
X3D Metadata and Structure
Geometry: Primitives
Grouping
Viewing and Navigation
Appearance, Material and Textures
Geometry: Points, Lines and Polygons
Event Animation and Interpolation
User Interactivity
Event Utilities and Scripting
Geometry: 2D
Lighting and Environment
Environment Sensor and Sound
Geometry: Triangles and Quadrilaterals
Prototypes
Computer Aided Design (CAD)
Distributed Interactive Simulation (DIS)
DISEntityManager
DISEntityTypeMapping
EspduTransform
ReceiverPdu
SignalPdu
TransmitterPdu
Geospatial
Humanoid Animation
BoxTestEspduTransorm.x3d - Navigator
Filters:
30:20
INS
Distributed Interactive Simulation (DIS)
Entity State Protocol Data Unit (ESPDU)
Test Panel
Translation along x-axis by -20m, to left
Rotation about y-axis by +20˚ counter-clockwise

Effective Collaboration

We use Microsoft Teams for local/remote class participation.

Computers must access the same local-area network (LAN) in order to share packets, or else have a network bridge that passes packets back and forth - without infinite loops!

Later in this course and the follow-on LVC practicum, we will look at special VPNs and bridging.

Troubleshooting Techniques

☺

Troubleshooting code can be difficult. We overcome that. No really!

We will pursue a number of challenges, big and small, to help you build a personal repertoire of techniques for solving problems.

These skills not only aid you in your own work, but also give you useful expectations and leadership skills when leading effective programming teams in the future.

THE MOVES INSTITUTE
NAVAL POSTGRADUATE SCHOOL

Contact

Don Brutzman

brutzman@nps.edu
http://faculty.nps.edu/brutzman

Code USW/Br, Naval Postgraduate School
Monterey California 93943-5000 USA
1.831.656.2149 work

THE MOVES INSTITUTE
NAVAL POSTGRADUATE SCHOOL