

# Generating Distributed Interactive Simulation (DIS) Codebases using opendis7-source-generator

## TUTORIAL

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SISO Simulation Interoperability Workshop (SIW)

7 February 2022



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# Tutorial sections

1. *Programmers:* [Configuring your system with NetBeans](#)
2. *Developers:* [building opendis7-source-generator](#)
3. *Developers:* [building opendis7-java library](#)
4. *Programmers:* [using opendis7-java.full.jar library](#)
5. *Programmers:* [Example applications](#)
6. *Community:* [Getting involved](#)

# 1. Configuring Your System for opendis-java Distributed Simulation

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

# Configuring your System

Good collaboration setup is important!

This illustrated slideset covers

- Java OpenJDK and Javadoc
- Netbeans and Netbeans plugins
- Git and gitlab.nps.edu
- Collaboration and Troubleshooting



SAVAGE

Full configuration details  
are maintained at  
[Savage Developers Guide](#)

# Java install

→ ↻ 🏠 <https://openjdk.java.net>

## OpenJDK

<https://openjdk.java.net>

**What is this?** The place to collaborate on an open-source implementation of the [Java Platform, Standard Edition](#), and related projects. (Learn more.)

**Download** and install the latest open-source JDK. Oracle's free, GPL-licensed, production-ready OpenJDK JDK 17 binaries for Linux, macOS, and Windows are available at [jdk.java.net/17/](https://jdk.java.net/17/); Oracle's commercially-licensed JDK 17 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 the Java that's 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 FAQ**  
Installing  
Contributing  
Sponsoring  
Developers' Guide  
Vulnerabilities  
JDK GA/EA Builds  
Mailing lists  
Wiki -IRC  
Bylaws - Census  
Legal

**JEP Process**  
**Source code**  
Mercurial  
GitHub  
**Tools**  
Mercurial  
Git  
jrebel 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)  
Amber  
Annotations Pipeline  
2.0  
Audio Engine  
Build Infrastructure  
CRaC  
Caciocavallo  
Closures  
Code Tools  
Coin

→ ↻ 🏠 <https://jdk.java.net/17/>

## JDK 17.0.2 General-Availability Release

This page provides production-ready open-source builds of the Java Development Kit, version 17, an implementation of the Java SE 17 Platform under the GNU General Public License, version 2, with the Classpath Exception.

Commercial builds of JDK 17.0.2 from Oracle, under a [non-open-source license](#), can be found at the [Oracle Technology Network](#).

### Documentation

- Features
- Release notes
- API Javadoc

### Builds

<b>Linux/AArch64</b>	tar.gz (sha256)	185776417 bytes
<b>Linux/x64</b>	tar.gz (sha256)	187033144
<b>macOS/AArch64</b>	tar.gz (sha256)	182209404
<b>macOS/x64</b>	tar.gz (sha256)	184480668
<b>Windows/x64</b>	zip (sha256)	186216309

**GA Releases**  
JDK 17  
JMC 8

**Early-Access Releases**  
JDK 19  
JDK 18  
Loom  
Metropolis  
Panama  
Valhalla

**Reference Implementations**  
Java SE 17  
Java SE 16  
Java SE 15  
Java SE 14  
Java SE 13  
Java SE 12  
Java SE 11  
Java SE 10  
Java SE 9  
Java SE 8  
Java SE 7

**Feedback**  
Report a bug  
Archive

← 📁 Extract Compressed (Zipped) Folders

**Requires admin permissions**

Select a Destination and Extract Files

Files will be extracted to this folder:

☒ Show extracted files when complete

33% complete

Copying 557 items from openjdk-16.0.1\_windows-x64\_bin (1)... to openjdk

33% complete





# Javadoc

[JDK 16 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](#)

→ ↻ 🏠 🔒 https://netbeans.apache.org 🔍 ⭐ ⚙️ 📄 | ⭐ ⬇️ ✓ 👤 ...

**Apache NetBeans** Community Participate Blog Get Help Plugins Download

Latest release

# Apache NetBeans 12.6

Download



## Apache NetBeans

### Fits the Pieces Together

Development Environment, Tooling Platform and Application Framework.

#### ✍️ Fast & Smart Editing

Apache NetBeans is much more than a text editor. It highlights source code **syntactically and semantically**, lets you easily **refactor code**, with a range of handy and powerful tools.

#### 🔧 Java, JavaScript, PHP, HTML5, CSS, and More

Apache NetBeans provides editors, wizards, and templates to help you create applications in **Java**, **PHP** and many other languages.

#### 📥 Cross Platform

Apache NetBeans can be **installed** on all operating systems that support Java, i.e., Windows, Linux, Mac OSX and BSD. Write Once, Run Anywhere, applies to NetBeans too.

#### 👤 Join us

Subscribe to our **mailing lists**, or follow us in **Twitter**, **Slack**, **Facebook** or **YouTube**.

#### ➔ Participate

See how you can participate by **submitting pull requests**, **filing issues**, or joining the **NetCAT** program.

#### 📖 Learn

We are currently reviewing the tutorials. See how you can **help us** review the **Java** and **PHP** tutorials.

# Apache Netbeans Installation

→ ↻ 🏠 🔒 https://netbeans.apache.org/download... 🔍 ⭐ ⚙️ 📄 | ⭐ ⬇️ ✓ 👤 ...

**Apache NetBeans** Community Participate

Latest release

## Apache NetBeans 12.6

Download

### Apache NetBeans Releases

Apache NetBeans is released four times a year. For details, see [full release schedule](#).

### Apache NetBeans 12.6

Latest version of the IDE, released on November 29, 2021.

Features Download

### Downloading Apache NetBeans 12.6

Apache NetBeans 12.6 was released on November 29, 2021. See [Apache NetBeans 12.6 Features](#) for a full list of features.

Apache NetBeans 12.6 is available for download from your closest Apache mirror.


- Binaries: [netbeans-12.6-bin.zip](#) (SHA-512, PGP ASC)
- Installers:
  - [Apache-NetBeans-12.6-bin-windows-x64.exe](#) (SHA-512, PGP ASC)
  - [Apache-NetBeans-12.6-bin-linux-x64.sh](#) (SHA-512, PGP ASC)
  - [Apache-NetBeans-12.6-bin-macosx.dmg](#) (SHA-512, PGP ASC)




→ ↺ 🏠 🔒


https://github.com/open-dis/opendis7-source-generator

🔍 ⭐ ⚙️ 📄 ⚙️ ⚙️ ⚙️ ⚙️

 Search or jump to... /

[Pull requests](#) [Issues](#) [Marketplace](#) [Explore](#)

 +

 [open-dis / opendis7-source-generator](#) Public

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[<> Code](#) [🕒 Issues 1](#) [🔗 Pull requests](#) [🔄 Actions](#) [📁 Projects](#) [📖 Wiki](#) [🛡 Security](#) [📊 Insights](#) [⚙ Settings](#)

🔑 master ▾


🔗 1 branch

🏷 0 tags

Go to file

Add file ▾

Code ▾

 **brutzman** rename paths as opendis7-java, omitting hyphen. project rename

📁 images	fix typo in name	
📁 lib	[Terry N.] merge Don B. mods	
📁 nbproject	rename as opendis7-source-generator	
📁 src-autogenerate/edu/nps/moves/dis...	javadoc	
📁 src-generated	[Terry N.] merge Don B. mods	
📁 src-specialcase	latest greatest	8 days ago
📁 src-supporting/java/edu/nps/moves/...	move DisTime from one directory tree to another, same package	15 days ago
📁 src	stub	6 days ago
📁 stringTemplates	use less-verbose getClass().getSimpleName()	26 days ago
📁 xml	rename paths as opendis7-java, omitting hyphen. project rename compl...	4 days ago
📄 .gitignore	align w/ build.xml all generate-source-code target	16 months ago
📄 README.md	rename paths as opendis7-source-generator, omitting hyphen. project r...	4 days ago
📄 build.all.out.txt	successful build all in new project	4 days ago
📄 build.python.out.txt	show output of open-dis7-source-generator generate-source-code-pyt...	6 days ago
📄 build.xml	rename paths as opendis7-source-generator, omitting hyphen	4 days ago

📄 Clone ?

HTTPS SSH GitHub CLI

https://github.com/open-dis/opendis7-source-generator

📄

Use Git or checkout with SVN using the web URL.

🖱 Open with GitHub Desktop

📦 Download ZIP

About

Project to generate a type-safe Java implementation of the DIS Protocol version 7, IEEE 1278.1-2012 and SISO-REF-010 Enumerations specifications.

📖 Readme

📄 View license

⭐ 1 star

👁 4 watching

🍴 3 forks

Releases

No releases published


[Create a new release](#)

Packages

No packages published

[Publish your first package](#)

Contributors 4

 **brutzman** Don Brutzman

# opendis7- source- generator

8



→ ↺ 🏠 🔒

https://github.com/open-dis/opensis7-java/blob/master/README.md

🔍 ⭐

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👤

🐙

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👤

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🍴 Fork 2

★ Starred 5

>

<> Code

🕒 Issues 12

🔗 Pull requests

💬 Discussions

🎬 Actions

📁 Projects

📖 Wiki

🛡 Security

📈 Insights

⚙ Settings

🔑 master

opensis7-java / README.md

Go to file

...

👤 brutzman temporary javadoc address

Latest commit 56e6edc 6 hours ago

🕒 History

👤 3 contributors

👤 👤 👤

18 lines (14 sloc) | 1023 Bytes

<> 📄 Raw Blame 🖨 📄 ✎ 🗑

# opensis7-java Library

This project provides a complete type-safe Java implementation of the IEEE Distributed Interactive Simulation (DIS) Protocol.

Current support includes IEEE DIS Protocol version 7 (IEEE 1278.1-2012) and Simulation Interoperability Standards Organization SISO-REF-010 Enumerations specifications. The majority of source code is autogenerated by the [opensis7-source-generator](#) project.

Also available: [opensis7-full.jar](#), [Javadoc](#), [DIS XML Schema](#) and [DIS XML Schema documentation](#).

Additional test programs and resources are found in the NPS MOVES [Networked Graphics MV3500](#) course. Recent project products include DIS stream-handling support.

🐙

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opensis7-java

# MV3500 course repository clone address

← → ↻ 🔍 <https://gitlab.nps.edu/Savage/NetworkedGraphicsMV3500> 100% ☆ 🔍 Search

**GitLab** Menu

Please review any and all PUBLIC repositories, groups and associate files. These allow anyone on the Internet to access without authentication. Repository and group owners are responsible for their content and permission settings. Go to your project(s), click on Settings > General and expand the "Visibility, project features, permissions" to change this setting.

Savage / NetworkedGraphicsMV3500

**NetworkedGraphicsMV3500** Project ID: 1563

🔔 Star 2 🍴 Fork 12

🔗 1,620 Commits 🌿 2 Branches 🏷️ 0 Tags 📁 1.9 GB Files 📦 1.9 GB Storage

Source code and resources for Networked Graphics course MV3500

master NetworkedGraphicsMV3500 / +

History Find file Web IDE Clone

updated to match IITSEC 2021 presentation template, editorial review  
Brutzman, Don authored 20 hours ago

📖 README 🛠️ Other ➕ Add CHANGELOG ➕ Add CONTRIBUTING ➕ Enable Auto DevOps ➕ Add Kubernetes cluster

Name	Last commit
📁 archive	2021 syllabus added, archive 2020 syllabus
📁 assignments	package info, package rename, view javadoc
📁 conferences	updated to match IITSEC 2021 presentation template, edit...

Clone with SSH  
git@gitlab.nps.edu:Savage/NetworkedGraphicsMV3500

Clone with HTTPS  
<https://gitlab.nps.edu/Savage/NetworkedGraphicsMV3500>

Open in your IDE  
Visual Studio Code (SSH)  
Visual Studio Code (HTTPS)

Copy URL

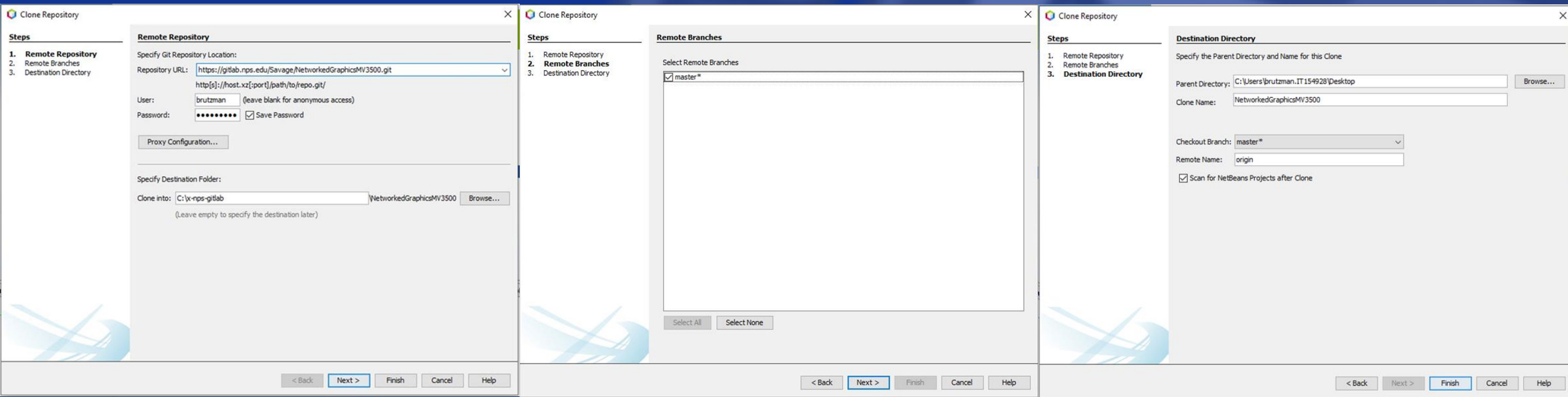
20 hours ago

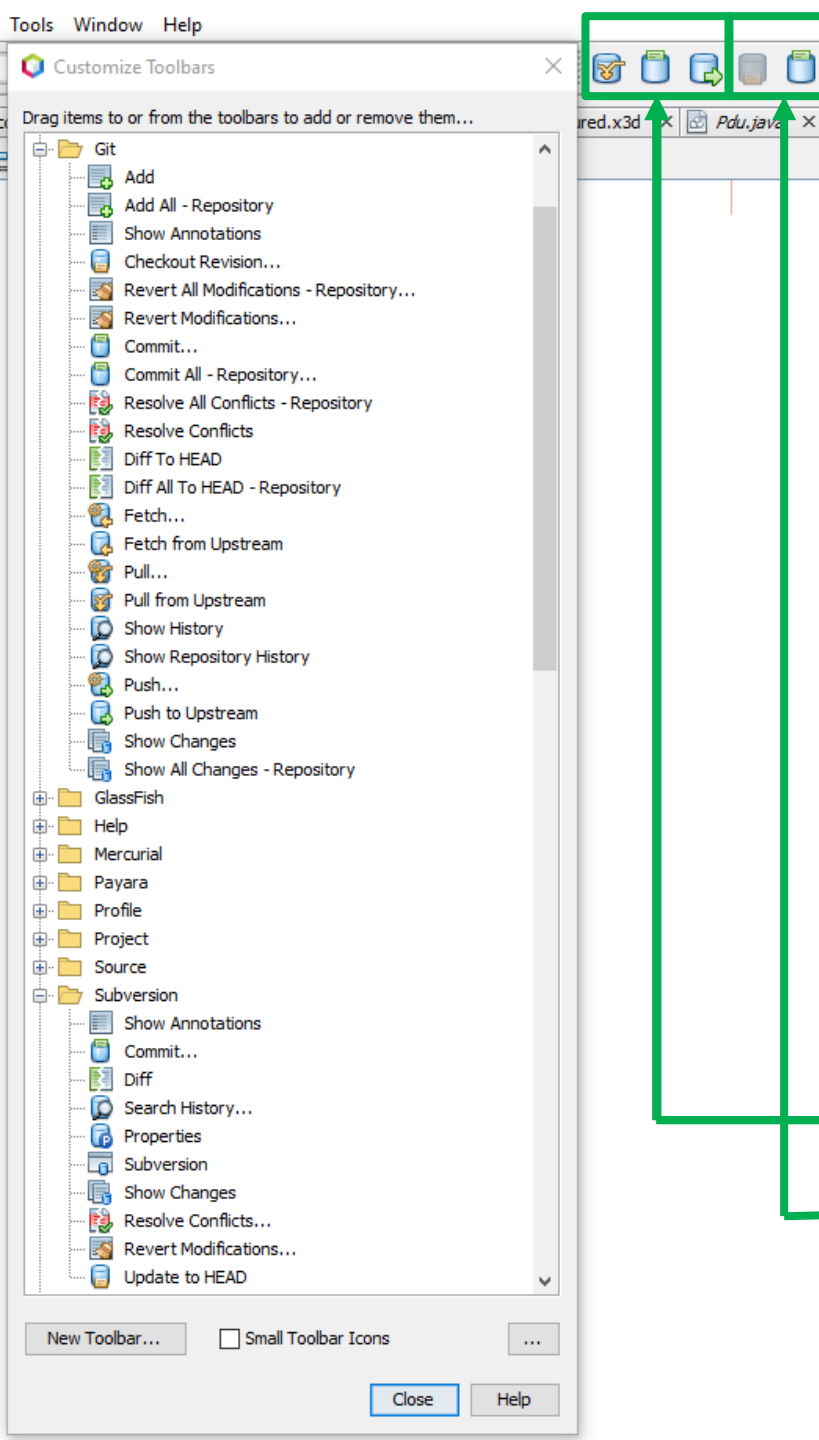
# Cloning course projects using NetBeans git

Netbeans can clone copies of git repositories and open projects:

- Netbeans menu: *Team > Git > Clone ...*

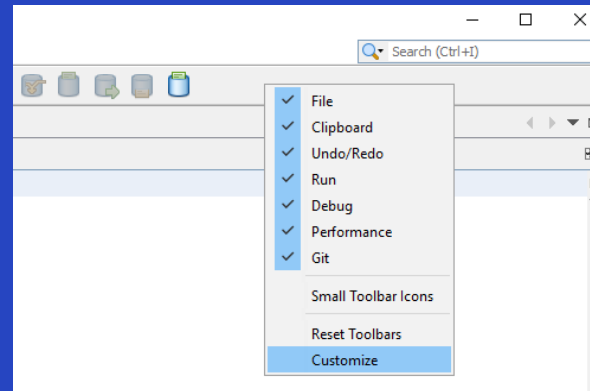
<https://gitlab.nps.edu/Savage/NetworkedGraphicsMV3500.git>





# NetBeans toolbar buttons (shortcuts) for subversion, git

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/kb/docs/ide/git.html>

## 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.

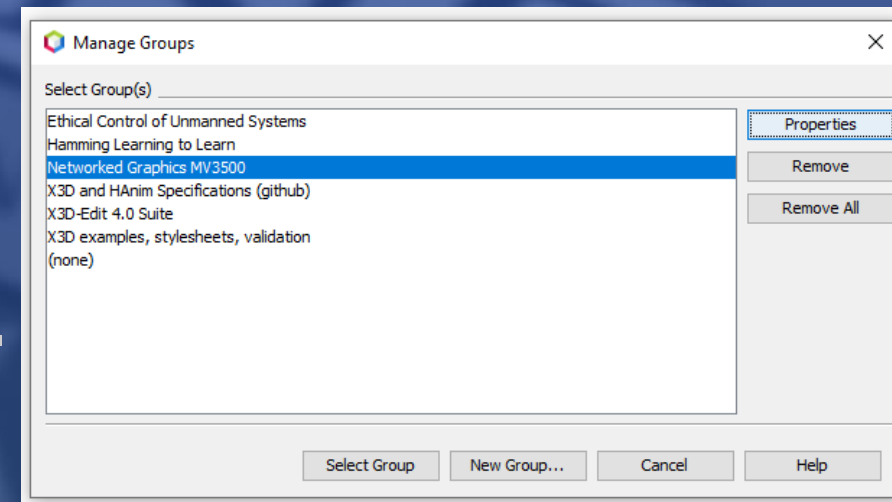
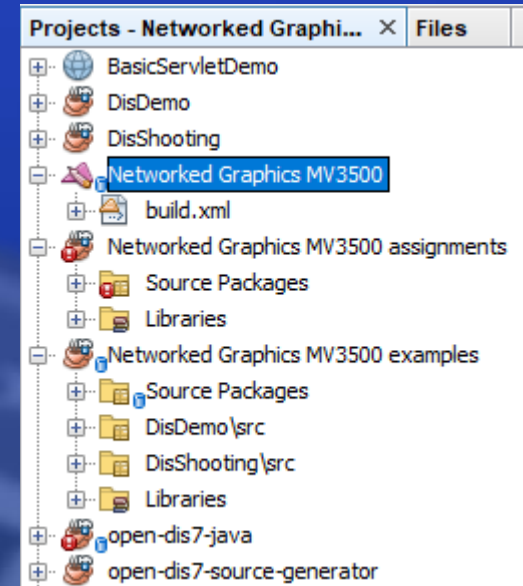
Alternative manual method:

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

Need to also select subprojects

- (so that build.xml files work)

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



# Netbeans Debugger

Critical feature for testing, understanding and improving code

Using the Visual Debugger in NetBeans IDE

- <https://netbeans.apache.org/kb/docs/java/debug-visual.html>

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>

# 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 MacOSX or Linux systems

Needed for NetBeans Windows users to 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>

# 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

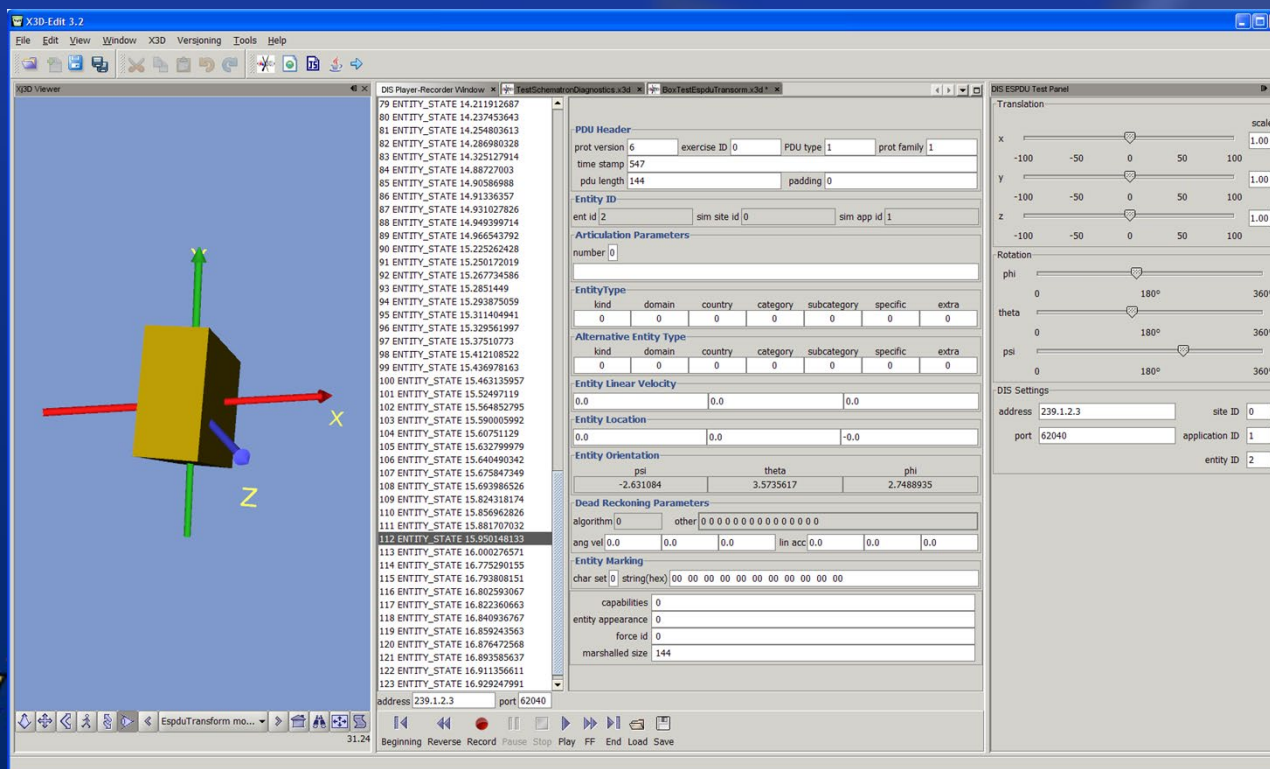


X3D-Edit 4.0

open-source X3D Graphics authoring

To support recording, inspection and playback of DIS PDUs

- <https://savage.nps.edu/X3D-Edit>



**WARNING:**

**YMMV,  
rewrite  
planned**



**X3D-Edit 3.2**

File Edit View Window X3D Versioning Tools Help

X3D Viewer

DIS Player-Recorder Window

TestSchematronDiagnostics.x3d

BoxTestEspduTransform.x3d

DIS ESPDU Test Panel

Translation

scale

x -100 -50 0 50 100 1.00

y -100 -50 0 50 100 1.00

z -100 -50 0 50 100 1.00

Rotation

phi 0 180° 360°

theta 0 180° 360°

psi 0 180° 360°

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

BoxTestEspduTransform.x3d - Navigator

- version="1.0" encoding="UTF-8"
- PUBLIC "ISO//Web3D//DTD X3D 3...."
- X3D xmlns:xsd="http://www.w3.org/2/..."
  - head
  - Scene
    - Viewpoint position="0 0 25", description...
    - Background skyColor="0.5 0.6 0.8"
    - EspduTransform port="62040", siteID="0", addr...
      - Shape
        - Box size="2 4 6"
        - Appearance
          - Material diffuseColor="0.748014 0.62085 0"
      - Transform scale="5 5 5"
      - Inline url="http://www.web3d.org/x3d/content/examples/Basic/course/CoordinateAxes.x3d"

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.2//EN" "http://www.web3d.org/specifications/x3d-3.2.dtd">
<X3D profile='Immersive' version='3.2' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance' xsd:noNamespaceSchemaLocation='http://www.web3d.org/x3d/content/examples/Basic/course/CoordinateAxes.x3d'>
  <head>
    <component level='1' name='DIS'/>
    <meta content='BoxTestEspduTransform.x3d' name='title'/>
    <meta content='Don Brutzman, Don McGregor' name='creator'/>
    <meta content='1 January 2007' name='created'/>
    <meta content='13 November 2008' name='modified'/>
    <meta content='Leonard Daly and Don Brutzman' name='creator'/>
    <meta content='A simple EspduTransform test to move a Box.' name='description'/>
    <meta content='http://www.web3d.org/x3d/content/examples/Basic/DistributedInteractiveSimulation/BoxTestEspduTransform.x3d' name='generator'/>
    <meta content='../license.html' name='license'/>
  </head>
  <Scene>
    <Viewpoint description='EspduTransform moves Box' position='0 0 25'/>
    <Background skyColor='0.5 0.6 0.8'/>
    <EspduTransform address='239.1.2.3' applicationID='1' entityID='2' marking='TestBox'
      networkMode='networkReader' port='62040' siteID='0'>
      <Shape>
        <Box size='2 4 6'/>
        <Appearance>
          <Material diffuseColor='0.748014 0.62085 0' shininess='0.93' specularColor='0.860606 0.860606 0.860599'/>
        </Appearance>
      </Shape>
    </EspduTransform>
    <Transform scale='5 5 5'>
      <Inline url='../course/CoordinateAxes.x3d'
        http://www.web3d.org/x3d/content/examples/Basic/course/CoordinateAxes.x3d"/>
    </Transform>
  </Scene>
</X3D>
```

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

## 2. *Developers:* building opendis7-source-generator

How the process works, part one.

Not necessary for regular Java programmers!

# build.xml target tasks

build all: clean, compile, create autogenerated classes, then copy results to opendis7-java project

Performs intermediate compilation to ensure correct syntax

Produces preliminary Javadoc, again to ensure correct syntax

Modifying source generators is highly tricky, not recommended

# Internal directories to produce source code

directory	Description
build	Class files and Javadoc for intermediate compilation
dist	Distribution directory for intermediate jar files
nbproject	Netbeans project configuration files
src-autogenerate	Source generator library, written in Java, to create various new codebases
src-generated	Autogenerated source code
src-specialcase	Classes requiring special treatment and bugfixes
src-supporting	Classes from master library
stringTemplates	Special Java formatting files to facilitate creation of large source programs
xml	SISO enumerations, DIS PDU XML descriptions, autogenerated DIS XML schema
src-python	Work in progress



Categories:

Sources

Libraries

Build

Compiling

Packaging

Deployment

Documenting

Run

Application

Web Start

License Headers

Formatting

Hints

Project Folder: C:\x3d-github\opendis7-source-generator

Source Package Folders:

Package Folder	Label
src-autogenerate	src-autogenerate
src-generated\java	src-generated\java
src-specialcase\java	src-specialcase\java
src-supporting\java	src-supporting\java
stringTemplates	stringTemplates
xml	xml

Add Folder...

Remove

Move Up

Move Down

Test Package Folders:

Package Folder	Label
test	Test Packages

Add Folder...

Remove

Move Up

Move Down

Source/Binary Format: JDK 17

Profile: Full JRE

Encoding: UTF-8

Includes/Excludes...

Netbeans  
project  
properties

opendis7-  
source-  
generator

### 3. *Developers:* building opendis7-java library

How the process works, part two.

Not necessary for regular Java programmers!

# build.xml target tasks

build all: clean, compile autogenerated and supporting classes, create distribution products

Performs final compilation and unit testing

Produce integrated Javadoc for all PDU and Enumeration classes

Modifying source generators is highly tricky, not recommended

# Internal directories to create Java distribution

directory	description
build	Class files and Javadoc for final compilation
dist	Distribution directory for final jar files, especially "fat jar" opendis7-java-full.jar
nbproject	Netbeans project configuration files
lib	Library jar files
src	Supporting utility classes that cannot be autogenerated
src-generated	Autogenerated source code
test	Test classes, maintained separately from regular tree for independent checks

Categories:

- Sources
- Libraries
- Build
  - Compiling
  - Packaging
  - Deployment
  - Documenting
- Run
- Application
  - Web Start
- License Headers
- Formatting
- Hints

Project Folder: C:\x3d-github\opendis7-java

Source Package Folders:

Package Folder	Label
src	Source Packages
src-generated	src-generated

Add Folder...

Remove

Move Up

Move Down

Test Package Folders:

Package Folder	Label
test	Test Packages

Add Folder...

Remove

Move Up

Move Down

Source/Binary Format: JDK 17

Profile: Full JRE

Encoding: UTF-8

Includes/Excludes...

Netbeans  
project  
properties

opendis7-  
java



## 4. *Programmers:* using opendis-java library

Add DIS to your Java application

## *opendis7-java.full.jar*

Contains all classes, source (for context-sensitive Javadoc)

- <https://gitlab.nps.edu/Savage/NetworkedGraphicsMV3500/-/raw/master/lib/opendis7-full.jar> (200MB) also available at
- <https://savage.nps.edu/open-dis7-java>

Add local copy of *opendis7-full.jar* to your classpath

- Also available: smaller *open-dis7-pdus-classes.jar* (880KB) for embedded use

# Confirmation of design notes

Plain Old Java Objects (POJO)

Open source, free for any use

Minimal inclusion of external libraries in “fat” opendis7-full.jar

- may get reduced even further when possible

Traceable in debug mode to aid troubleshooting

# Javadoc

[JDK 17 Javadoc Documentation](#) describes Java interfaces in detail, providing online documentation and context-sensitive help

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](#)

# open-dis7 Javadoc

🔗 The open-dis7-java🔗 library provides a complete type-safe Java implementation of both the DIS Protocol version 7 (IEEE 1278.1-2012) and SISO-REF-010 Enumerations specifications, interfaces and objects, all as open source.

- Over 22,000 SISO-REF-010 enumeration values are provided.
- edu.nps.moves.dis7.pdus package contains IEEE DIS Protocol Data Unit (PDU) packet-definition classes.
- edu.nps.moves.dis7.utilities package contains network interface and data-conversion utilities.
- edu.nps.moves.dis7.utilities.stream package contains stream utilities for DIS file saving, conversions and playback.
- Experimental DIS XML schema🔗 and documentation🔗 assist with data-centric processing of DIS streams.

Distribution binary available at open-dis7-full.jar🔗. Further examples, presentations and projects are provided in Networked Graphics MV3500🔗 course archive by the Modeling, Virtual Environments, Simulation (MOVES) Institute🔗 of the Naval Postgraduate School (NPS)🔗.

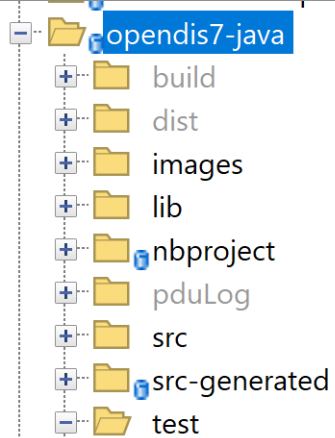


Packages	
Package	Description
edu.nps.moves.dis7.entities	The entities packages provide a large number of autogenerated utility classes for world entities of interest.
edu.nps.moves.dis7.entities.afg.lifeform.land	Afghanistan (AFG) LIFE_FORM LAND typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.
edu.nps.moves.dis7.entities.afg.platform.land	Afghanistan (AFG) PLATFORM LAND typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.
edu.nps.moves.dis7.entities.alb.platform.surface	Albania (ALB) PLATFORM SURFACE typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.
edu.nps.moves.dis7.entities.are.platform.air	United Arab Emirates (ARE) PLATFORM AIR typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.
edu.nps.moves.dis7.entities.are.platform.surface	United Arab Emirates (ARE) PLATFORM SURFACE typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.
edu.nps.moves.dis7.entities.arg.munition.antiship	Argentina (ARG) MUNITION ANTI_SHIP typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.
edu.nps.moves.dis7.entities.arg.platform.air	Argentina (ARG) PLATFORM AIR typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.
edu.nps.moves.dis7.entities.arg.platform.subsurface	Argentina (ARG) PLATFORM SUBSURFACE typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.
edu.nps.moves.dis7.entities.arg.platform.surface	Argentina (ARG) PLATFORM SURFACE typed classes for world entities defined by SISO-REF-010-v30-DRAFT-20220129-d11 (2022-01-29) enumerations.



## 5. *Programmers*: Example Applications

Unit tests and sample programs



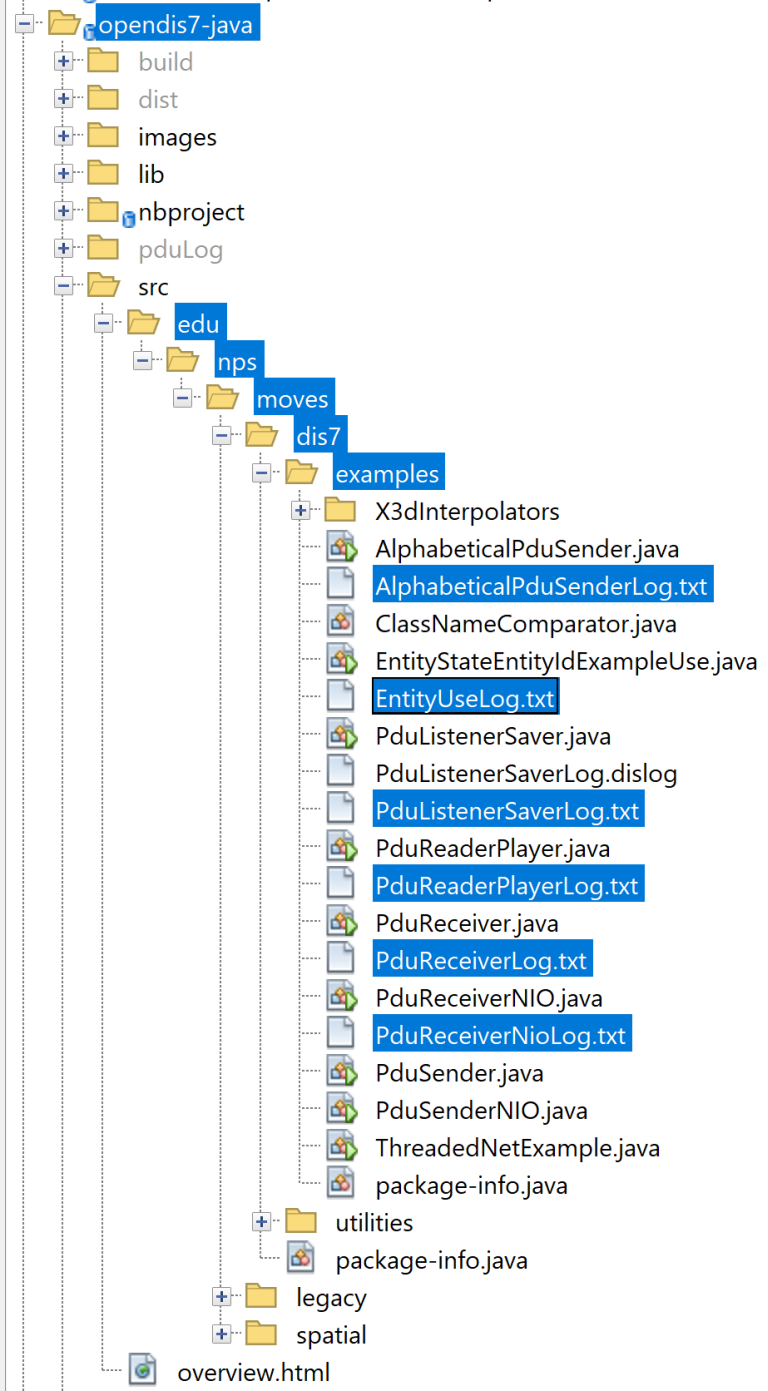
AllPduRoundTripTest.java  
BitFieldRoundTripTest.java  
CommentPdusTest.java  
CreateAllObjectTypesTest.java  
CreateAllPduTypesTest.java  
DataQueryPduRoundTripTest.java  
DetonationPduTest.java  
EntityStatePduTest.java  
FirePduTest.java  
FixedAndVariableDatumRoundTripTest.java  
MarshalEnumsTest.java  
NullFieldsEntityMarshallTest.java  
ObjectTypeMarshallTest.java  
PduFactoryTest.java  
PduTest.java  
SignalPdusTest.java  
X3dInterpolatorsTest.java  
package-info.java

```
+++ JUnit Jupiter[OK]
| +-- All Pdu Round Trip Test [OK]
| | '-- testRoundTripAllPdus() 16544 ms [OK]
| +-- CreateAllPduTypesTest [OK]
| | '-- testCreateAll() [OK]
| +-- Null Fields Entity Marshall Test[OK]
| | +-- testGoodMarshall() [OK]
| | '-- testNoSpecificNoExtraMarshal() [OK]
| +-- X3dInterpolatorsTest [OK]
| | '-- testInterpolators() [OK]
| +-- Pdu Factory Test [OK]
| | '-- testCreateAllPdus() [OK]
| +-- Marshal Enums Test [OK]
| | '-- testGoodMarshall() [OK]
| +-- Detonation Pdu Test [OK]
| | '-- testRoundTrip() [OK]
| +-- Signal Pdus Test [OK]
| | +-- testRoundTripNet() [OK]
| | '-- testRoundTripLog() [OK]
| +-- Object Type Marshal Test [OK]
| | +-- testGoodMarshall() [OK]
| | '-- testNoSubCategory() [OK]
| +-- Fire Pdu Test [OK]
| | '-- testRoundTrip() [OK]
| +-- Entity State Pdu Test [OK]
| | '-- testRoundTrip() [OK]
| +-- Fixed and Variable Datum Round Trip Test[OK]
| | '-- testRoundTrip() [OK]
| +-- All Object Types Create [OK]
| | '-- testCreateAllObjectTypes() [OK]
| +-- Bit Field Round Trip Test [OK]
| | '-- testRoundTrip() [OK]
| +-- Data Query Pdu Round Test [OK]
| | '-- testRoundTrip() [OK]
| '-- Comment Pdus Test [OK]
|   '-- testRoundTrip() [OK]
'-- JUnit Vintage [OK]
```

## build.xml: *ant test* *test* subdirectory

```
Test run finished after 37455 ms
[      18 containers found      ]
[      0 containers skipped    ]
[      18 containers started    ]
[      0 containers aborted    ]
[      18 containers successful ]
[      0 containers failed     ]
[      19 tests found          ]
[      0 tests skipped         ]
[      19 tests started        ]
[      0 tests aborted         ]
[      19 tests successful     ]
[      0 tests failed          ]
```

full build results  
available in  
[build.all.out.txt](#)

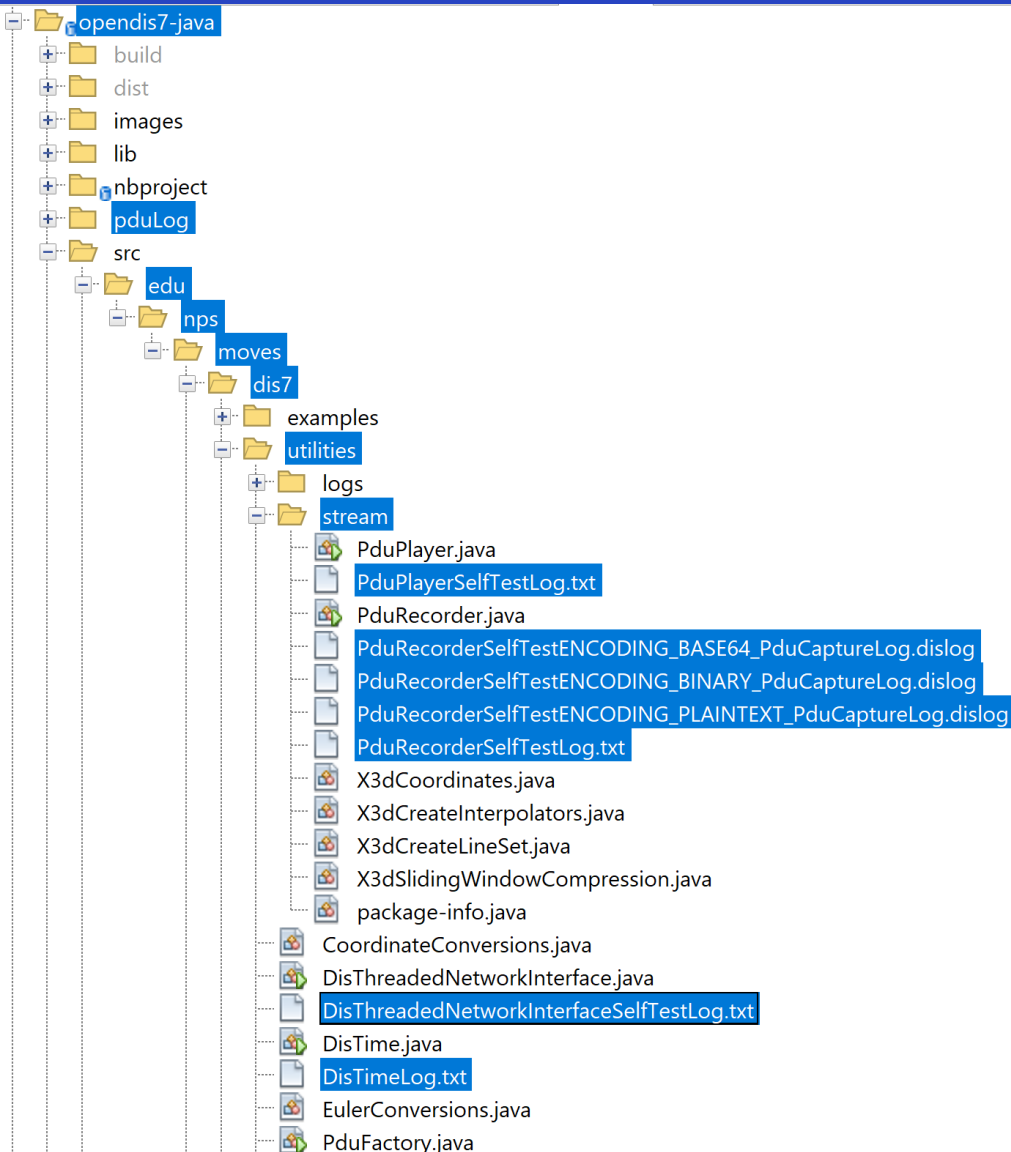


*examples* subdirectory has further tests, results as *SomeNameLog.txt*

```

...ng PduListenerSaverLog.txt × README.md × build.xml [Download IEEE and SISO Specifications] × build.xml [opendis7-source-generator] ×
Source History
1 ant -f C:\x3d-github\open-dis7-java -Dnb.internal.action.name=run.single -Diavac.includes=edu/nps/moves/dis7/examples
2 init:
3 deps-jar:
4 Compiling 1 source file to C:\x3d-github\open-dis7-java\build\classes
5 warning: [options] bootstrap class path not set in conjunction with -source 8
6 1 warning
7 compile-single:
8 run-single:
9 edu.nps.moves.dis.examples.PduListenerSaver started...
10 Beginning PduListenerSaver (239.1.2.3:3000) to directory ./pduLog
11 Recorder log file open: C:\x3d-github\open-dis7-java\pduLog\PduCaptureLog.dislog
12 [DisThreadedNetworkInterface] using network interface Intel(R) Centrino(R) Ultimate-N 6300 AGN
13 [DisThreadedNetworkInterface] datagramSocket.joinGroup address=239.1.2.3 port=3000 start() complete
14 [PduRecorder PduListenerSaver] listening to IP address 239.1.2.3 on port 3000
15 Type p/enter to pause, r/enter to resume, q/enter to quit
16 [DisThreadedNetworkInterface PduListenerSaver] [receipt 1] DisPduType 15 ACKNOWLEDGE, size 32 bytes)
17 [DisThreadedNetworkInterface PduListenerSaver] [receipt 2] DisPduType 55 ACKNOWLEDGE_RELIABLE, size 32 bytes)
18 [DisThreadedNetworkInterface PduListenerSaver] [receipt 3] DisPduType 16 ACTION_REQUEST, size 40 bytes)
19 [DisThreadedNetworkInterface PduListenerSaver] [receipt 4] DisPduType 56 ACTION_REQUEST_RELIABLE, size 44 bytes)
20 [DisThreadedNetworkInterface PduListenerSaver] [receipt 5] DisPduType 17 ACTION_RESPONSE, size 40 bytes)
21 [DisThreadedNetworkInterface PduListenerSaver] [receipt 6] DisPduType 57 ACTION_RESPONSE_RELIABLE, size 40 bytes)
22 [DisThreadedNetworkInterface PduListenerSaver] [receipt 7] DisPduType 33 AGGREGATE_STATE, size 136 bytes)
23 [DisThreadedNetworkInterface PduListenerSaver] [receipt 8] DisPduType 47 APPEARANCE, size 67 bytes)
24 [DisThreadedNetworkInterface PduListenerSaver] [receipt 9] DisPduType 45 AREAL_OBJECT_STATE, size 49 bytes)
25 [DisThreadedNetworkInterface PduListenerSaver] [receipt 10] DisPduType 48 ARTICULATED_PARTS, size 17 bytes)
26 [DisThreadedNetworkInterface PduListenerSaver] [receipt 11] DisPduType 72 ATTRIBUTE, size 32 bytes)
27 [DisThreadedNetworkInterface PduListenerSaver] [receipt 12] DisPduType 66 COLLISION_ELASTIC, size 100 bytes)
28 [DisThreadedNetworkInterface PduListenerSaver] [receipt 13] DisPduType 04 COLLISION, size 60 bytes)
29 [DisThreadedNetworkInterface PduListenerSaver] [receipt 14] DisPduType 22 COMMENT, size 32 bytes)
30 [DisThreadedNetworkInterface PduListenerSaver] [receipt 15] DisPduType 62 COMMENT_RELIABLE, size 32 bytes)
31 [DisThreadedNetworkInterface PduListenerSaver] [receipt 16] DisPduType 11 CREATE_ENTITY, size 28 bytes)
32 [DisThreadedNetworkInterface PduListenerSaver] [receipt 17] DisPduType 51 CREATE_ENTITY_RELIABLE, size 32 bytes)
    
```

# Some built-in classes have self-test *main()* methods



```
10 run-single:
11 dis7.utilities.stream.PduRecorder main() performs self-test by sending full set of PDUs
12 dis7.utilities.stream.PduRecorder allPDUTypesArray created, length=73 ...
13 =====
14 Test PduRecorder encoding ENCODING_PLAINTEXT
15 Recorder log file open: C:\x3d\github\open-dis7-java\pduLog\PduRecorderSelfTestENCODING_PLAINTEXT_PduCaptureLog.dislog
16 [DisThreadedNetworkInterface] using network interface PANGP Virtual Ethernet Adapter
17 [DisThreadedNetworkInterface] datagramSocket.joinGroup address=239.1.2.3 port=3000 isConnected()=false createDatagramSocket() complete.
18 [DisThreadedNetworkInterface] createThreads() receiveThread.isAlive()=true
19 [DisThreadedNetworkInterface] createThreads() sendingThread.isAlive()=true
20 [PduRecorder PduRecorder main() self test ENCODING_PLAINTEXT] listening to IP address 239.1.2.3 on port 3000
21 dis7.utilities.stream.PduRecorder pduRecorder started... isRunning()=true
22 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [sending 1] DisPduType 01 ENTITY_STATE , size 144 bytes)
23 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [receipt 1] DisPduType 01 ENTITY_STATE , size 144 bytes)
24 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [sending 2] DisPduType 02 FIRE, size 96 bytes)
25 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [receipt 2] DisPduType 02 FIRE, size 96 bytes)
26 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [sending 3] DisPduType 03 DETONATION, size 104 bytes)
27 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [receipt 3] DisPduType 03 DETONATION, size 104 bytes)
28 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [sending 4] DisPduType 04 COLLISION, size 60 bytes)
29 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [receipt 4] DisPduType 04 COLLISION, size 60 bytes)
30 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [sending 5] DisPduType 05 SERVICE_REQUEST, size 28 bytes)
31 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [receipt 5] DisPduType 05 SERVICE_REQUEST, size 28 bytes)
32 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [sending 6] DisPduType 06 RESUPPLY_OFFER, size 28 bytes)
33 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [receipt 6] DisPduType 06 RESUPPLY_OFFER, size 28 bytes)
34 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [sending 7] DisPduType 07 RESUPPLY_RECEIVED, size 28 bytes)
35 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [receipt 7] DisPduType 07 RESUPPLY_RECEIVED, size 28 bytes)
36 [DisThreadedNetworkInterface PduRecorder main() self test ENCODING_PLAINTEXT] [sending 8] DisPduType 08 RESUPPLY_CANCEL, size 24 bytes)
```



*pduLog* subdirectory contains \*.dislog outputs

[illegible]



Categories:

- Sources
- Libraries**
- Build
  - Compiling
  - Packaging
  - Deployment
  - Documenting
- Run
- Application
  - Web Start
- License Headers
- Formatting
- Hints

Java Platform: JDK 17 (Default) Manage Platforms...

Libraries Folder: Browse...

Compile Processor Run Compile Tests Run Tests

Compile-time Libraries:

Modulepath

+

Edit

Classpath

+

Remove

Move Up

Move Down

../lib/opendis7-full.jar

../lib/open-dis\_4.16.jar

../lib/dis-enums-1.3.jar

Compile-time libraries are propagated to all library categories.

☒ Build Dependencies

MV3500 examples use Netbeans project settings to add opendis7-full.jar to CLASSPATH

You can also set operating system ENVIRONMENT variable

# MV3500 examples, OpenDis7Examples, ExampleSimulationProgram.java

Projects - open-dis7, MV3500 Networked Simulation

Files x Favorites

...txt ExampleSimulationProgramLog.txt x PduSender.java x PduTrack.java x ExampleTrackInterpolationLog.txt x PduReaderPlayerLog.txt x build...

Source History

```
1 ant -f C:\x-nps-gitlab\NetworkedGraphicsMV3500\examples -Dnb.internal.action.name=run.single -Diavac.includes=OpenDis7
2 init:
3 Deleting: C:\x-nps-gitlab\NetworkedGraphicsMV3500\examples\build\build-jar.properties
4 deps-jar:
5 Updating property file: C:\x-nps-gitlab\NetworkedGraphicsMV3500\examples\build\build-jar.properties
6 Compiling 1 source file to C:\x-nps-gitlab\NetworkedGraphicsMV3500\examples\build\classes
7 compile-single:
8 run-single:
9 [OpenDis7Examples.ExampleSimulationProgram] main() started...
10 [OpenDis7Examples.ExampleSimulationProgram] thisHostName=IT160907-UWALPP
11 [DisThreadedNetworkInterface] using network interface PANGP Virtual Ethernet Adapter
12 [DisThreadedNetworkInterface] datagramSocket.joinGroup address=239.1.2.3 port=3000 isConnected()=false createDatagramSoc
13 [DisThreadedNetworkInterface] createThreads() receiveThread.isAlive()=true
14 [DisThreadedNetworkInterface] createThreads() sendingThread.isAlive()=true
15 Network confirmation: address=239.1.2.3 port=3000
16 Beginning pdu save to directory ./pduLog
17 Recorder log file open: C:\x-nps-gitlab\NetworkedGraphicsMV3500\examples\pduLog\PduCaptureLog.dislog
18 [DisThreadedNetworkInterface] using network interface PANGP Virtual Ethernet Adapter
19 [DisThreadedNetworkInterface] datagramSocket.joinGroup address=239.1.2.3 port=3000 isConnected()=false createDatagramSoc
20 [DisThreadedNetworkInterface] createThreads() receiveThread.isAlive()=true
21 [DisThreadedNetworkInterface] createThreads() sendingThread.isAlive()=true
22 [PduRecorder PduRecorder] listening to IP address 239.1.2.3 on port 3000
23 ... My simulation just did something, no really...
24 ... [Pausing for 1.0 seconds]
25 sending PDUs for simulation step 1, monitor loopback to confirm sent
26 [DisThreadedNetworkInterface ExampleSimulationProgram pdu looping] [sending 1] DisPduType 01 ENTITY_STATE Entity #1, s
27 [DisThreadedNetworkInterface ExampleSimulationProgram pdu looping] [receipt 1] DisPduType 01 ENTITY_STATE Entity #1, s
```

Output x Search Results Versioning Output Notifications Usages Terminal - ...am Files/NetBeans-12.6/netbeans/bin Test Results

icsMV3500 - C:\x-nps-gitlab\NetworkedGraphicsMV3500 x opendis7-java (test) x opendis7-java (run-single) x opendis7-java (run-single) x MV3500 examples (run-single) x

```
[DisThreadedNetworkInterface PduRecorder] close(). pduSendSize() + pduRecvSize() + pduSize() + pduSize() + pduSize() + pduSize()
[DisThreadedNetworkInterface PduRecorder] datagramSocket.leaveGroup address=239.1.2.3 port=3000 isClosed()=true close() complete.
*** killThread() status: sendingThread.isAlive()=false sendingThread.isInterrupted()=true
*** killThread() status: receiveThread.isAlive()=false receiveThread.isInterrupted()=true
*** Thread close status: sendingThread.isAlive()=false receiveThread.isAlive()=false

PduRecorder.stop() closing recorder log file: C:\x-nps-gitlab\NetworkedGraphicsMV3500\examples\pduLog\PduCaptureLog.dislog
[OpenDis7Examples.ExampleSimulationProgram] complete.
BUILD SUCCESSFUL (total time: 10 seconds)
```

## 6. *Community*: Get involved

We are opening everything up and sharing the fun!

# Discussion

Lots of ideas, no shortage of worthwhile work to pursue...

# Contact

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