# Fusion Data Framework Documentation

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# ABOUT FDF

Fusion Data Framework (FDF) is a data access, management, and visualization framework for magnetic fusion experiments.

Repository: https://github.com/Fusion-Data-Framework/fdf

HTML Documentation or PDF Documentation

Submit bugs or feature requests: https://github.com/Fusion-Data-Framework/fdf/issues

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To contribute to the FDF project, please contact John, David, Kevin, or Howard.

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# USER GUIDE

This guide is for people who want to use FDF without contributing to the FDF code repository (https://github.com/Fusion-Data-Framework/fdf).

HTML documentation is available here: http://fusion-data-framework.github.io/fdf/

To use FDF on the PPPL Linux cluster (`portal.pppl.gov`), load the module nstx/fdf (you may need to unload other nstx modules):

```
[sunfire06:~] % module load nstx/fdf
[sunfire06:~] % module list
Currently Loaded Modulefiles:
1) torque/2.5.2      5) idl/8.2           9) java/v1.6
2) moab/5.4.0        6) nstx/treedefs    10) nstx/mdsplus5
3) ppplcluster/1.1   7) nstx/epics       11) nstx/fdf
4) freetds/0.91      8) nstx/idldirs
```

Verify that python points to `/p/fdf/anaconda/bin/python`:

```
[sunfire06:~] % which python
/p/fdf/anaconda/bin/python
```

If python does not point to `/p/fdf/anaconda/bin/python`, then PATH contains to a different python distribution ahead of `/p/fdf/anaconda/bin`. In this case, you need to modify PATH so `/p/fdf/anaconda/bin` is the first python distribution in PATH.

Finally, you can launch python and import the FDF package:

```
[sunfire06:~] % python
Python 2.7.10 |Anaconda 2.3.0 (64-bit)| (default, Sep 15 2015, 14:50:01)
[GCC 4.4.7 20120313 (Red Hat 4.4.7-1)] on linux2
Type "help", "copyright", "credits" or "license" for more information.
Anaconda is brought to you by Continuum Analytics.
Please check out: http://continuum.io/thanks and https://anaconda.org
>>> import fdf
>>>
```

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# PACKAGE REFERENCE

## 5.1 Module factory.py

Root module for the FDF package.

**Classes**

- Machine - root class for the FDF package
- Shot - shot container class
- Logbook - logbook connection class
- Container - diagnostic container class
- Node - mdsplus signal node class
- FdfError - error class for FDF package

**Usage**:

```
>>> import fdf
>>> nstx = fdf.Machine('nstx')
>>> nstx.s140000.logbook()
>>> nstx.addshots(xp=1048)
>>> nstx.s140000.mpts.plot()
```

## 5.2 Class Machine

**class** factory.**Machine**(*name='nstx'*, *shotlist=[]*, *xp=[]*, *date=[]*)

Factory root class that contains shot objects and MDS access methods.

Basic class initialization is performed as follows: >>>nstx = Machine(name='nstx')

the Machine class contains a model shot object: nstx.s0

shot data can be accessed directly through the Machine class: >>> nstx.s141398 >>> nstx.s141399

alternatively, a list of shot #'s may be provided during initialization: >>>nstx = Machine(name='nstx', shotlist=[141398, 141399])

or added later using the addshot method: >>>nstx.addshot([141398, 141399])

## 5.3 Class Shot

**class** factory.**Shot**(*shot*, *root=None*, *parent=None*)

## 5.4 Class Logbook

**class** factory.**Logbook**(*name='nstx'*, *root=None*)

## 5.5 Module fdf_signal.py

fdf-signals.py - module containing Signal class

**Classes**

- Signal - signal class for data objects

Created on Tue Jun 23 2015

@author: hyuh

## 5.6 Class Signal

**class** fdf_signal.**Signal**(***kwargs*)

sig=fdf.Signal(signal_ndarray, units='m/s', axes=['radius','time'], axes_values=[ax1_1Darray, ax2_1Darray], axes_units=['s','cm']

e.g.: mds.Signal(np.arange((20*10)).reshape((10,20)), units='keV', axes=['radius','time'], axes_values=[100+np.arange(10)*5, np.arange(20)*0.1], axes_units=['s','cm'])

or an empty signal: s=mds.Signal() default axes order=[time, space] sig=fdf.Signal(units='m/s', axes=['radius','time'], axes_values=[radiusSignal, timeSignal])

## 5.7 Module fdf_globals.py

fdf_globals.py contains package-level constants

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@author: ktritz

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