Between Shots TRANSP Web Service

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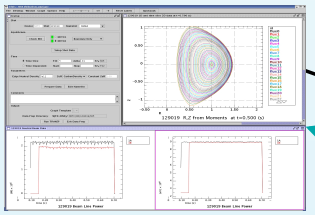
1. Graphical User Interface



Set up TRANSP run from Java application.

Sends requests to data prep system on cluster.

Receives graph data.

Submits TRANSP run.

Requests

Graph Data

2. Web Server

Access from anywhere on Internet.

Receives requests from TRANSP client.
Forwards service requests to servlet.
Returns graph data for display.

5. Compute Service

Command Line I/O Controller

Pseudo-Terminal

Special I/O channel that suppresses buffering. Sends interactive commands entered by user to the Python interpreter.

Python Interpreter

TRANSP Data Prep System

Python interpreter processes command lines received from client. Invokes class methods that extract shot data, create graphs, compute input files, and submit TRANSP run. Commonly used functions are assigned to buttons in user interface. Advanced users can enter command lines or invoke scripts to access more features and prototype new interfaces.

Jython (Java implementation of Python) enables integration with ElVis Java API.

TRANSP Input Files

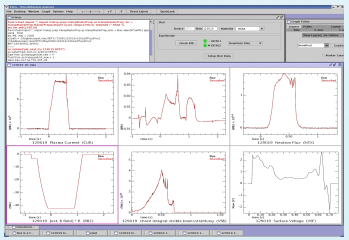
User Files

Manage Session

ElVis XML

ElVis Java API

User enters NSTX shot number



Signals retrieved from MDSplus database for a recent shot on NSTX.

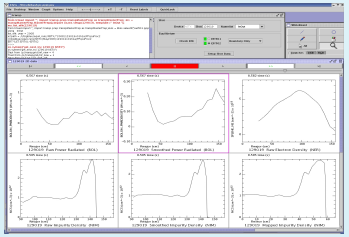
Multi-Tier Architecture
Distributes Functionality

3. Portal Server

Register sessions.
Manage credentials.

Visualization Servlet

Credentials



Examine multiple *f(x,t)* flux surfaces with time-indexed animation.

4. myProxy Server

X.509 Certificates

Convenient for authenticated, off-site user: Enter name and password instead of managing files.

6. Experiment Data

MDSplus Database

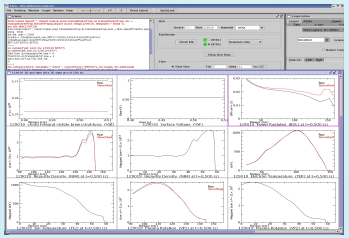
Acquired Shot Data

Processed EFIT Data

7. TRANSP Run System

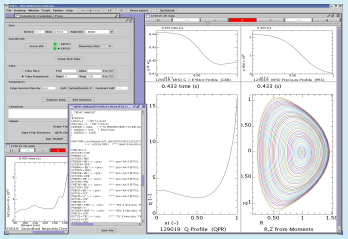
Transport analysis program calculates plasma transport properties based on selected shot. Time slice or time dependent cases are run. Advanced users can edit the namelist for specific results.

TRANSP results typically available within 5 minutes after job submission. Processed by production system on PPL compute cluster.

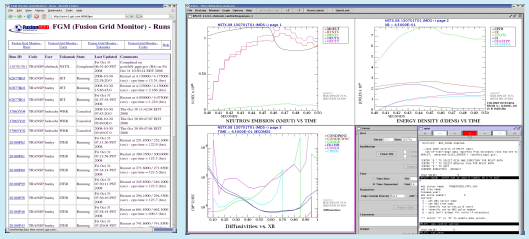


Prepare time slice or time dependent TRANSP run. Physicists can visually verify input data shown in graphs.

`http://w3.pppl.gov/elvis`



Namelist editor to check and modify parameters not in GUI. Submit run to production system.



Monitor & view TRANSP run:

Neutron emission

Energy density

Diffusivities

Physicists can adjust operating parameters of subsequent shots based on TRANSP runs of prior shots. Examine local changes of computed values.

Physics calculations validate diagnostics acquired from experiment.