VISA Development Status

27th September 2024

NEUTRONS
FOR SOCIETY

Outline

- New features (in prod)
  - Multiple cloud provider support
  - File transfer component
  - Printing from VISA instance to local printer

- Recent developments (dev branch)
  - Migration to Quarkus framework
  - Websocket improvements

- Development plans

- Usage statistics at the ILL

NEUTRONS
FOR SOCIETY

New features

Multiple cloud provider support (October 2022)

- Allow instances to be created on different clouds

- Current situation at the ILL: upgrade of infrastructure
  - Allows seamless migration from one provider to another

- Different resources can be available on each cloud
  - Reserve resources for specific users

- VISA Admin can dynamically add a new provider

NEUTRONS
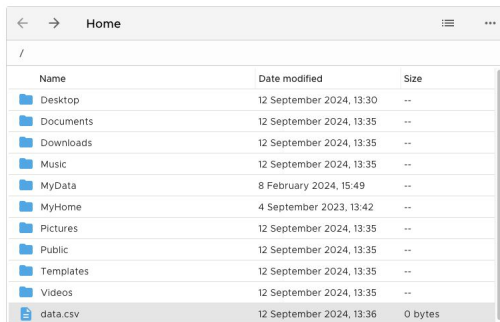FOR SOCIETY

New features

File transfer (November 2023)

- Simplify transfer of files between user's computer and instance
  - Previously possible only via JupyterLab

- Add a graphical component to the VISA Angular client to give access to the instance file system

- Two open-source projects added to @illgrenoble on GitHub
  - **node-fs-api**: web-server providing HTTP access to filesystem commands (eg ls, writeFile, rm, cp, mv, mkdir, rmdir) - deployed to each instance
  - **ngx-fs-client**: Angular component renders data from node-fs-api

- VISA automatically determines if node-fs-api is running
  - ngx-fs-client component rendered if available

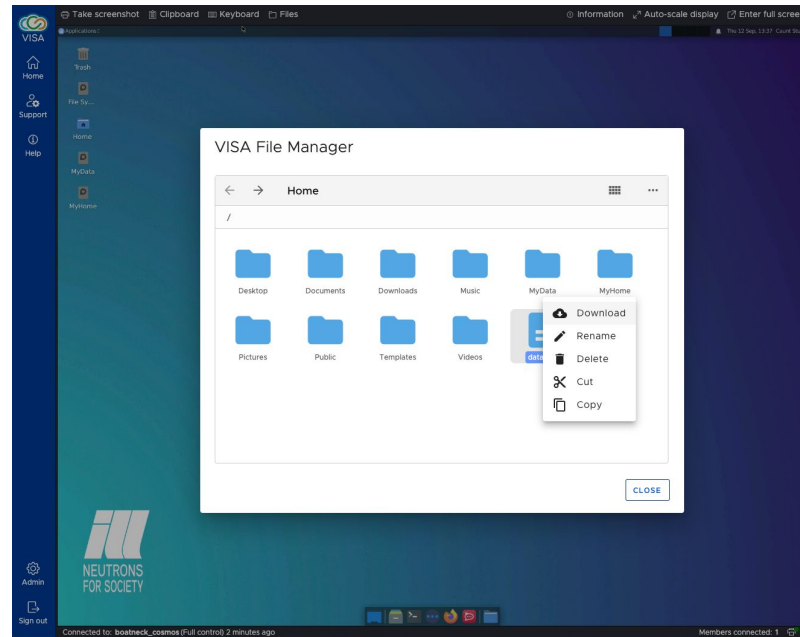NEUTRONS
FOR SOCIETY

New features

File transfer

- Angular component provides standard file manager functionality
  - Browse and navigate folder contents
  - File upload and download
  - Drag and Drop files and folders
  - Cut/Copy/Delete actions
  - Create new files and folders
  - Rename files and folders
  - View as icons or list

THE EUROPEAN NEUTRON SOURCE

NEUTRONS FOR SOCIETY

New features

Printing to local printer (January 2024)

- User request to print from VISA desktop to a local printer

- Add a CUPS driver that will send PDF files to VISA client and automatically open up the print dialog of the browser

- Three open-source projects added to @illgrenoble
  - **visa-cups**: adds default CUPS driver to instance to manage print requests
  - **visa-print-server**: websocket server to allow connections from VISA clients and send PDFs to clients (local REST API) - deployed to each instance
  - **visa-print-client**: Angular component to connect websocket and open print dialog when PDFs received

- VISA automatically determines if visa-print-server is running
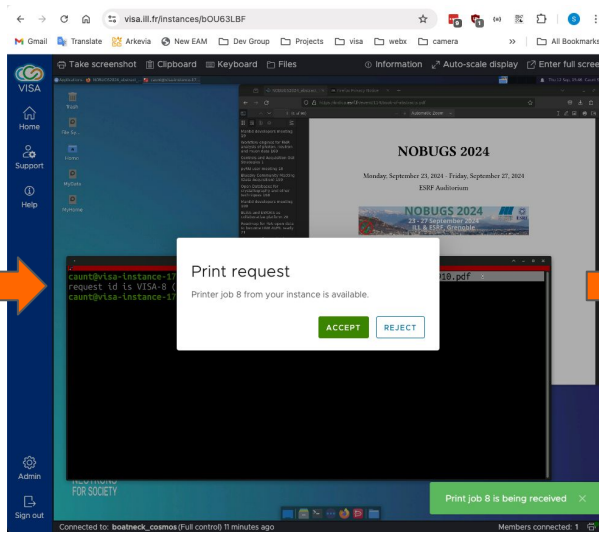 - Websocket connection made if available

NEUTRONS FOR SOCIETY

New features
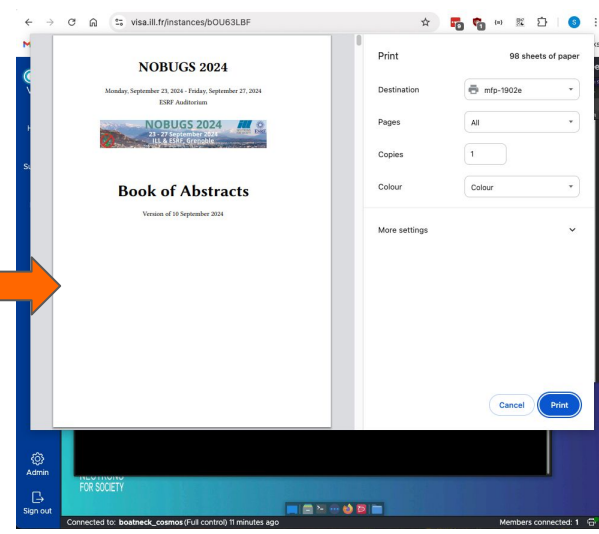## Printing to local printer

- User can print via user interfaces or command line

$ lp filename.pdf
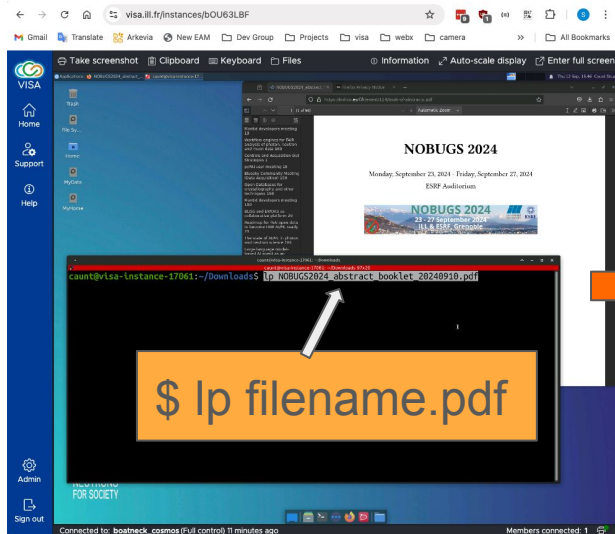
Command to print to
default printer

Request received by
VISA client (owner only)

User prints with standard
browser dialog

THE EUROPEAN NEUTRON SOURCE

NEUTRONS
FOR SOCIETY

Recent developments

Migration to Quarkus framework

- visa-api-server previously built using Dropwizard

- Maintenance and upgrading becoming difficult
  - Outdated library (lacking in documentation)
  - Upgrading difficult (major API changes)
  - Many third-party libraries used
    - Upgrading Dropwizard breaks other dependencies
    - Not all dependencies maintained and upgradable

- Stuck with Java 14

NEUTRONS
FOR SOCIETY

Recent developments

Migration to Quarkus framework

- Decision made to migrate to Quarkus framework
  - ILL chosen framework (experience gained from other projects)
  - Easier to onboard new developers

- A leading solution for microservice/backend development
  - Excellent user documentation and developer environment
  - Many extensions already included
    - 3rd party libraries reduced from 29 to 7
  - Better for production deployment
    - Native image build possible
  - Now running with Java 21 (LTS)

QUARKUS

Recent developments

Websocket Improvements

- **Phase 1: Replace socket.io** for remote desktop with "traditional" websocket
  - Use official guacamole-common-js library
  - Better performance (socket.io nice for simple messaging but not optimised for high data rate communication)
  - Single web-server: port 8086
- **Phase 2: Implement double websocket**
  - One dedicated to remote desktop protocol (second performance gain)
  - Second used as an events channel
    - Remote desktop events, instances states, notifications, etc
  - Polling removed from client
- Development finished early September
  - Production release aimed for October

NEUTRONS
FOR SOCIETY

Development plans

Remote Desktop improvements

- User experience of the remote desktop a priority
  - Lag can be a problem
- Recent developments (Quarkus + double websocket) now allow for action to improve performance
  - Quarkus native image for compiled back-end
  - Native websocket allows for pure binary data transfer
- WebX can be tested with pure binary socket
  - socket.io/shared socket prevented some performance gains from being propagated to VISA
- Priority to test remote desktop technology
  - Examine solutions such as rustdesk
  - Comparing these to WebX / Guacamole
  - Determine if WebX architecture can be simplified or if a Wayland adapter would be useful

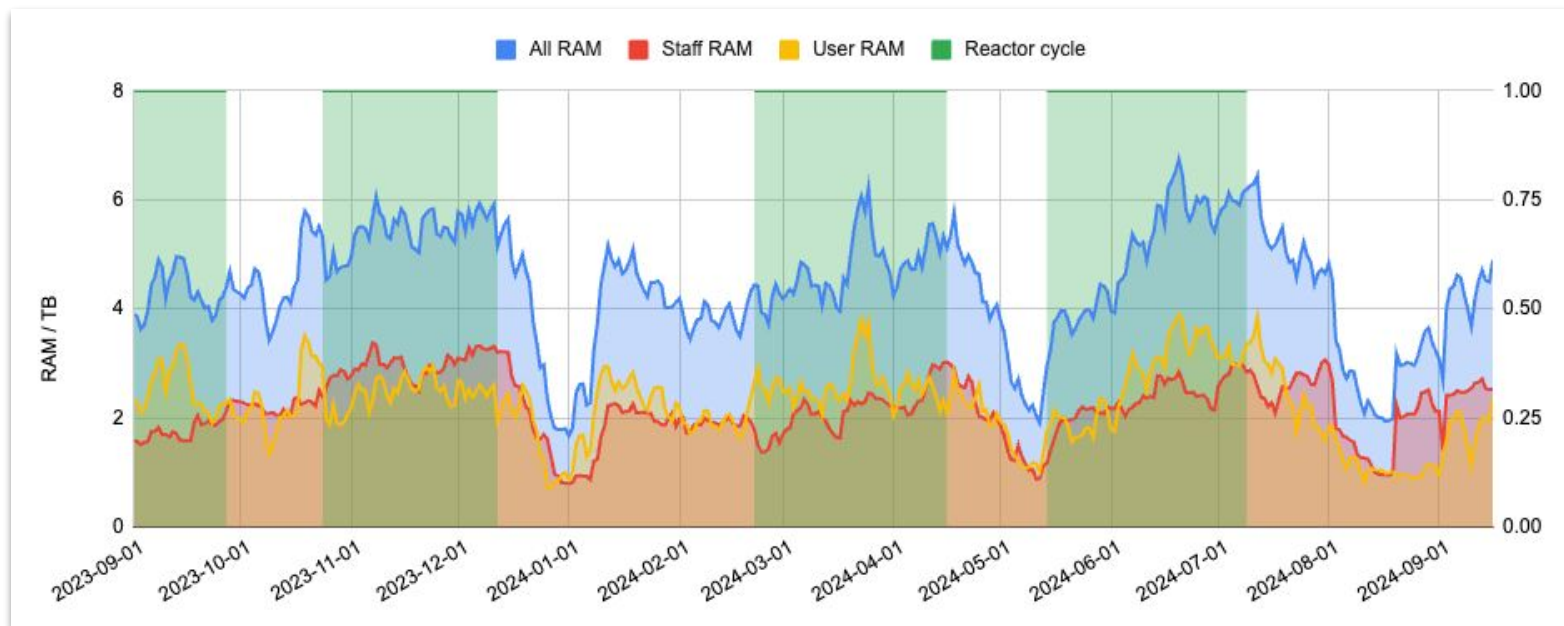NEUTRONS FOR SOCIETY

Usage metrics

Instance counts

- Generally around 100 instances out of reactor cycle
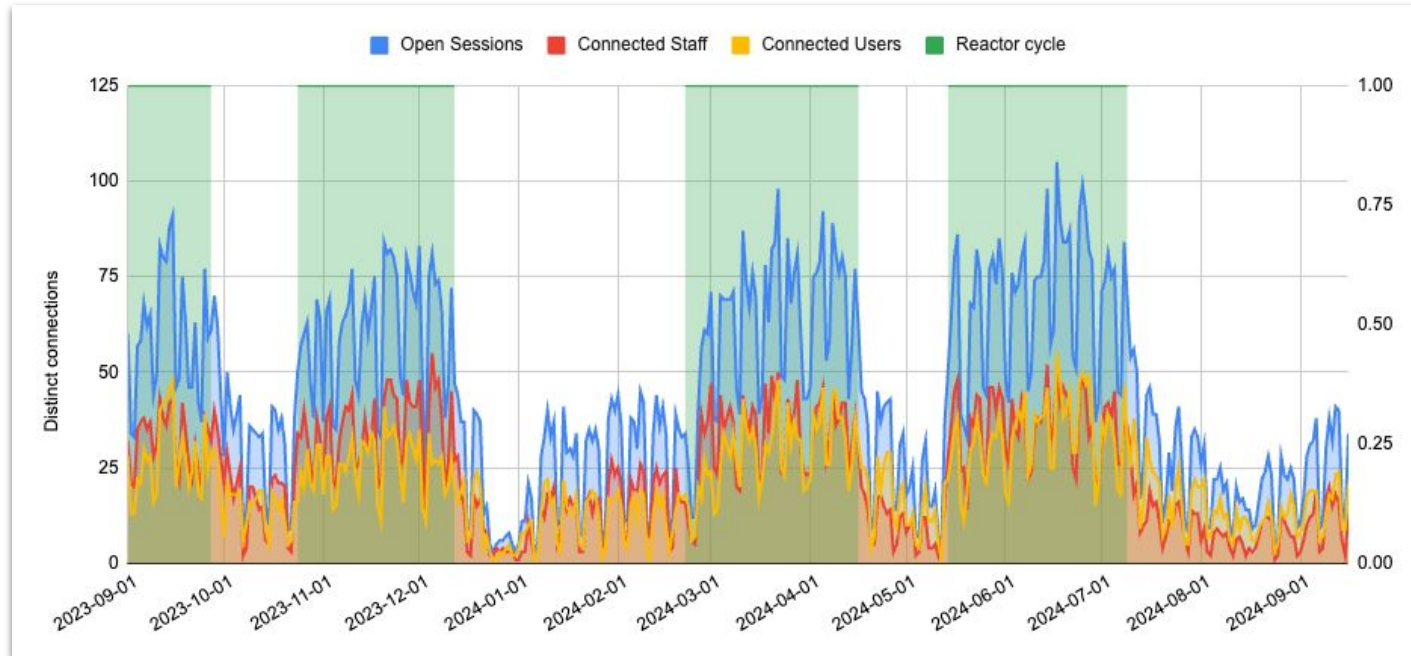- About 200 instances during cycles
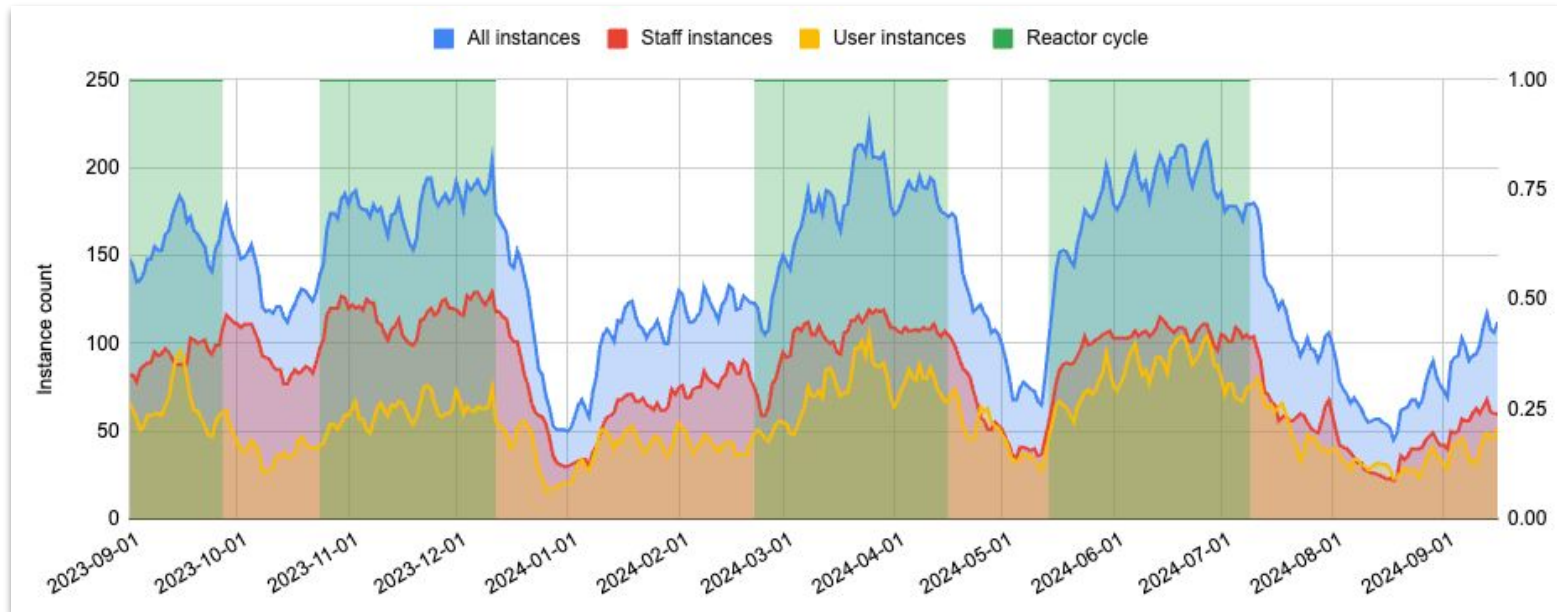
Usage metrics

RAM Usage

- ● RAM is limiting factor of VISA usage
  - ○ Maximum regularly achieve during reactor cycle (6.6TB, was 6.1TB)

NEUTRONS
FOR SOCIETY

Usage metrics

Remote Desktop connections

- Usage during cycles clearly important
- Similar number of connections between staff and external users

Thanks!

INSTITUT LAUE LANGEVIN

NEUTRONS FOR SOCIETY

THE EUROPEAN NEUTRON SOURCE