



Australian Government



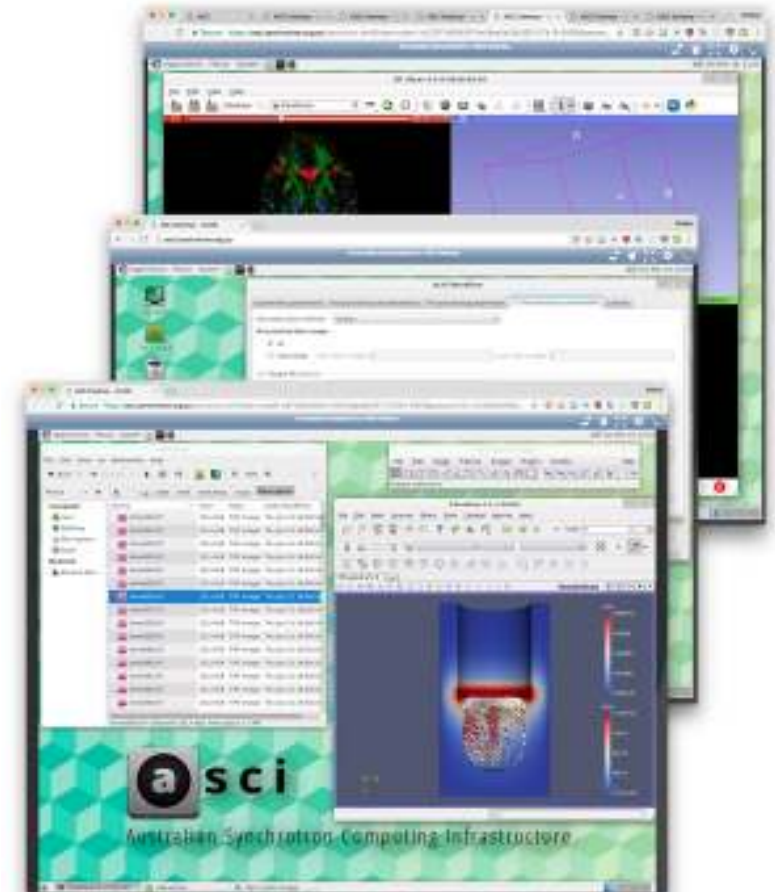
ASCI: Australian Synchrotron Compute Infrastructure

synchrotron.org.au



ASCI

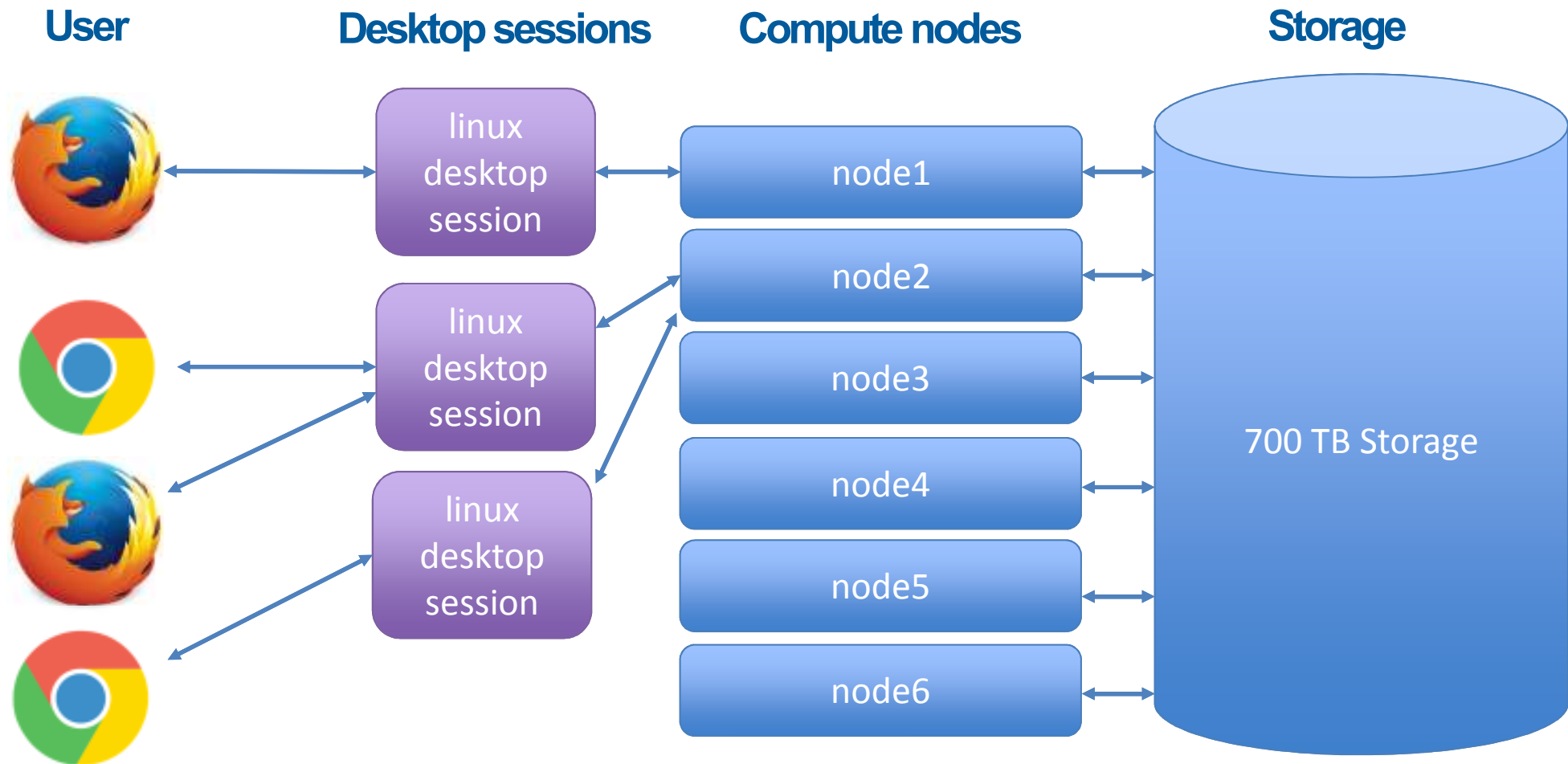
- New high performance compute infrastructure
- Will support:
 - Data processing during experiment
 - Post-experiment processing
- Familiar desktop environment for processing and visualisation backed by powerful compute hardware



Motivation

- MASSIVE M1 cluster hardware is reaching end of life
- Increase flexibility:
 - develop new processing workflows
 - support new applications
- Provide the same processing environment during experiment as post-experiment
- Avoid issues with user authentication and permissions
- Integrating the storage with the compute hardware will increase performance

System



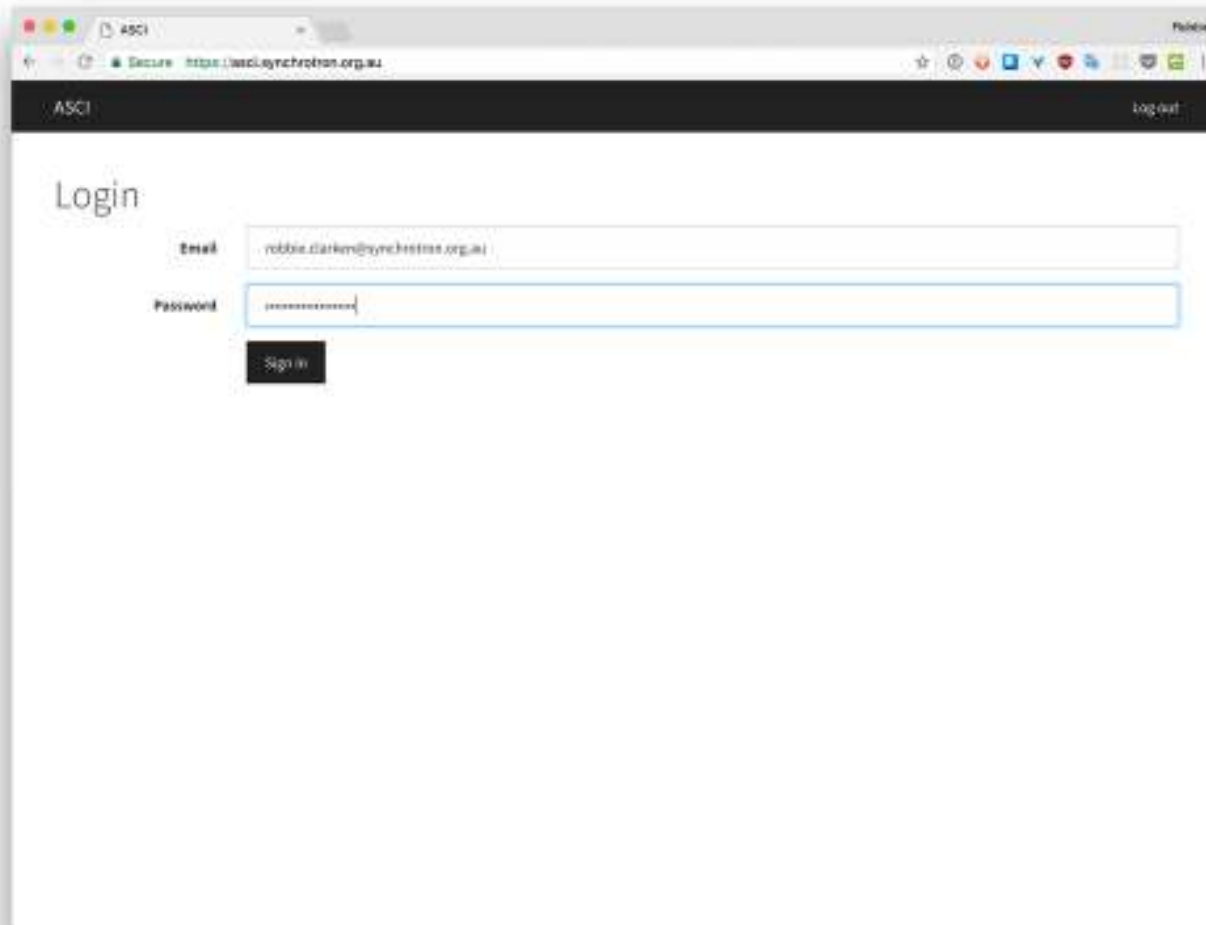
Node Hardware

Each node has:

- 2 x Intel Xeon E5-2650 v4
 - 12 cores / 2.2 GHz
 - With hyper-threading: 48 cores per node
- 2 x NVIDIA GeForce GTX 1080, 8GB
 - 5120 cuda cores per node
- 512 GB RAM
- 480 GB SSD per node
- 2-5 times faster than MASSIVE

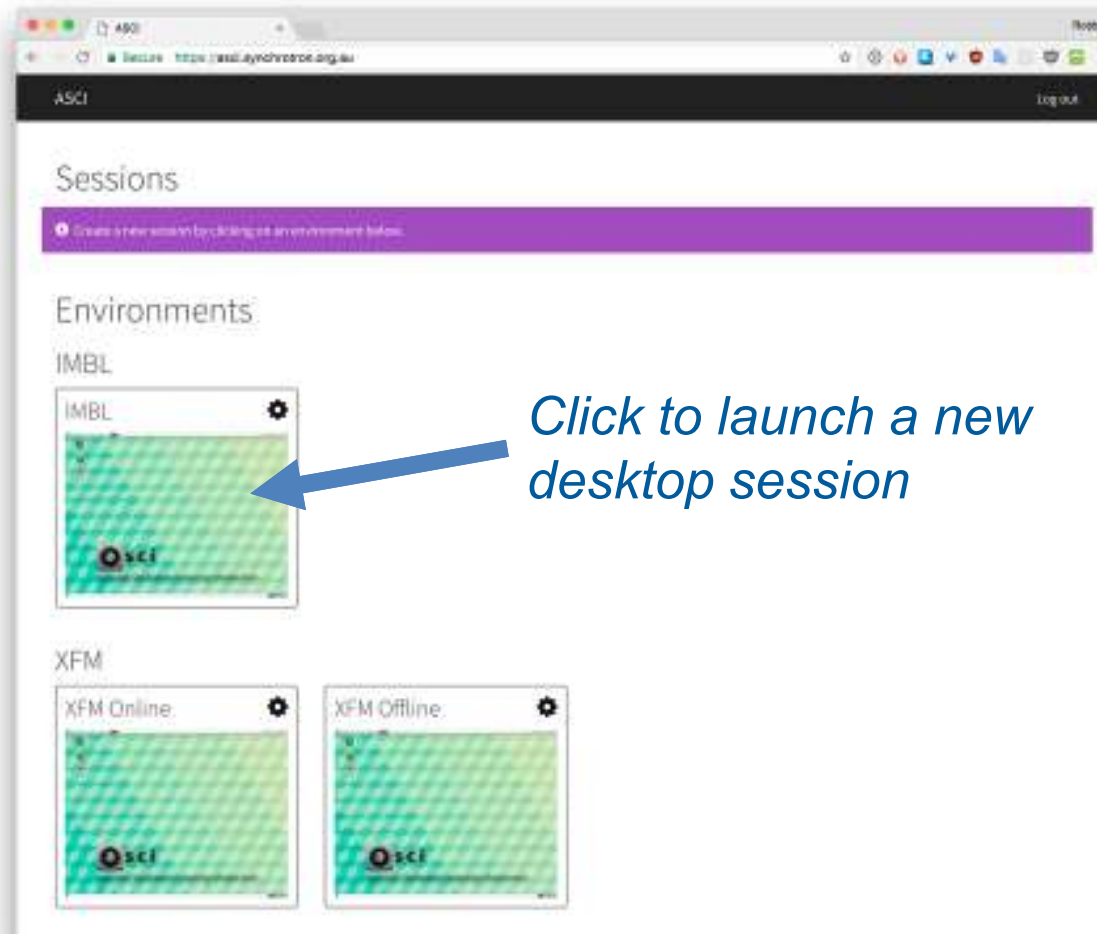


User Perspective

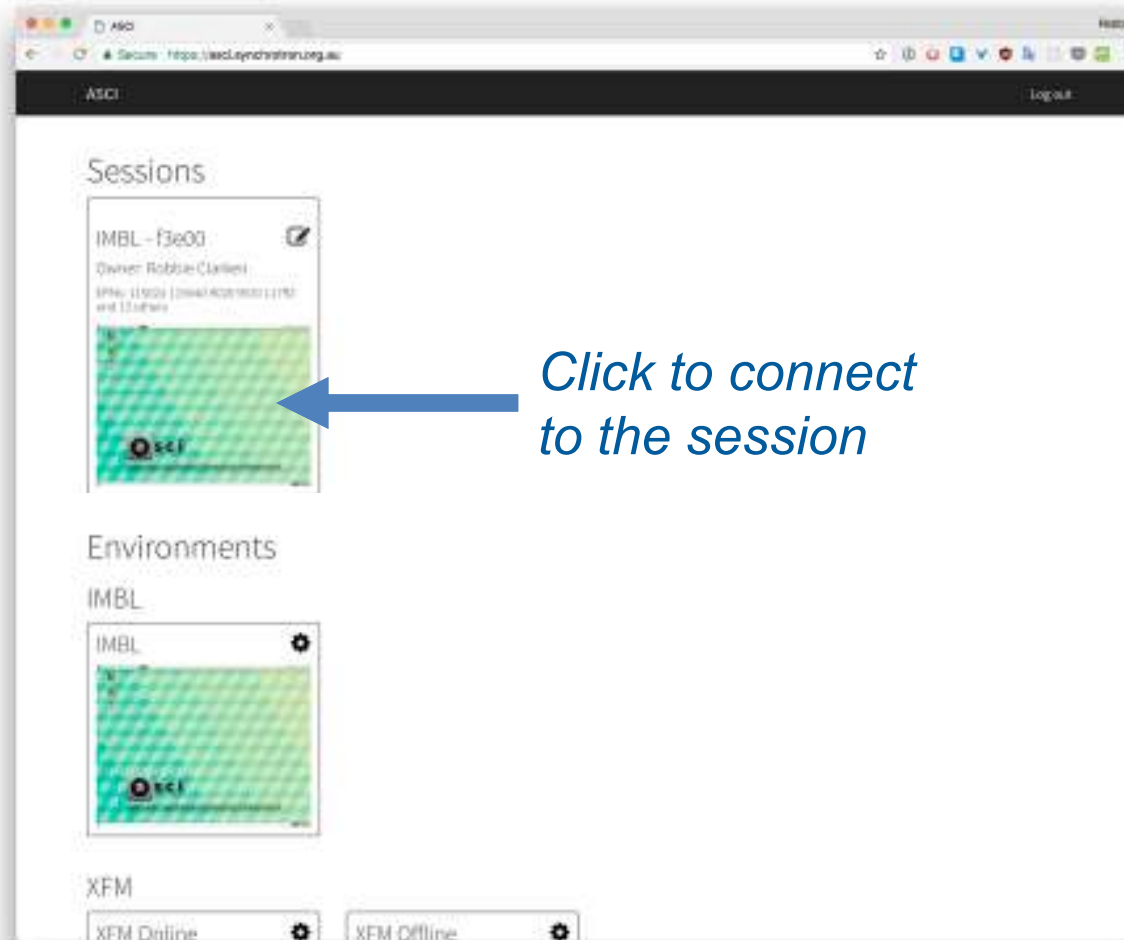


A screenshot of a web browser window showing the login page for the Australian Synchrotron (ASCI). The browser's address bar shows the URL <https://asci.synchrotron.org.au>. The page has a dark header with the text "ASCI" on the left and a "Log out" link on the right. The main content area is white and titled "Login". It contains two input fields: "Email" with the value "robbie.clarke@synchrotron.org.au" and "Password" with masked characters. Below the password field is a black "Sign in" button.

User Perspective



User Perspective



*Click to connect
to the session*

User Perspective



User Perspective



User Perspective

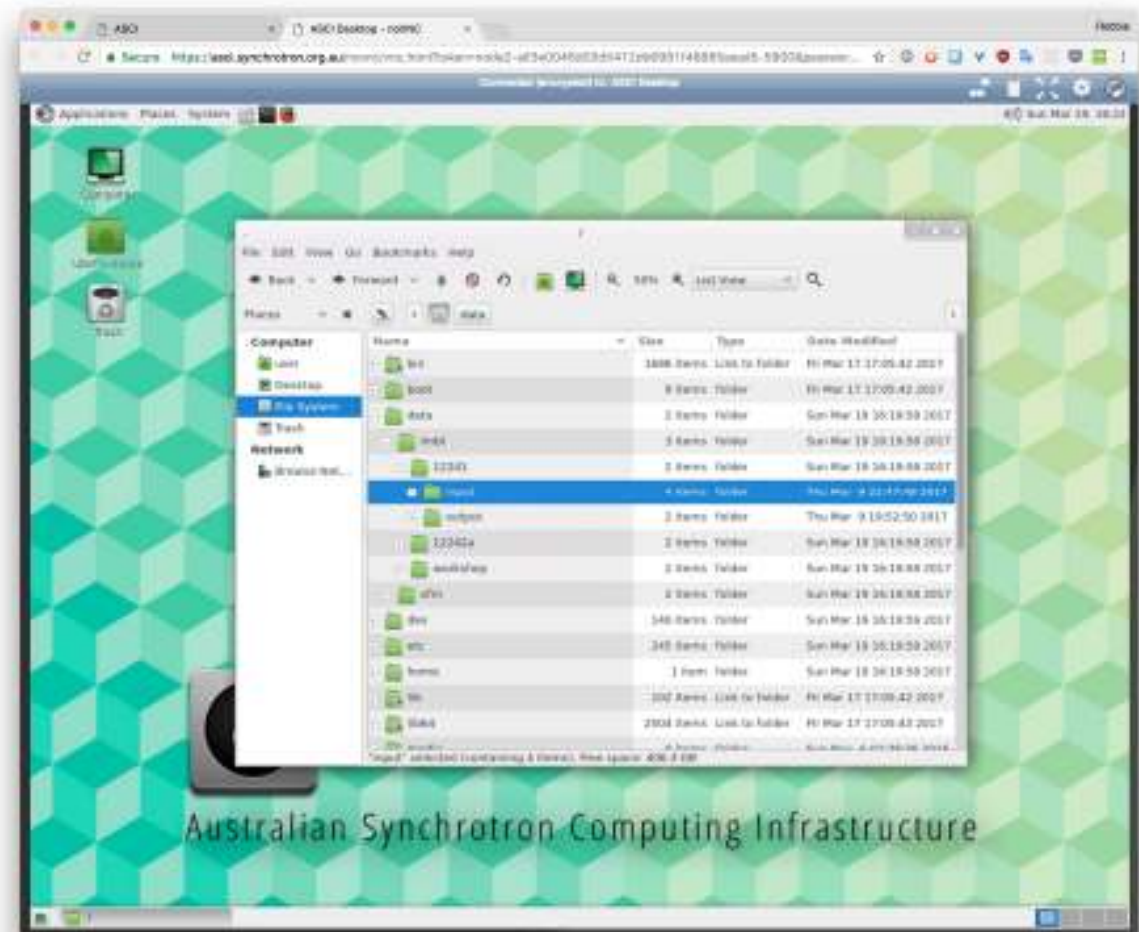
Data is found in

`/data/<beamline>/<epn>`

Eg:

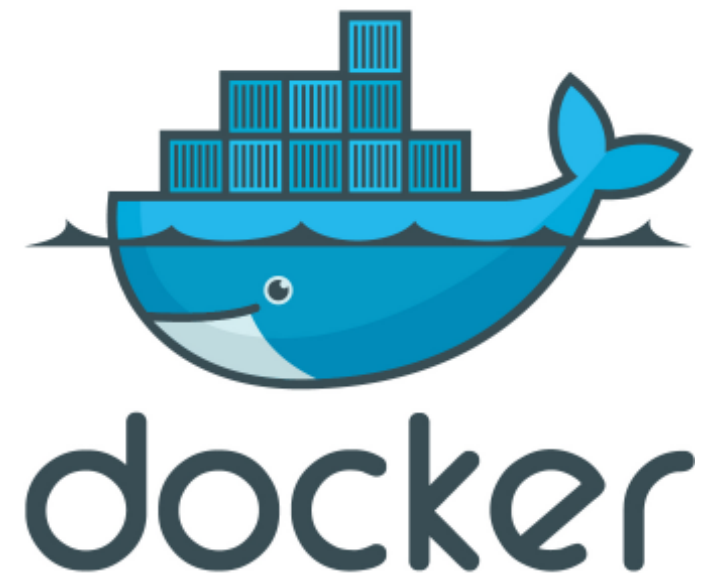
`/data/imbl/12241`

- **input** folder is readonly
- **output** folder is writable
(applications should be set to write processed data here)



What is a “Session”

- Linux container running directly on the node
 - Isolated process environment
 - Processes have direct access to system resources (unlike VMs where there is an emulation layer)
 - Low overhead → can run many sessions on the same node
 - Sandboxed: users cannot read or write to files they haven't been given access to



How long will a session last

- Up to a week: initially we plan to schedule maintenance on ASCI for every week
- As the system matures we will revisit this

Note:

- Changes made inside a container are not saved
- Only data stored inside the experiment folder will be persisted between sessions
- Save all scripts inside the experiment folder

Session resources

- Initially nodes will be allocated per beamline
- Ensure “online” experiment processing have sufficient resources
- All post-experiment IMBL processing will be allocated to a single node
- Sessions on this node will have full access to all RAM, CPU, GPU resources
- If resources become constrained we can add more nodes

node1: IMBL Online

node2: IMBL Offline

node3: XFM Online

node4: XFM Offline

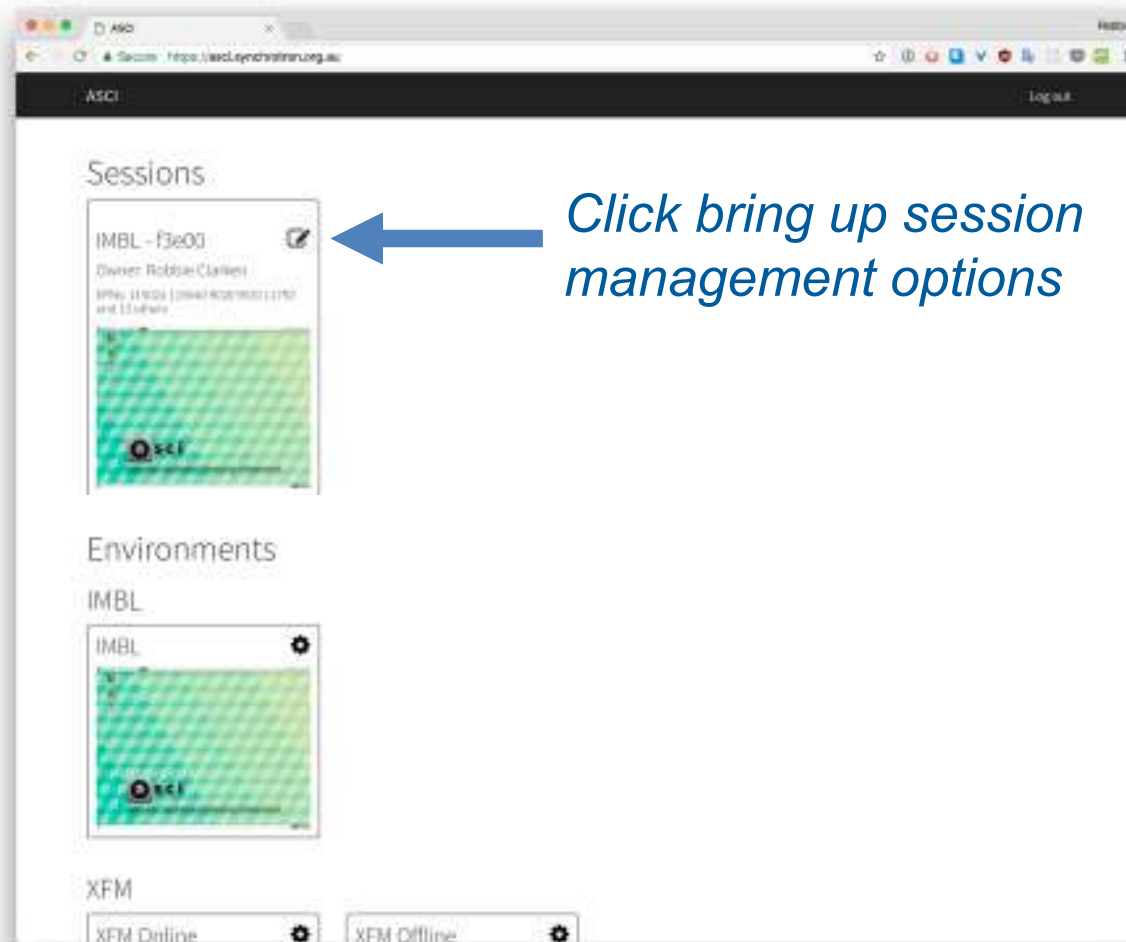
node5: MX2 Online

node6: Development

Session management

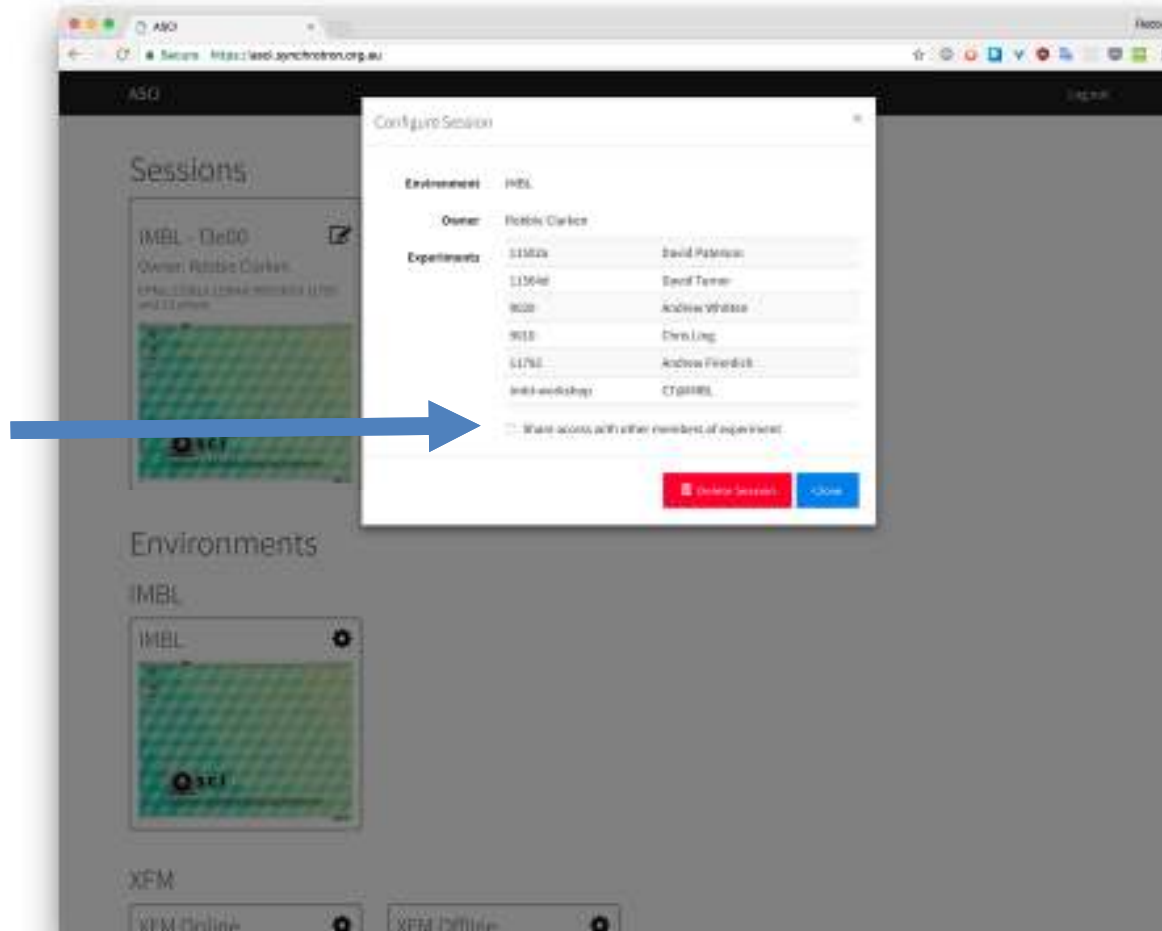
- The user who creates the session is the “owner”
- Initially only the owner can connect to the session
- Owner can share the session:
 - All collaborators of mounted experiments can then connect to the desktop
- When multiple users connect, they each see the same desktop
- Both users can control the mouse cursor and enter keyboard input

Sharing a session



Sharing a session

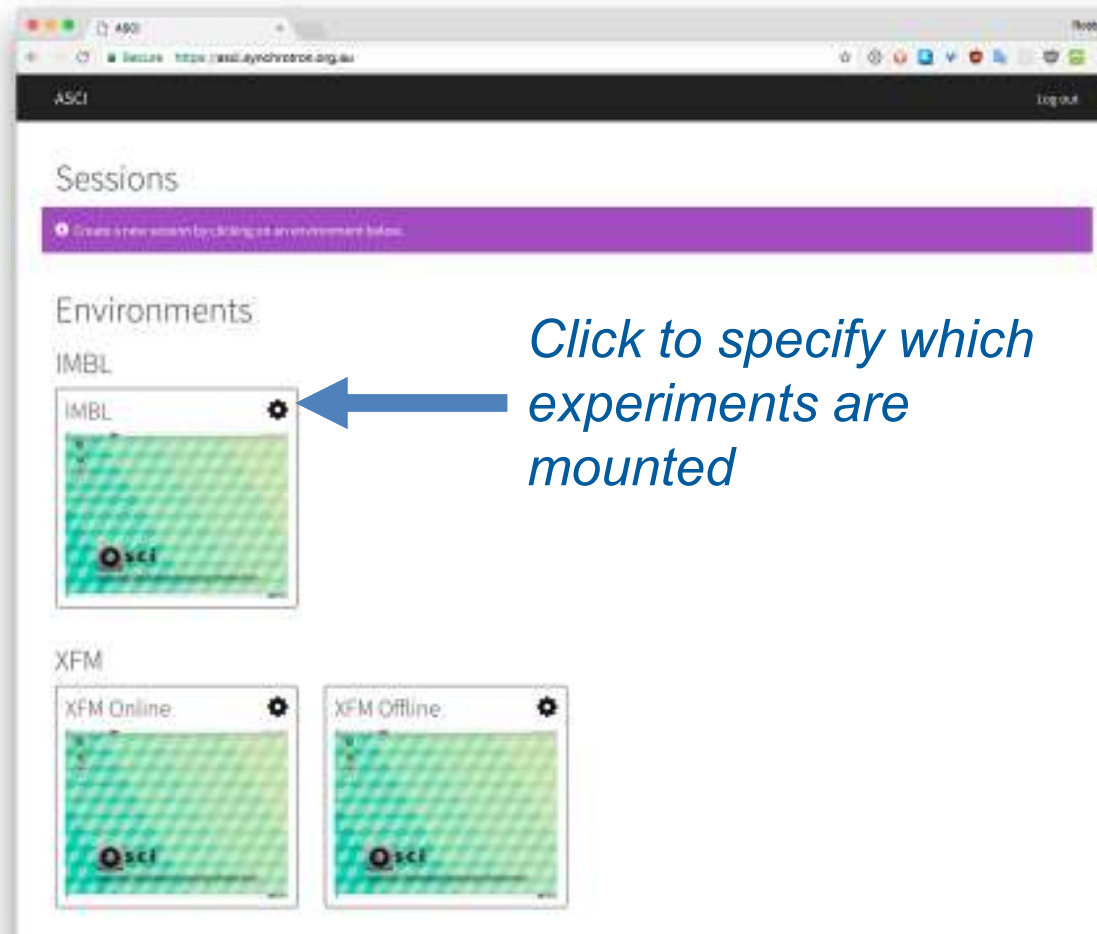
*Click to share
the session*



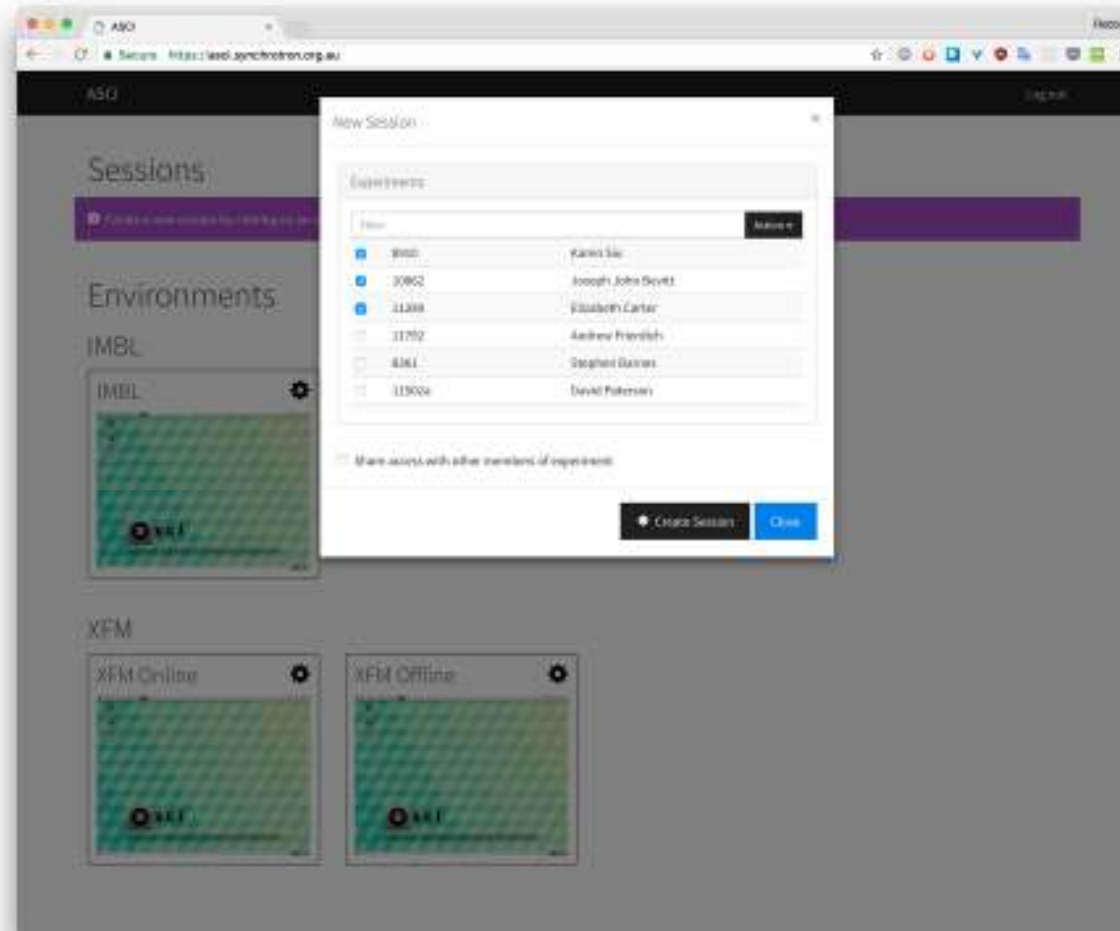
Experiment data

- By default, every experiment you are a member of is mounted
- When you share a session you are granting your collaborators access to every experiment you have mounted
- If you want to restrict which experiments are mounted you must do it before creating the session

Controlling which experiments are mounted



Controlling which experiments are mounted



What is an “Environment”

- Defines the software available inside the session
- Supports versioning to facilitate reproducing analysis
- IMBL environment has:
 - ctas
 - Drishti
 - Fiji
 - ITK
 - ParaView
 - 3D Slicer
 - X-TRACT
- Additional software can be added upon request
- Software needs to run on Linux or under Wine

When will ASCI be available?

- You will get to try the system later today!
- IMBL experiments will be switched over in May
- Remote access to ASCI will follow shortly
- MASSIVE M1 will continue to be supported for the near term
- Please give us feedback so we can design the system to meet your needs