



# Mamba :HEPS Beamline Software System

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The launch of Mamba data acquisition software project is aiming to offer a unified science-oriented software solution for experimental control and data acquisition in the High Energy Photon Source (HEPS) of China, a diffraction limited storage ring synchrotron light source with an estimated completion in 2025. The main features for Mamba is the separation of control and data management functionalities, with the highly layered control part designed on top of the Bluesky (NSLS II) and data management part tailored for HEPS needs using original codes and innovative in-house designed frameworks. Mamba also has a server-client design to make it more user-friendly with sophisticated GUI application developments and automated metadata acquisition schemes.

**Mamba**

Framework Design of Mamba

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Within the Mamba framework, Mamba data worker serves as a data multiplexing and management tool to address challenges of implementing next generation high throughput area detectors and data processing requirements of multimodal experiments in HEPS.

Command Injection Mechanisms      Framework Design of Mamba Data Worker      Flexible Configuration of Data Processing Flow

TUPV045

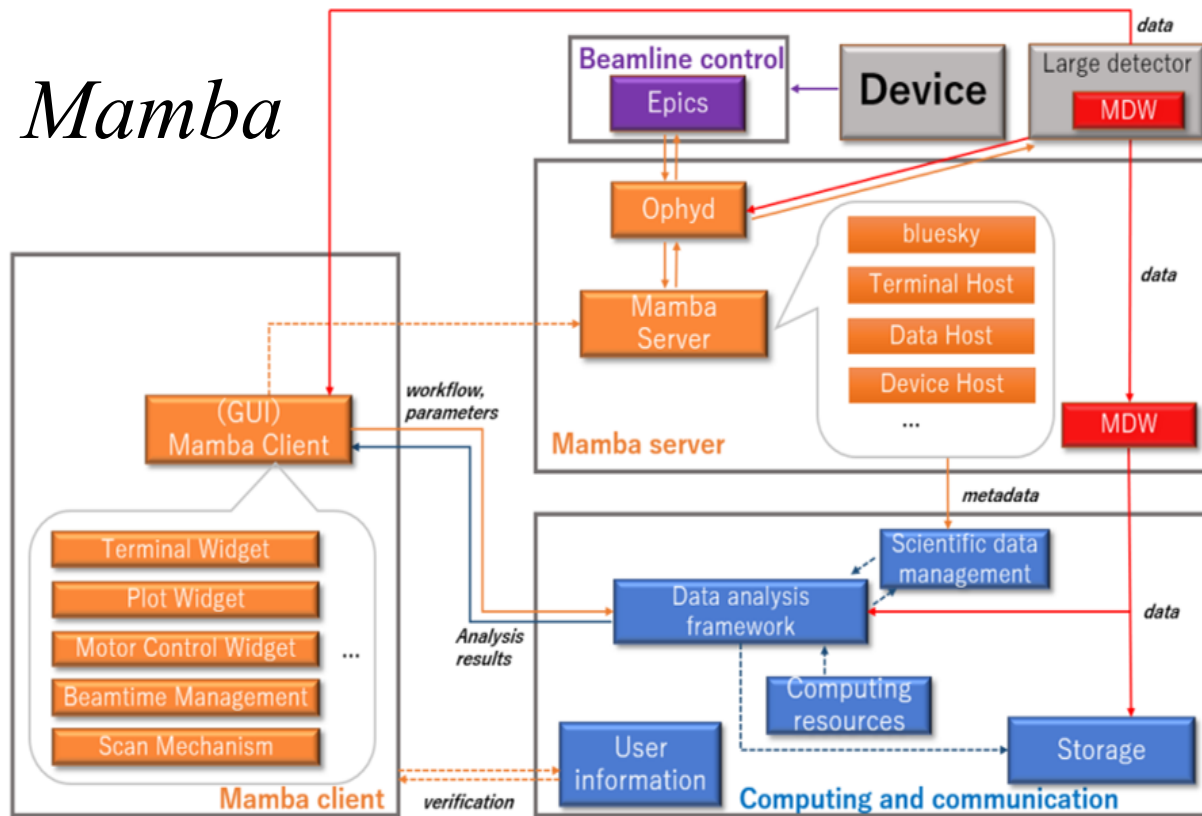
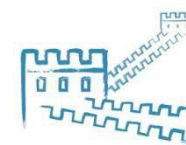
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First year progress of Mamba project

Scan Sequence      Tomography Experiment Software based on Mamba



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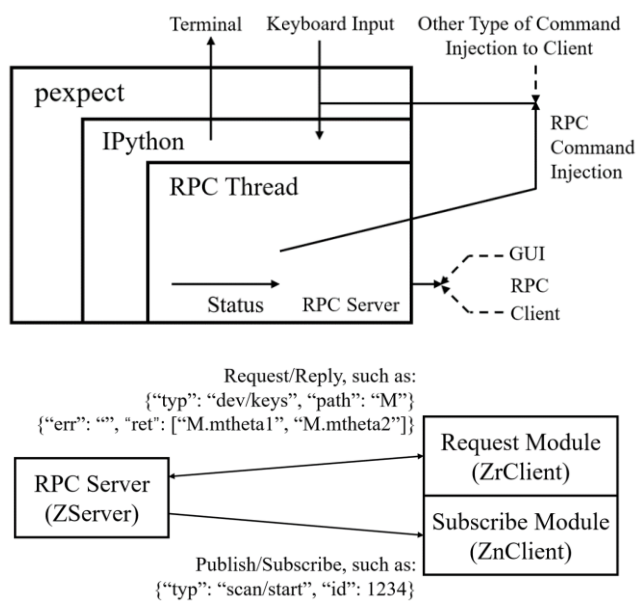


Framework Design of Mamba

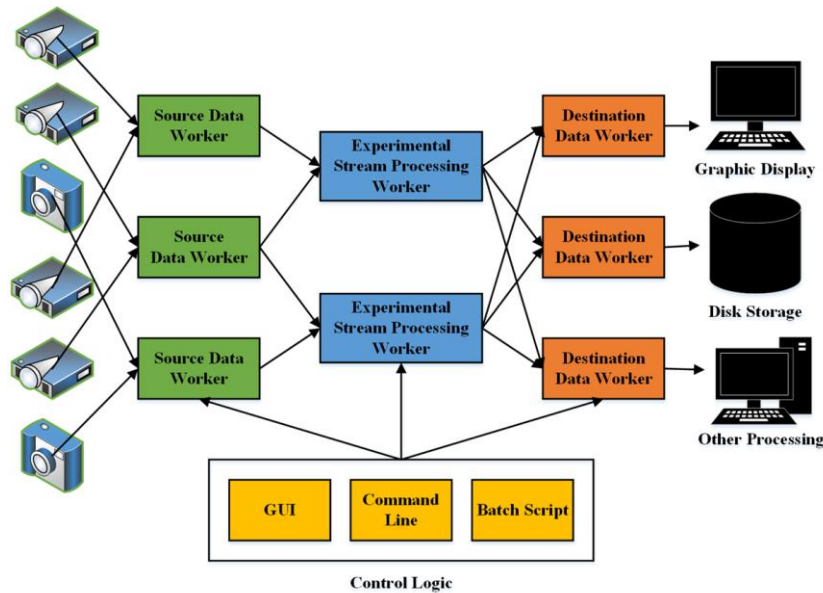




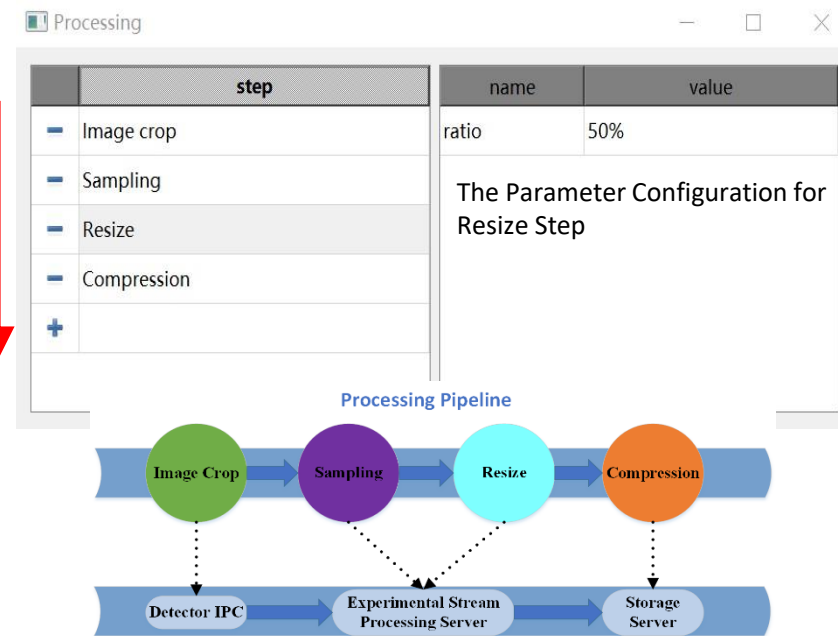
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Command Injection Mechanisms



Framework Design of Mamba Data Worker



Flexible Configuration of Data Processing Flow



# First year progress of Mamba project

Scan Sequence

step	name	value
- Scan	Motor	+
+	Name	
	Start Position	
	Stop Position	
	Number of ...	
	Detector	+
	Name	

Scan Sequence

step	name	value
- Scan	Delay	
- Count		
- MV		
- Sleep		
+		

```

IPython: zhangyi88/mamba
File Edit View Search Terminal Tabs Help
zhangyi88... zhangyi88... IPython: zh... zhangyi88... zhangyi88...
generator scan ['ae9d630a'] (scan num: 5)
In [17]: ('ae9d630a-ed11-44bb-9977-6cbac14a20dd',)
In [18]: post_proc(db[-].documents())
In [19]: M.mSampRot.velocity.set(2.0).wait()
In [20]: from bluesky.plans import scan
In [21]: from bluesky.callbacks import LiveTable
In [22]: RE(scan([D.k648x, D.andor],
                M.mSampRot, 70.0, 250.0, 30), LiveTable([M.mSampRot.name]), md = mzs.s
                tate.mdg.read_advance())

seq_num | time | M_mSampRot
-----|-----|-----
1 | 16:39:45.0 | 70.00000
2 | 16:39:46.7 | 70.60000
    
```

**Left Blade**

0.300 mm Stop

ABS 0.300 mm

REL Open 1.000 mm Close

**Right Blade**

0.200 mm

ABS 0.200 mm

REL Close 1.000 mm

**Bottom Blade**

-3.050 mm Stop

ABS -3.050 mm

REL Close 1.000 mm Open

Mamba

Device Auth

Scan Mechanism

Scan ID	Frame	Status	Elapsed Time	ETA
6	-/-	RUNNING	0:00:06	inf

Scan Definition

Scan ID	Frame	Status	Elapsed Time	ETA
2				

Detectors

Detector
1 - D.k648x
2 - D.andor
3 +

Sequence Definition

Motor

M.mSampRot

Motor Control

Current Position: 71.20

Move to (Abs):

Move to (Rel):

Plot2D

Plot1D

Scan Sequence

Tomography Experiment Software based on Mamba