

# NSCLDAQ: The Present and Future

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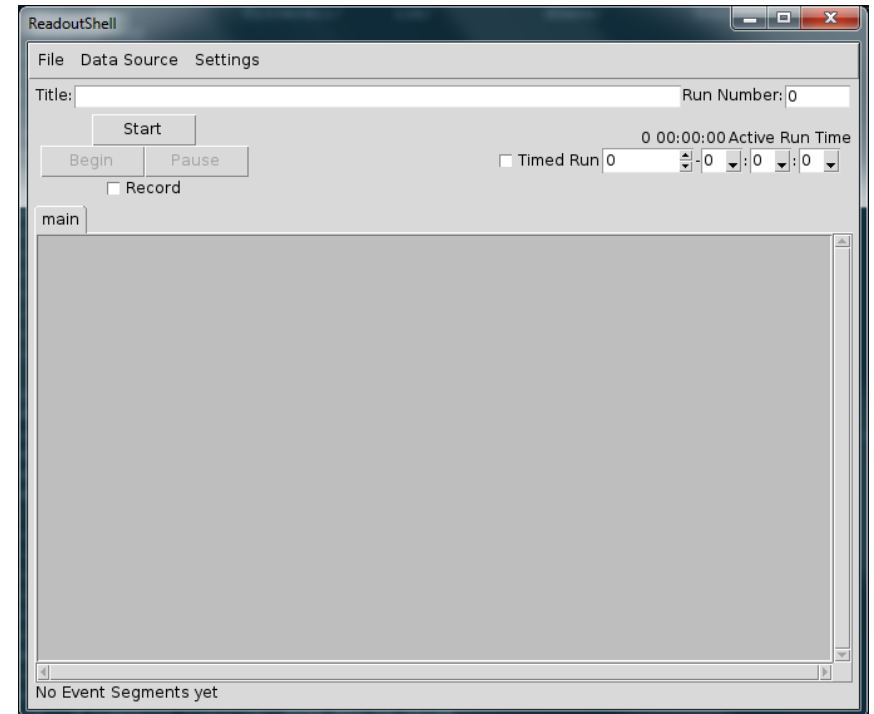
NSCL

# Outline

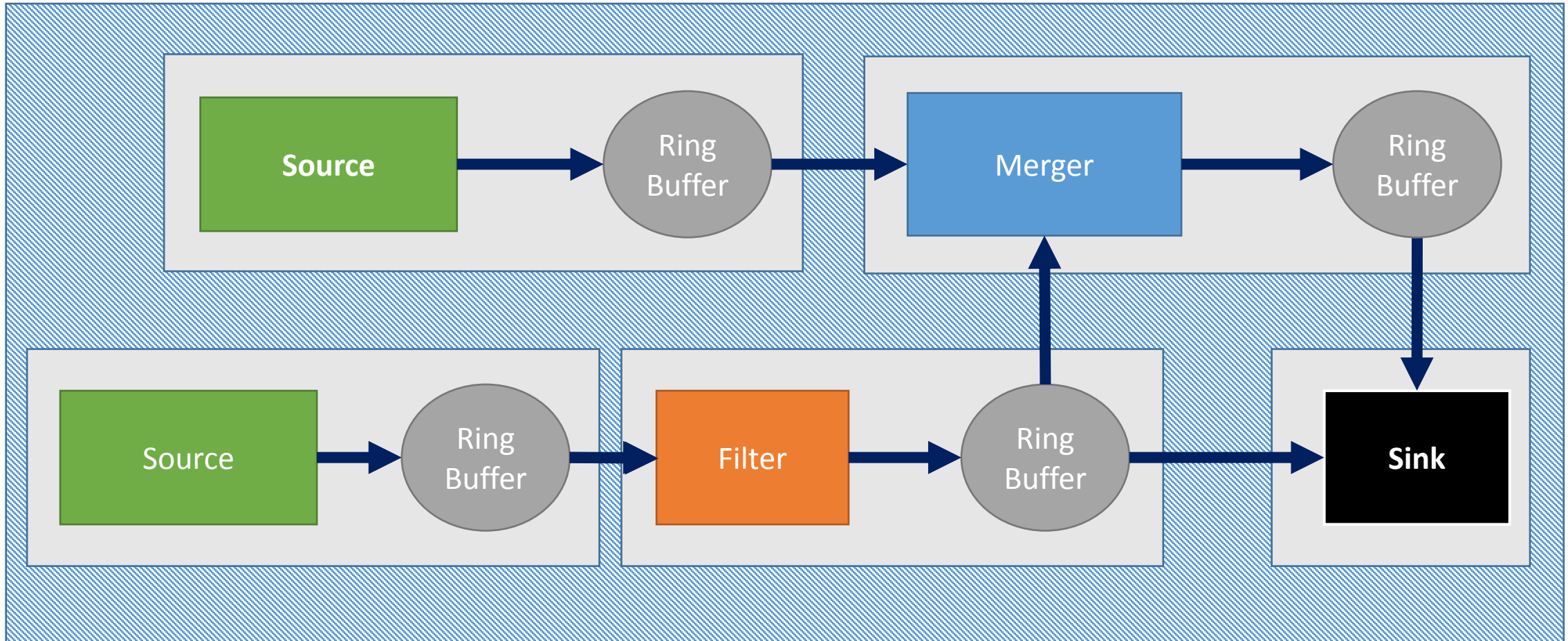
- NSCLDAQ Overview
- The Ring Buffer subsystem
- The Event Builder
- Run control and composing the experiment DAQ
- SpecTcl online analysis support

# What is NSCLDAQ?

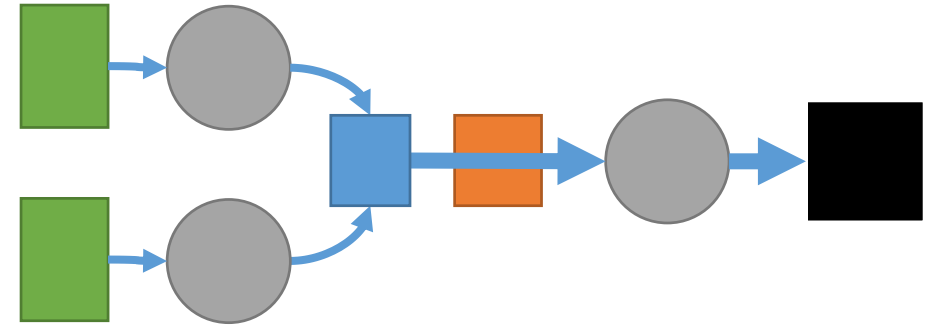
- Suite of applications and services
- Provides data flow management and run control
- Flexible
- Extensible
- Composable
- A set of drivers



# NSCLDAQ Concepts



# The suite...



## Run Control

ReadoutShell

## Data Sources

VMUSBReadout  
CCUSBReadout  
Production Readout  
s800toring

## Filters

BufferToRing  
compatibilitybuffer  
convert10to11  
Filter framework

## Merging

Event Builder  
glom  
teering  
unglom  
ringFragmentSource  
offlineorderer  
startOrderer

## Data Sinks

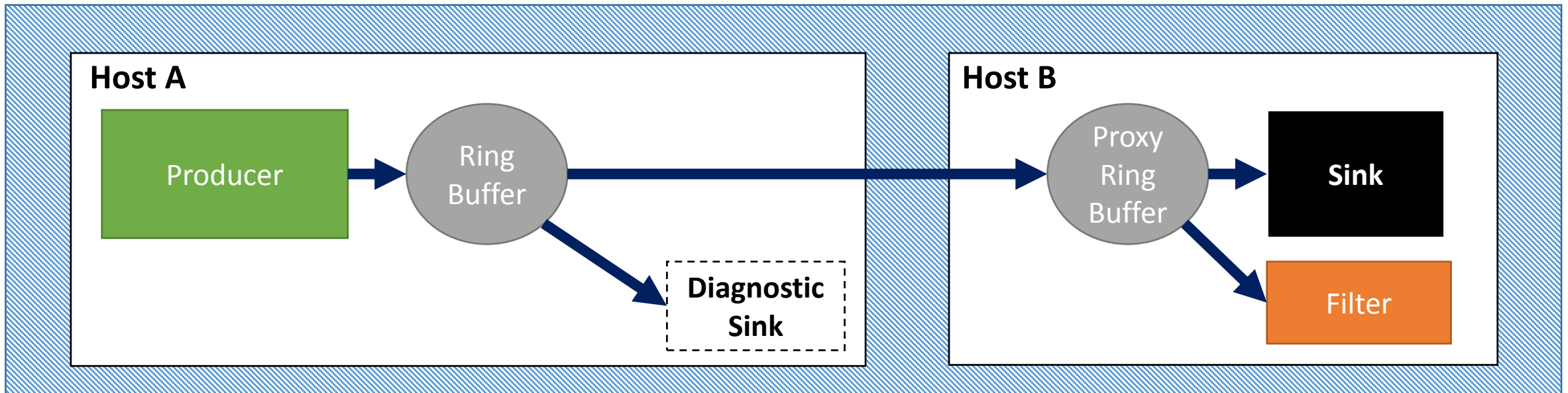
dumper  
ScalerDisplay  
scIClient  
Eventlog  
ringselector

## Buffering/Streaming

ringbuffer  
(RingBuffer API)  
stdintoring  
ringtostdout

# The Ring Buffer Subsystem

- Single producer, multiple consumer
- Network transparency
- Single transmission of data between hosts

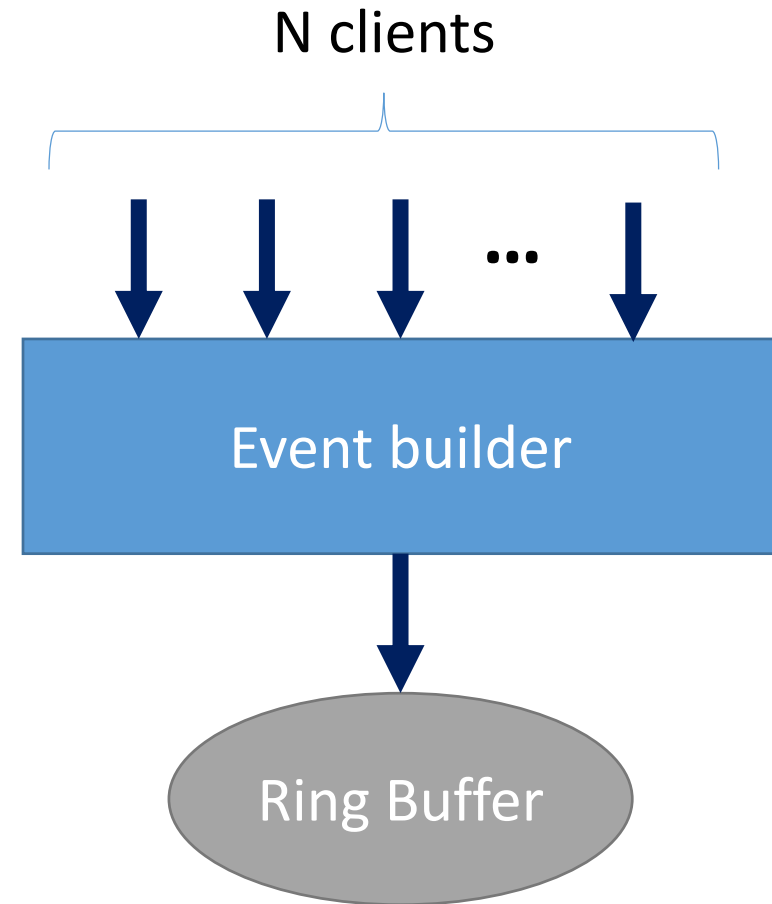


# NSCLDAQ Event Builder

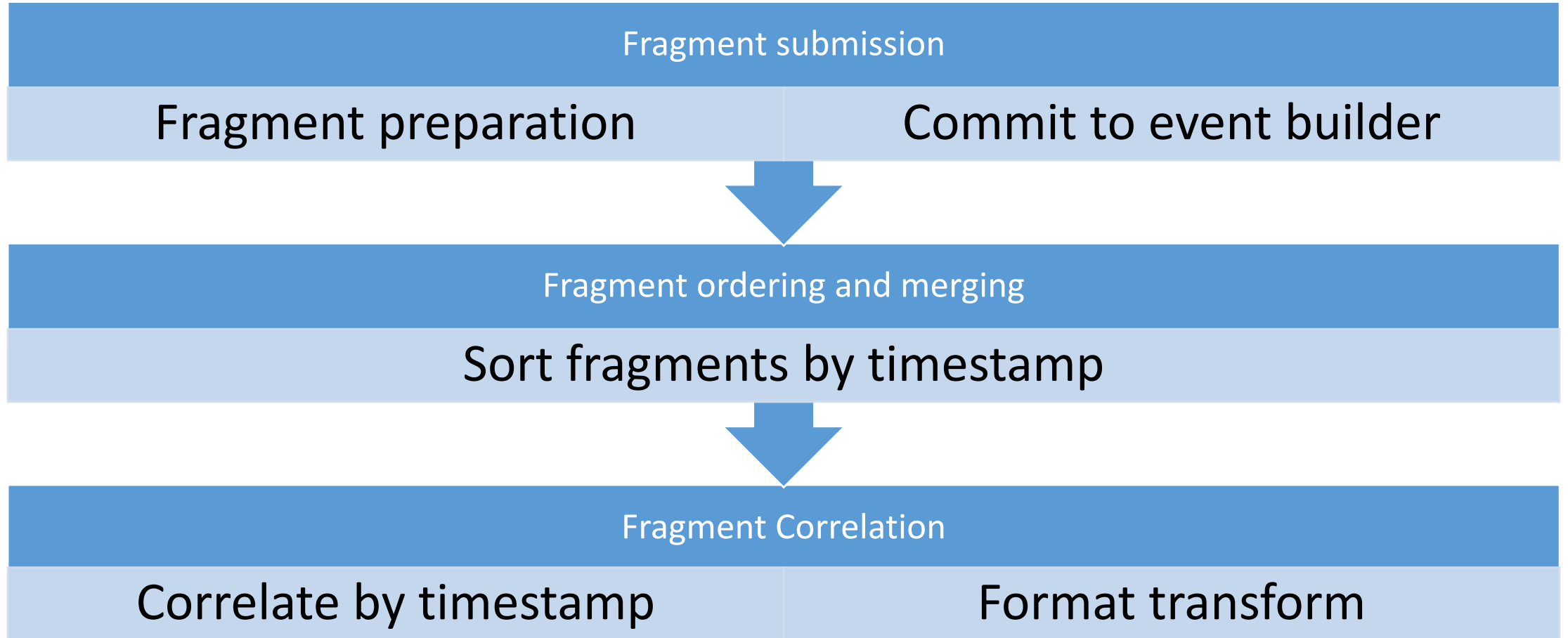
- Online
- Data format agnostic

Fragment Header	Timestamp
	Source identifier
	Payload size
	Synchronization type
<b>Payload</b>	<b>Data...</b>

- N – to – 1 stream merging



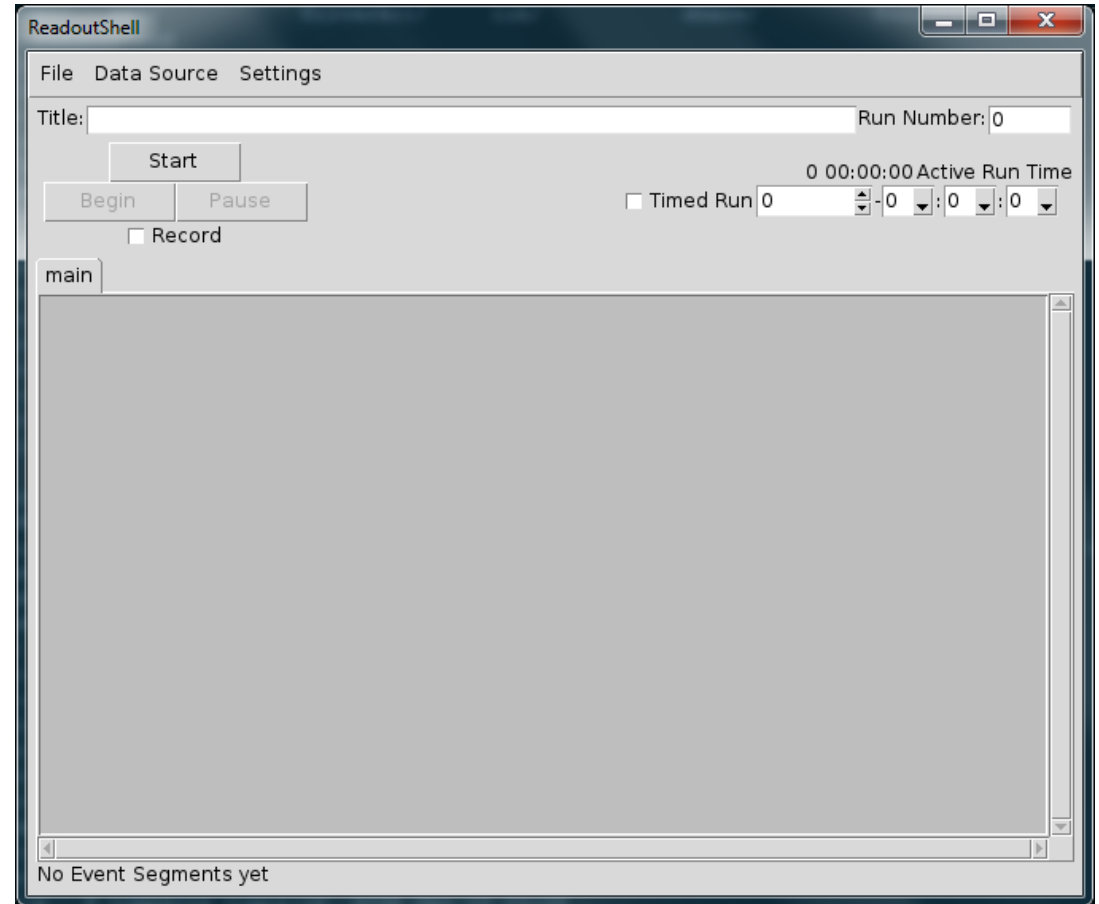
# Event Builder Stages



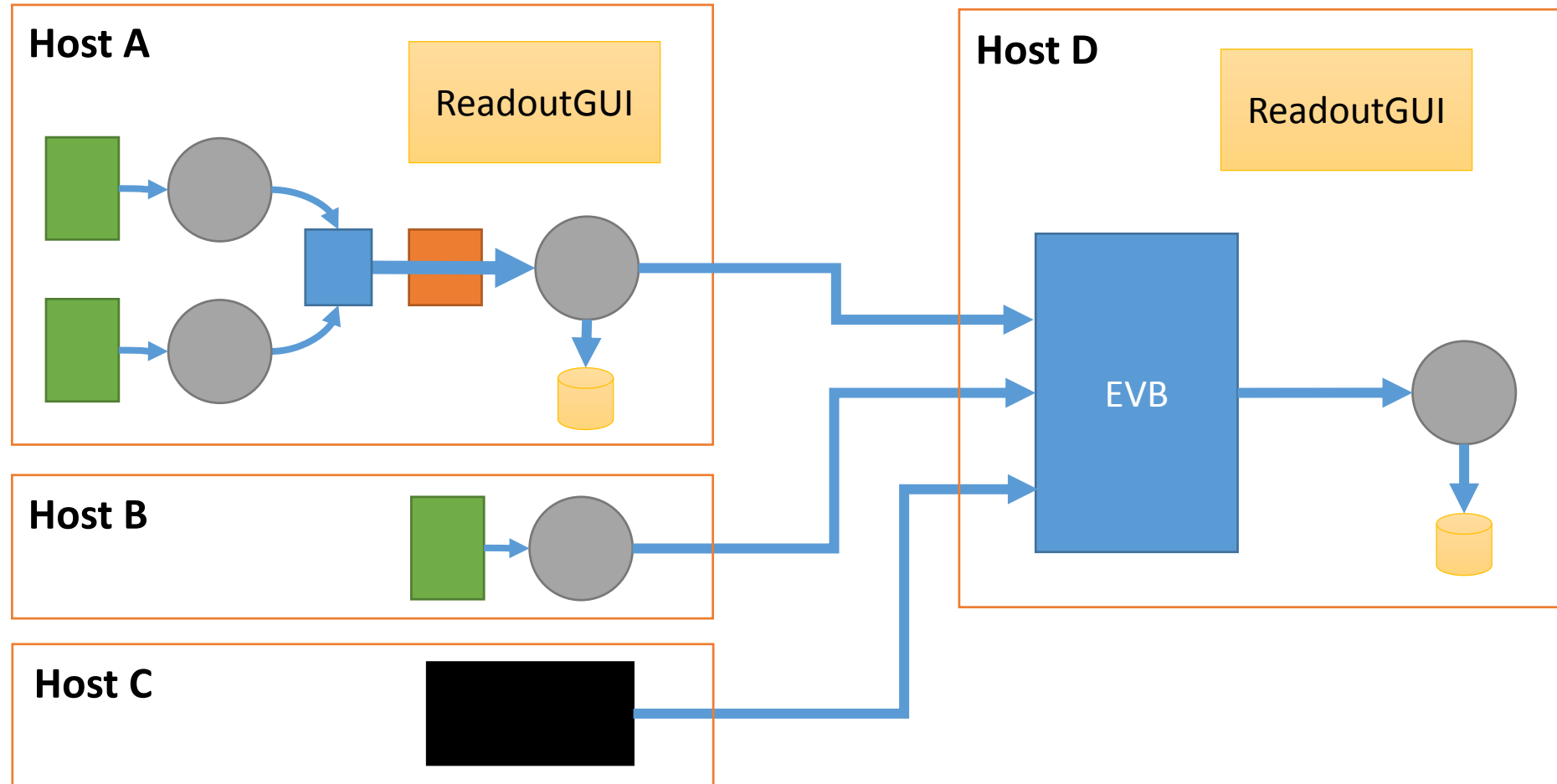


# The 11.0 ReadoutGUI

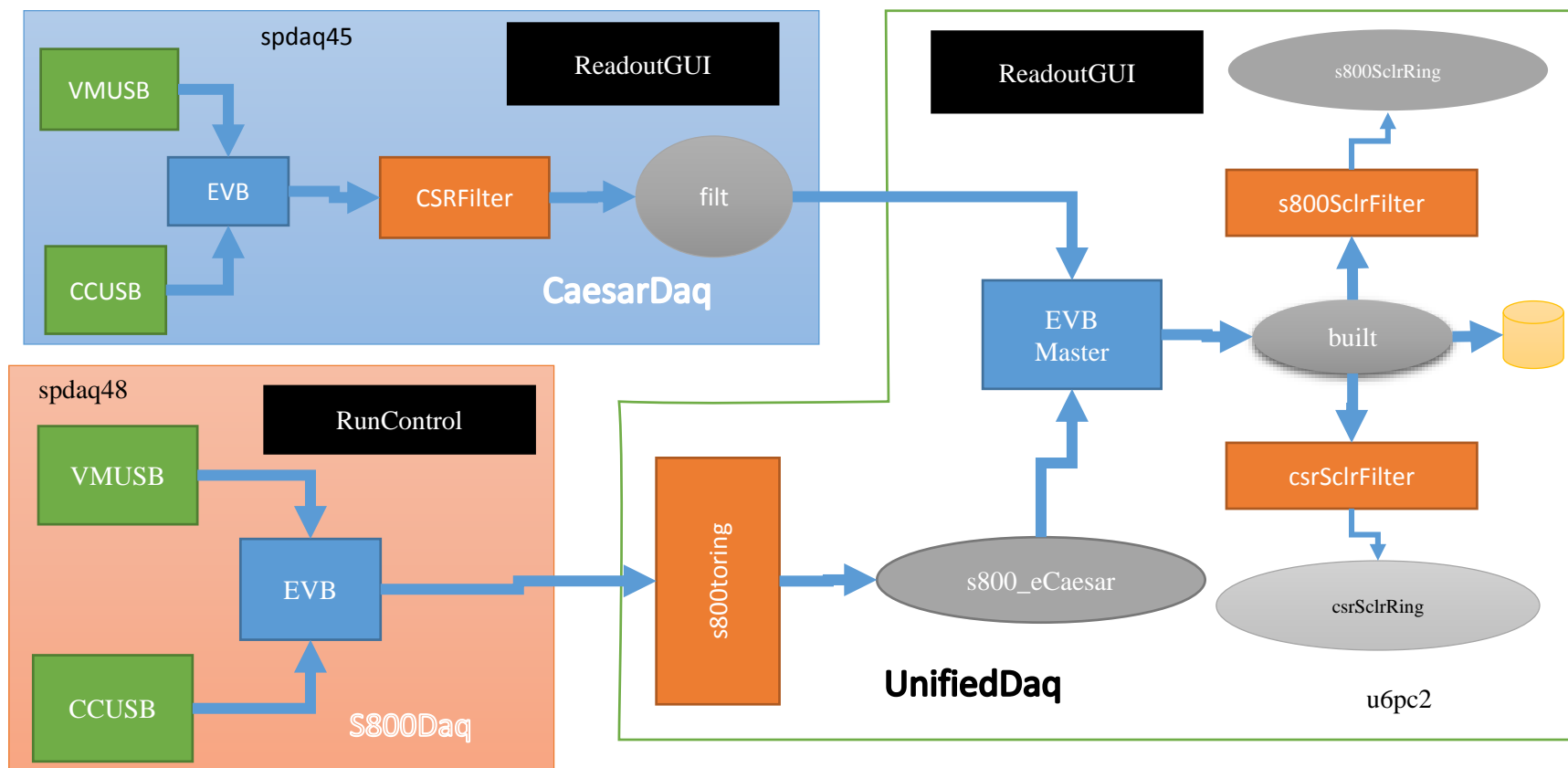
- Global/local run control
- Simplified system building
- Controls an arbitrary number of subcomponents
- Extensible
- Remote controllable



# Composing Experiments with ReadoutGUI



# Example: Caesar + S800 (7/2014 - 8/2014)



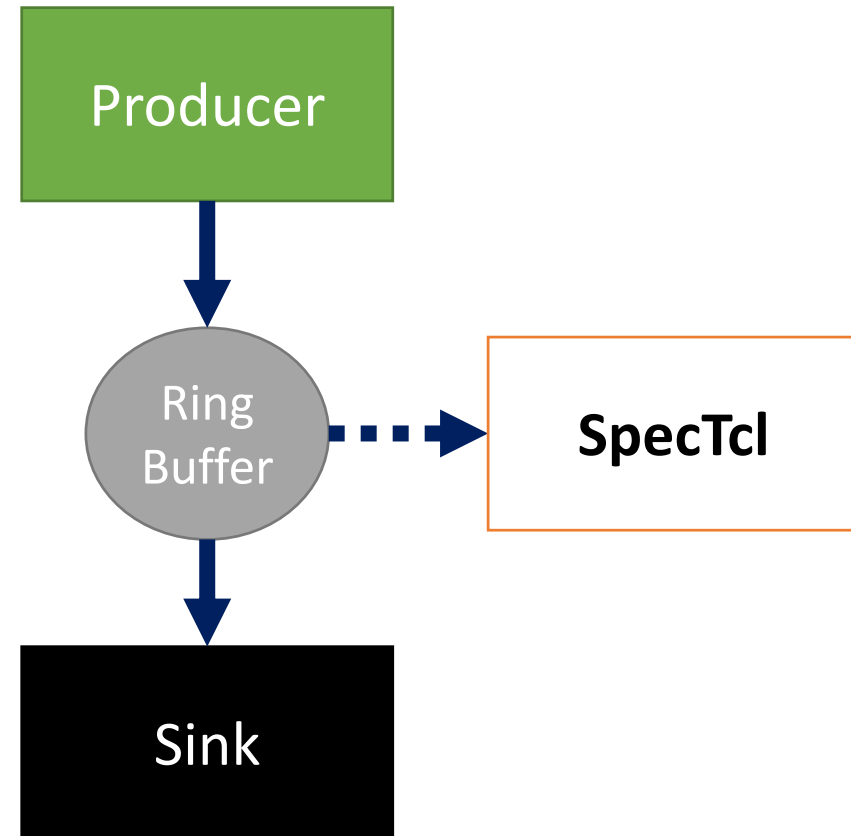
# Towards Versions 11.1, 11.2, 11.3, ... , 12.0

## Planned improvements

- Improve diagnostics
- Stability enhancements
- Improve support for legacy data formats
- Further simplification of experiment setup with database
- PUB/SUB state-machine run control
- Tool for visualizing data flow

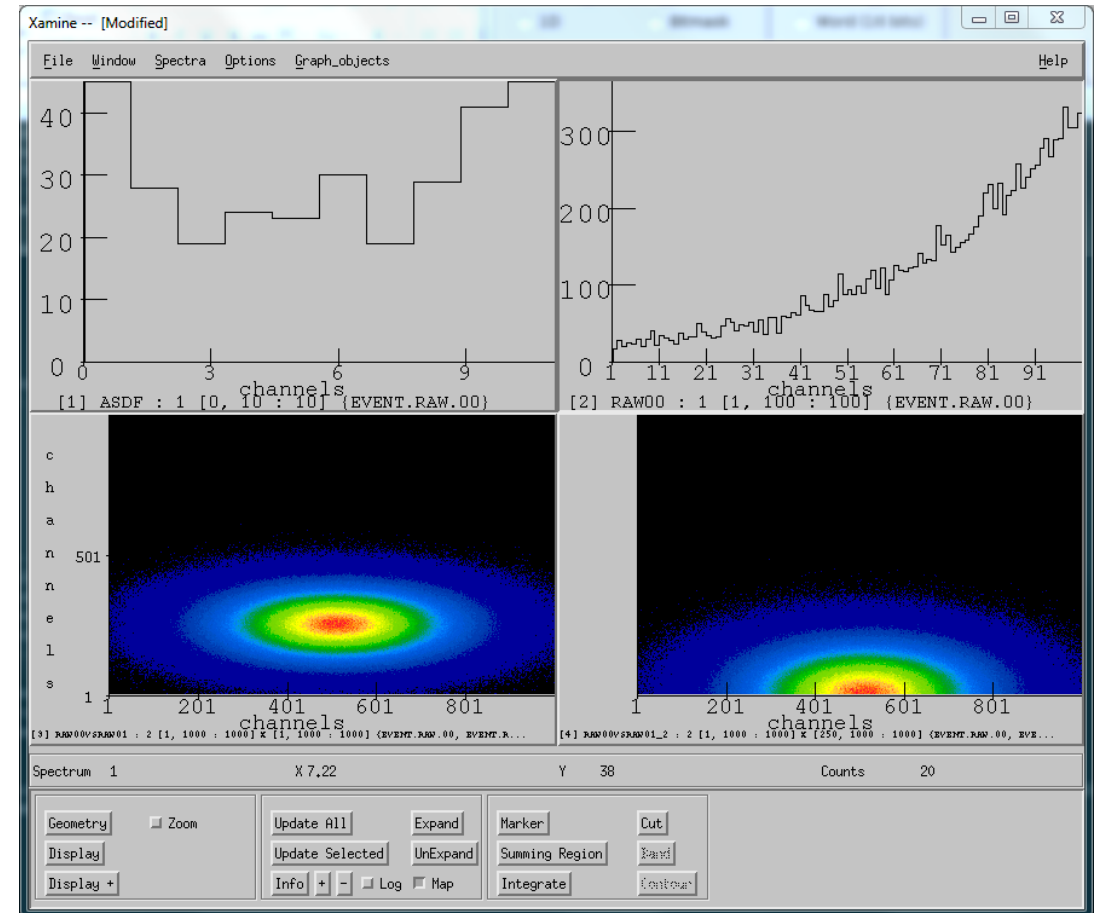
# SpecTcl Online Analysis

- Low learning curve
- Unintrusive data sampling
- DAQ agnostic
- Extensible C++ framework
- Customizable interface



# SpecTcl

- Rich set of histogram options
  - 1D, 2D, summary, gamma
- Basic fitting and integrations
- Logical data filtering
  - 1D slices
  - 2D gates
  - AND, OR, NOT



# Summary

- NSCLDAQ is a suite of software tools to manage data flow and run control.
- Supports composition of multiple subsystems into a single unified, experiment DAQ
- Support for online event building
- Online analysis support provided via SpecTcl
- Provides good support for heterogeneous systems via extensible software frameworks

# Thank you.

- Ron Fox



# Ring Buffer Write Performance

