Adaptable framework LDRD update

https://indico.fnal.gov/event/52666/contributions/231769/attachments/153101/198580/SCDProjects_LDRD_Knoepfel.pdf

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DUNE/LDRD monthly meeting

9 November 2022

Framework-supported algorithm constructs

Framework-agnostic constructs:

- **Transform** (producer) – creates data products from existing data of the same processing level
- **Reduction** (producer) – creates data products based on accumulations of data at a more granular processing level (e.g. endSubRun)
- **Monitor** (analyzer) – consumes data products and does not produce any new data
- **Filter** – supports processing a subset of data based on satisfying Boolean criteria

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Framework-aware constructs:

- **Source** – creates product stores that provide data products
- **Splitter** – splits existing product stores into smaller ones for downstream processing
- **Output** – writes product stores to an output file, stream, etc.

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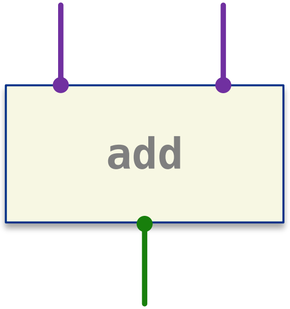

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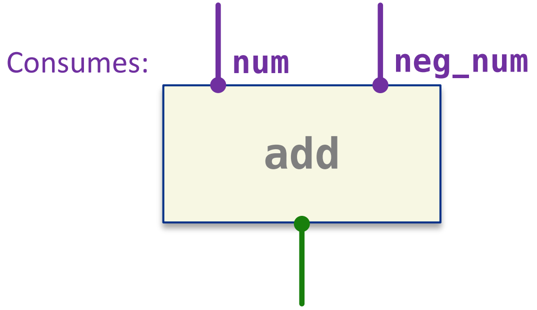

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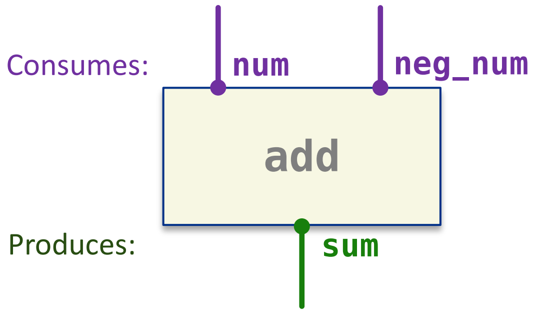

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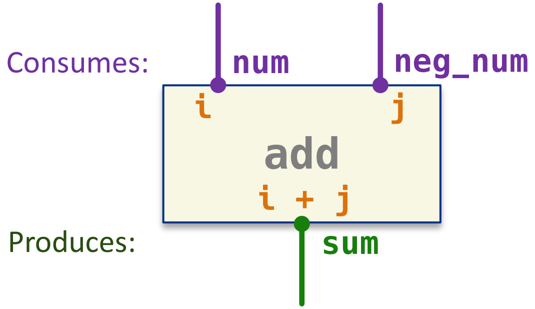

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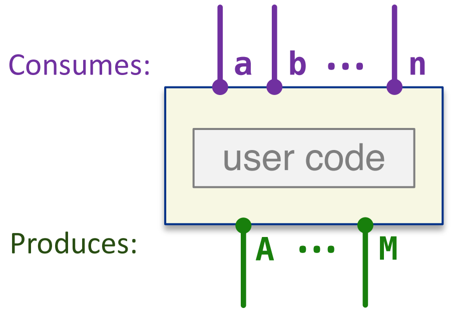
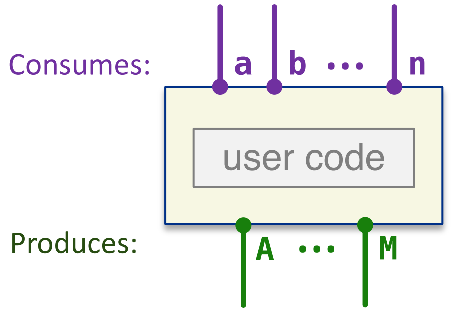
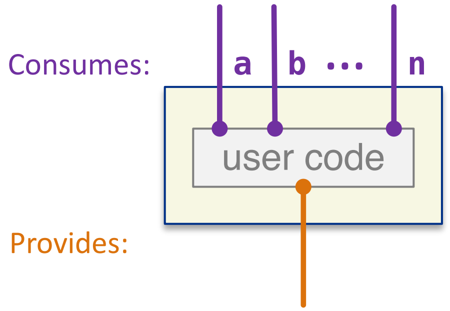


Graph nodes

- For *framework-agnostic constructs*, framework details **do not need to be** accessed by the user within the node.

- For *framework-aware constructs*, framework details **must be** accessed by the user within the node.





In the last month

- I have implemented filters that are specifiable via configuration:

  Allow all modules (except sources) to specify preceding filters

```
{
  source: {
    plugin: 'source_t',
    max_numbers: 10,
  },
  modules: {
    add: {
      plugin: 'module_t',
      filtered_by: ['only_evens', 'greater_than_5'], # logical AND of specified filters
    },
  },
}
```

Fermilab

Next steps

- Support non-product inputs to user functions
- Run performance tests against *art*
- Start looking at I/O
  - Includes eager writing of data products
  - Exploring HDF5 and other technologies
  - Considering a general dictionary system that can be used in addition to ROOT’s
- Explore paths and backwards compatibility
- Thoughts?