Computing and Networking Challenges in Supporting Streaming Applications
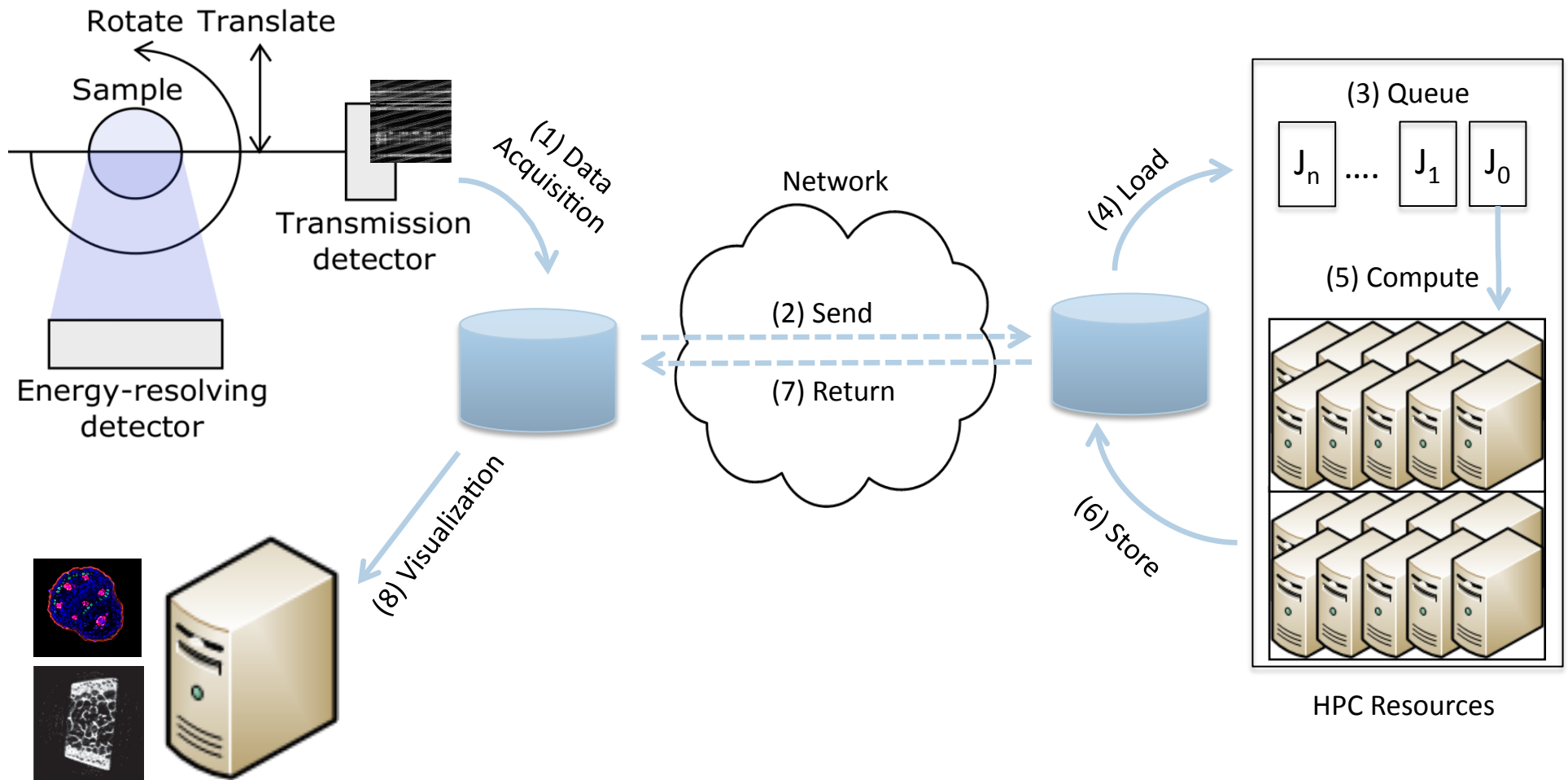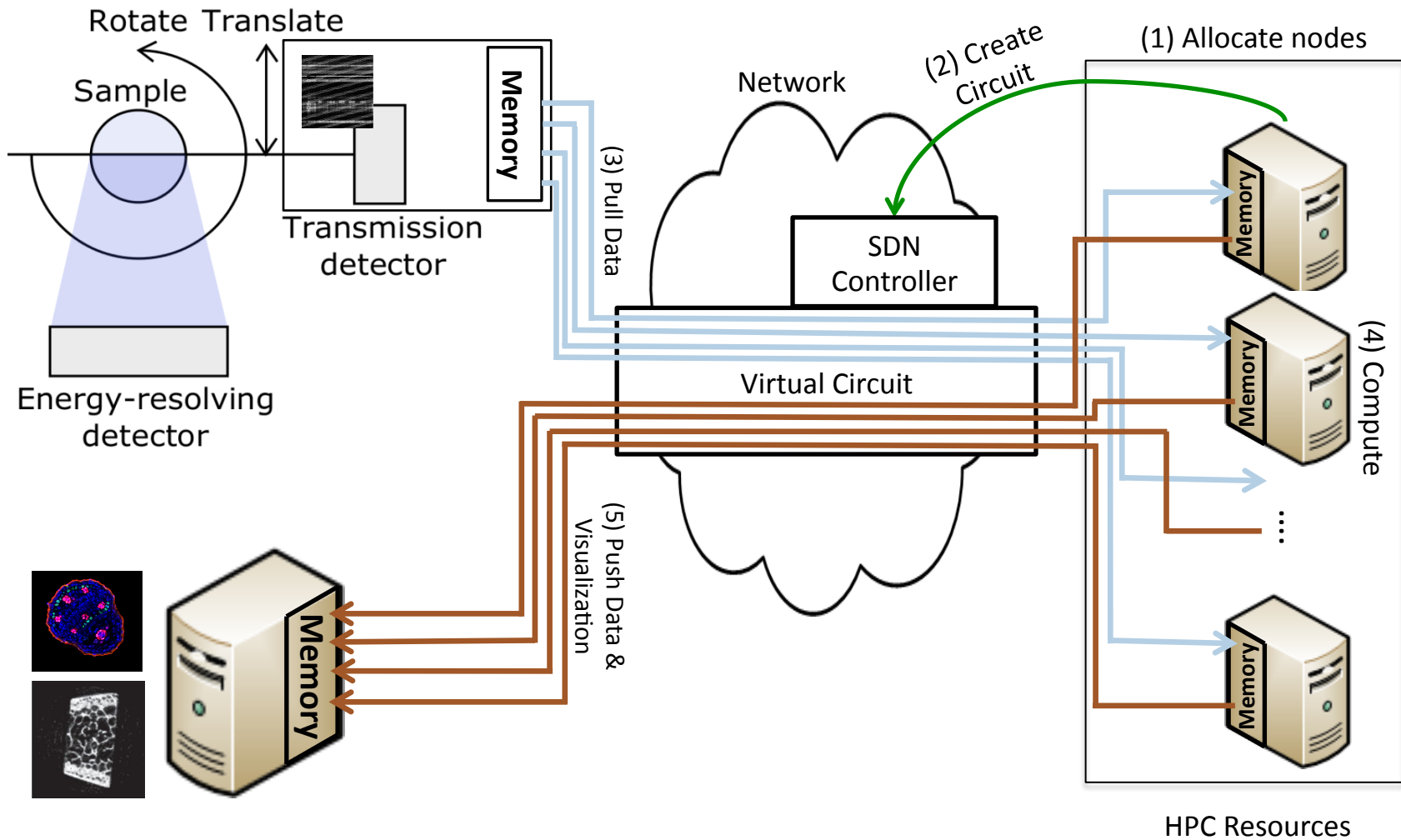
Raj Kettimuthu and Ian Foster

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U.S. DEPARTMENT OF **ENERGY**

Light source workflow - current

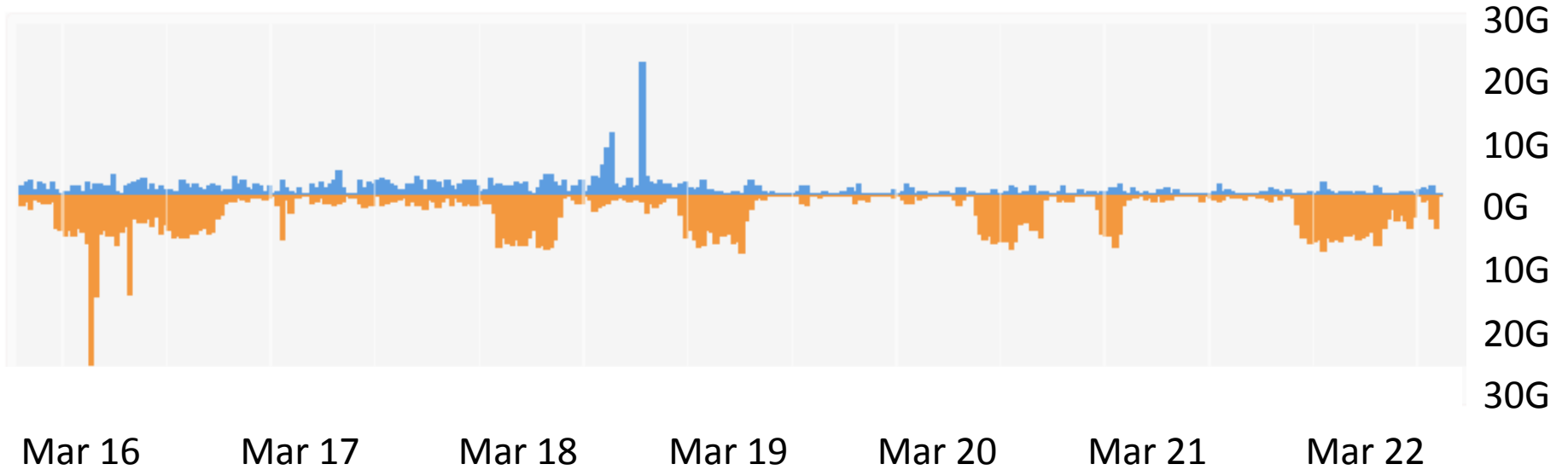# Light source workflow - future

On-demand computing in supercomputers

- Real-time queue?
  - Higher charge rate
  - NERSC has modest number of nodes allocated
- Steal resources that service the batch queue?
  - Preempt batch jobs
  - Low-priority queues?
    - Lower charge rate
- How to keep the average utilization of the system high?
  - Bursty real-time loads
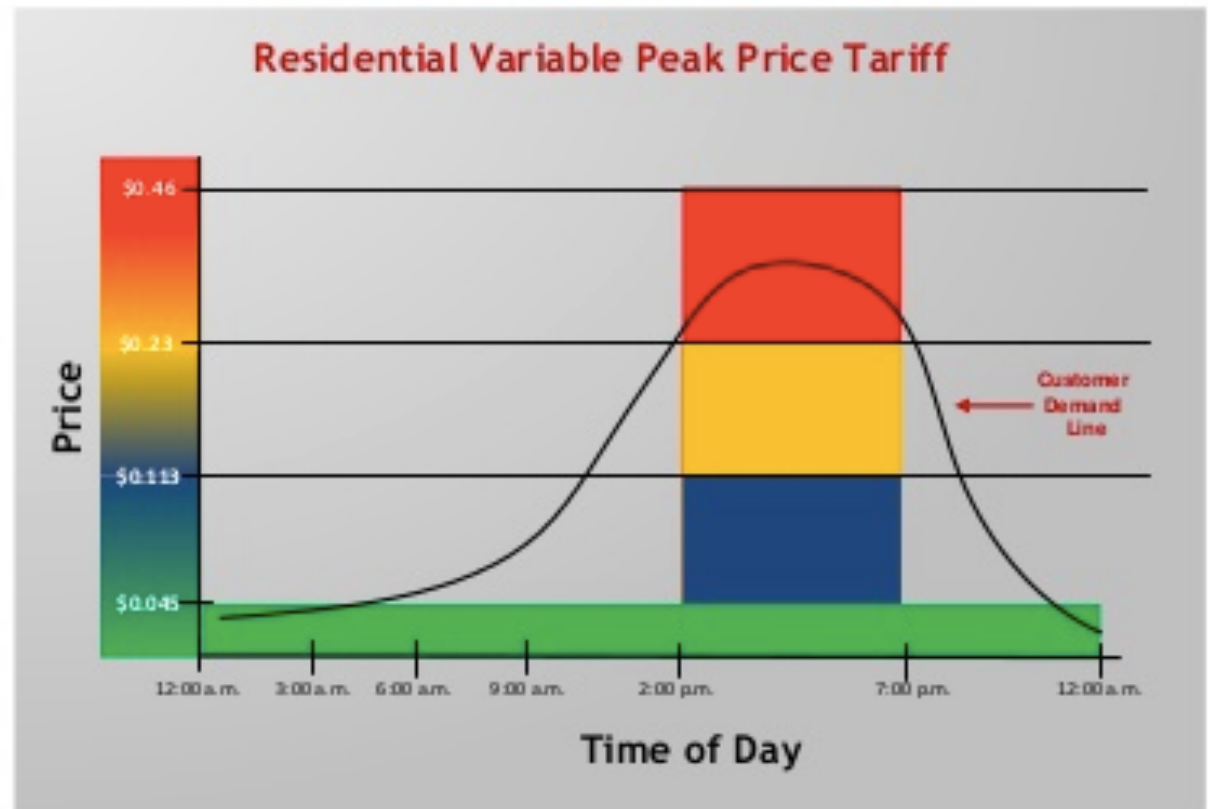- Checkpointing
  - User or system?
  - Restart overhead

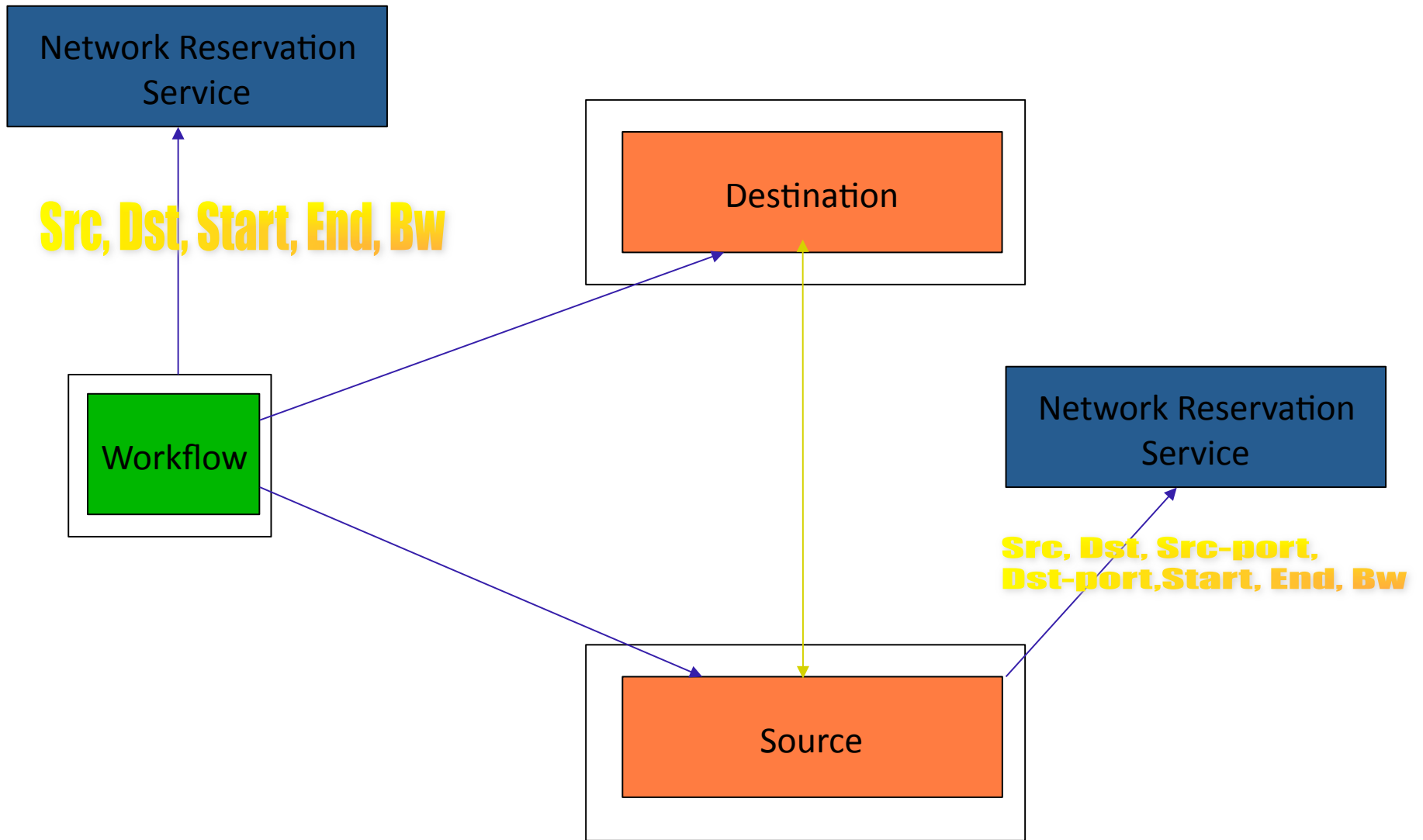# Peak vs. average network utilization

Charge network bandwidth?
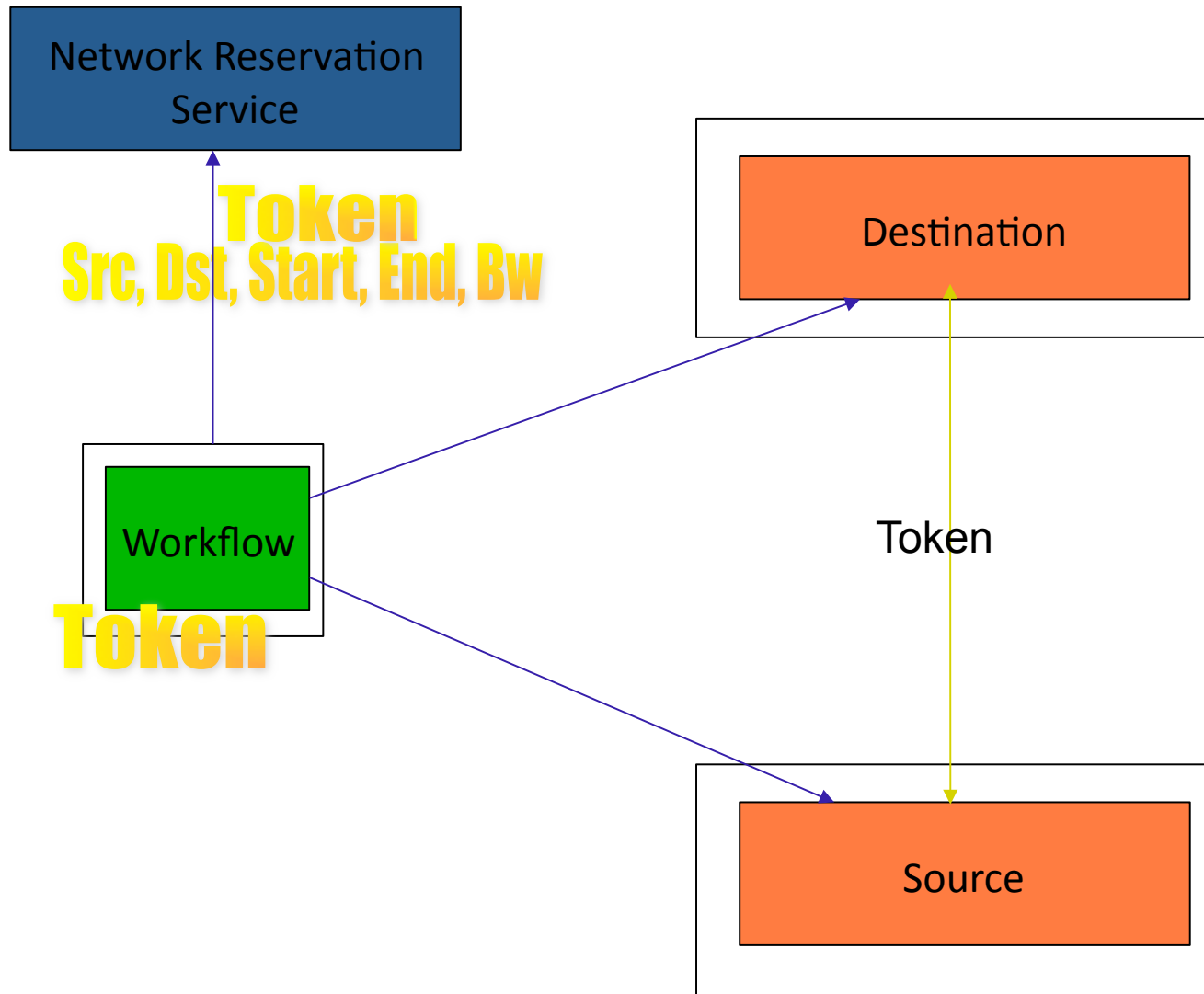
New Dynamic Pricing Options Offered

- **Hours**: 2 – 7pm, Monday - Friday
- **Summer Season** (June – September)
- Customers receive day-ahead price via in-home display, web, text, email, voice message
- Tariff is **optional**
- **Customer** decides how to respond & manage consumption

Residential Variable Peak Price Tariff

$0.46

$0.23

$0.113

$0.045

Price

Customer Demand Line

12:00 a.m. 3:00 a.m. 6:00 a.m. 9:00 a.m. 2:00 p.m. 7:00 p.m. 12:00 a.m.

Time of Day

Gaps in current network reservation methods

Network Reservation Service

Src, Dst, Start, End, Bw

Destination

Workflow

Network Reservation Service

Src, Dst, Src-port, Dst-port, Start, End, Bw

Source

Gaps in current network reservation methods

Questions