Evolution of Cray Management Services

Tara Fly
Cray Management Services
Cray, Inc.

Introduction

Acknowledgements:

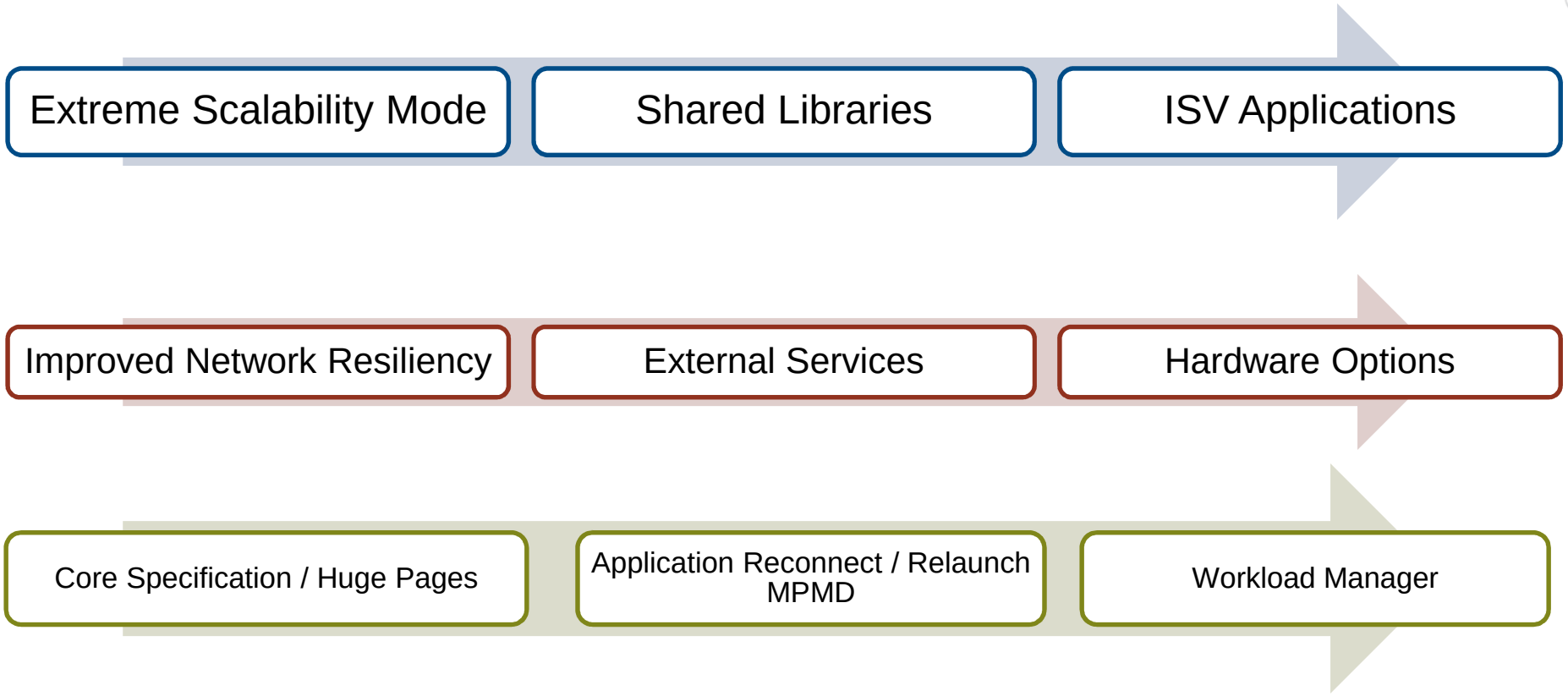
- CMS Team
- Service Team: Jeff Caplow, Jeff Becklehimer

Concepts

New Futures

Future Direction

Overview



- Improving Availability
- Increasing Use Cases
- Growing Feature Set

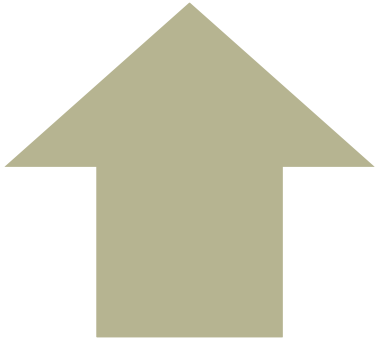
Cray System Administration

Administration

- Collecting and isolating failures
- Root Cause Analysis
- Data collection and analysis

System Improvements

- Uptimes
- Feature Set Complexity
- Hardware



Cray Management Solution Response

- Centralized Data Collection
- Standardized Data Formats
- Flexible Dump Collection
- Event Correlation
- Improved System Accounting
- Health Checking

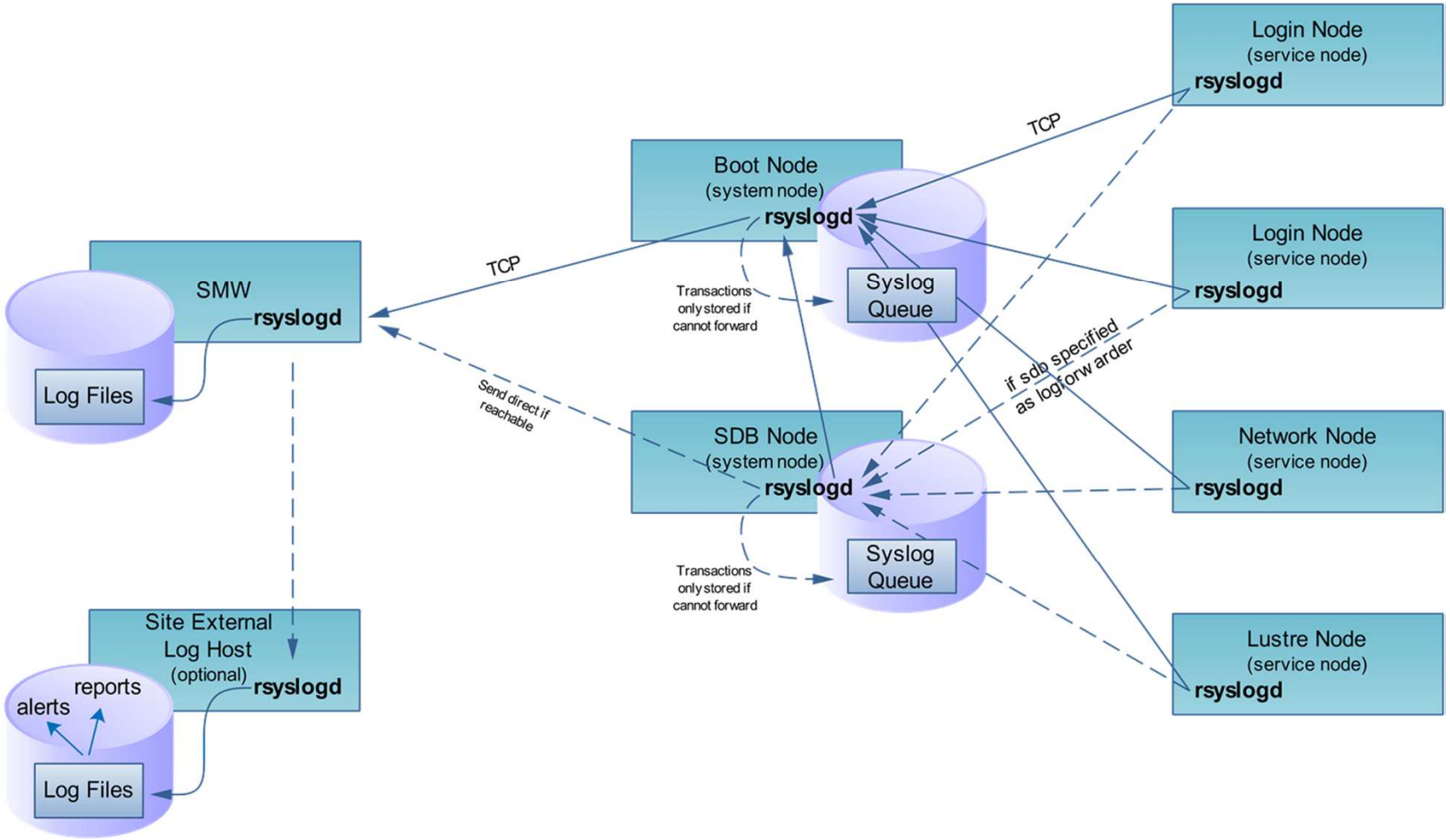
Architectural Premises

Architectural Premises

- **Scalable extensible frameworks**
- **Capabilities provided through plugins**
- **Multiple delivery formats**
- **Iterative development model**
  - Base capabilities provided in initial release
  - Add incremental functionality over time

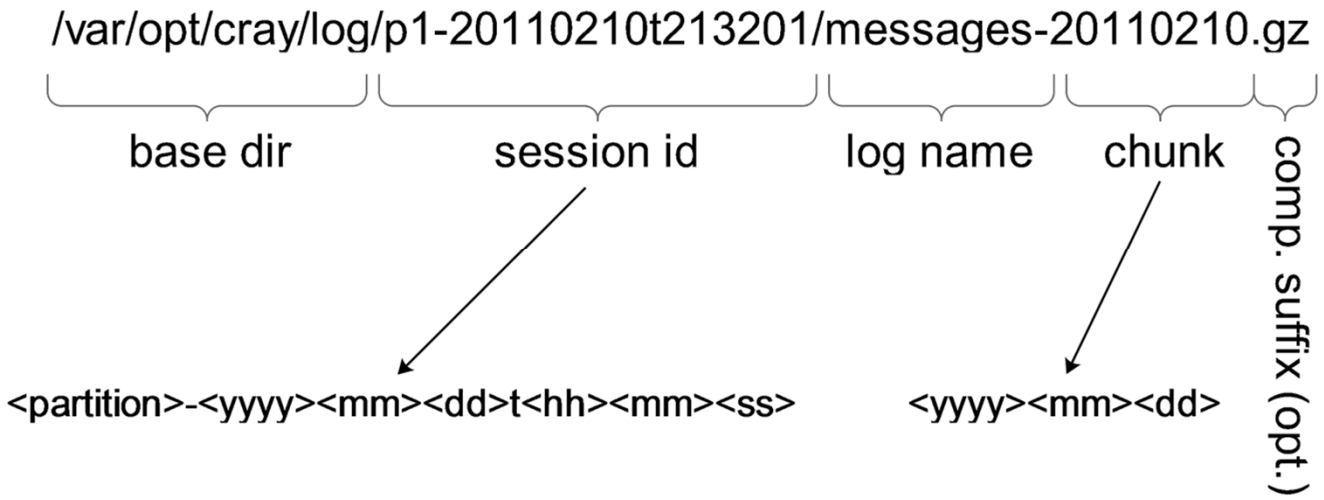
- **Customers can extend for specialized use cases**

Lightweight Log Manager Architecture

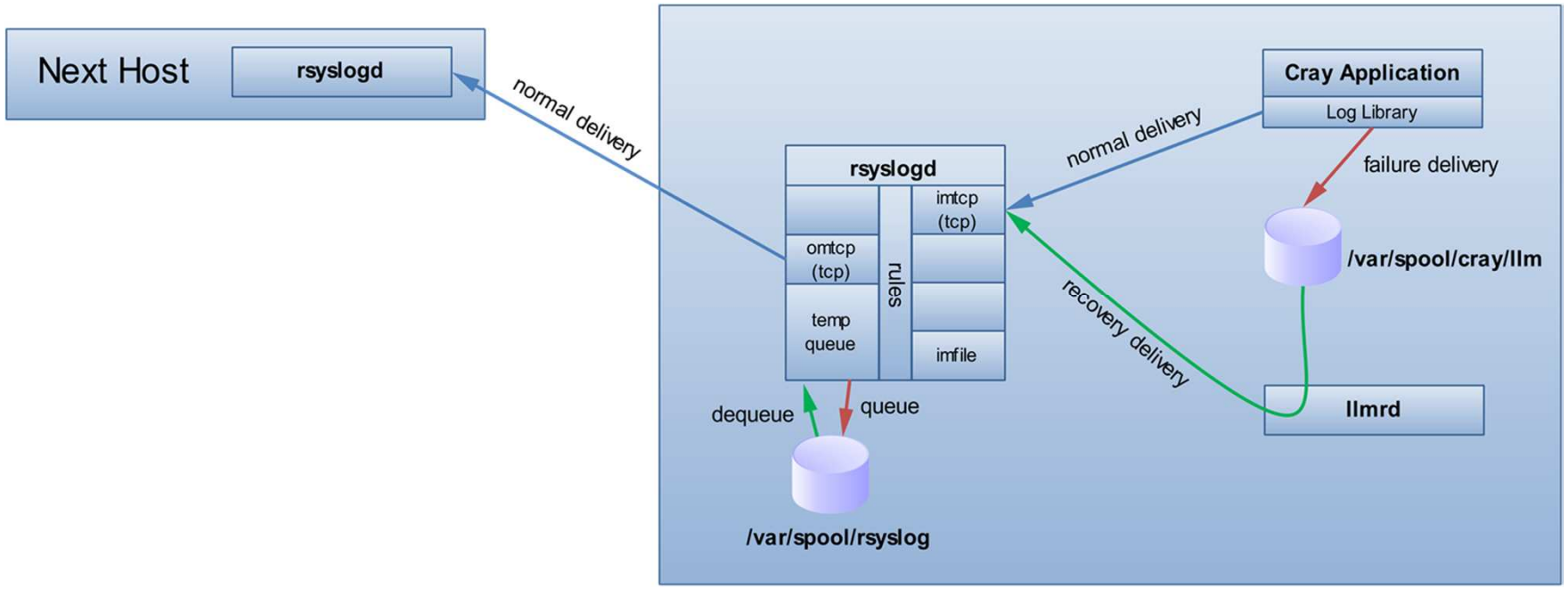


Lightweight Log Manager

- Provides standard logging mechanism for Cray software
- Provides centralized log aggregation on SMW
- Standardizes logging format
- Allows forwarding to an external log host
- Supports configurable log rotation
- HSS controller log forwarding
- Leverages rsyslog



LLM Resiliency

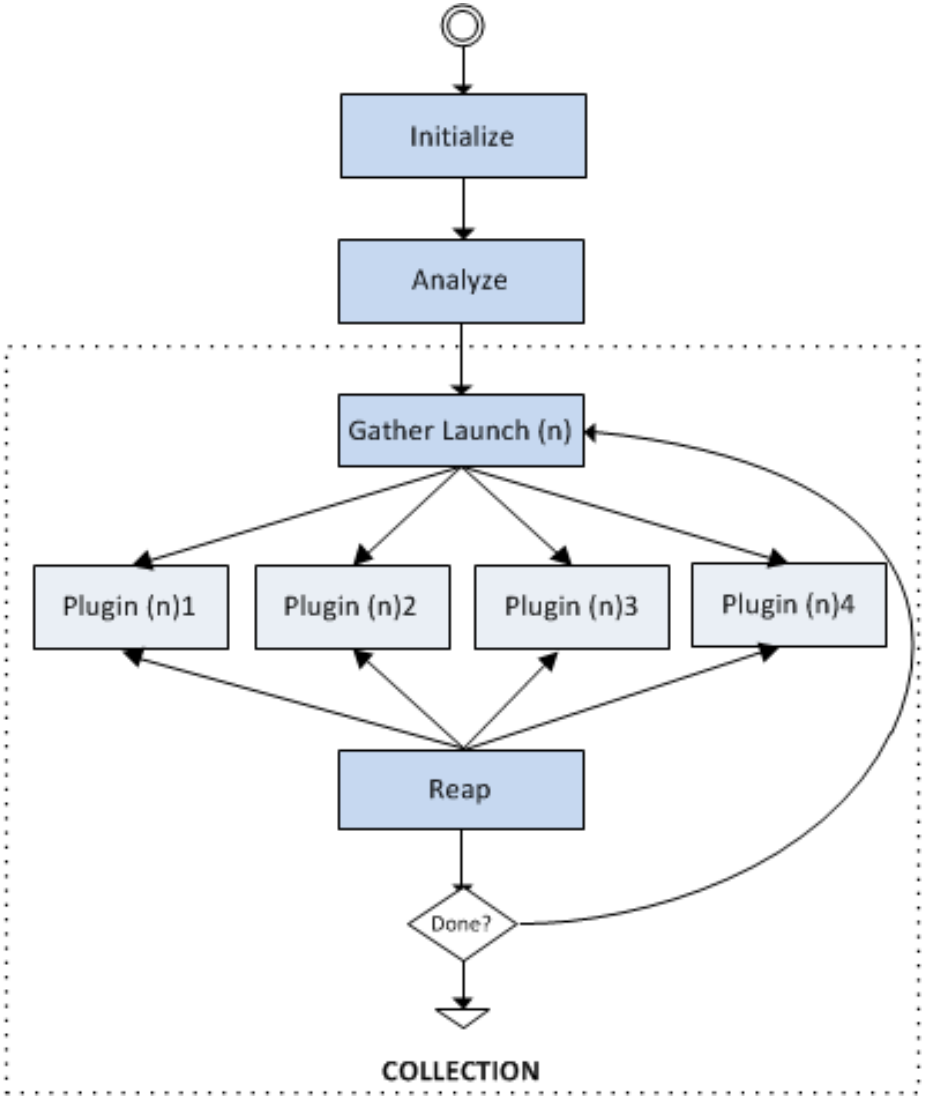


Modular System Dump

Python-based xtdumpsys

- Scalable mechanism for fault collection
- Supports parallelism
- Core infrastructure with plugins
- Site extensible
- Scenario support providing targeted data collection
- Significant performance improvements

Modular System Dump Architecture



Performance and Fault Detection

Data collection organized by run level style hierarchy

All plugins at a given run-level can be run in parallel up to a maximum parallel count

Dump scenarios provide targeted collection for specific failure modes

- HSN congestion,
- admindown node(s)
- down node(s)
- panicked node(s)
- power and cooling failures

Log window support to gather logs from a specified time range or delta from current time

Node Health Checker Improvements

Reservation-level testing

- Allow site administrators to move testing to the end of a batch-job reservation
- Helps eliminate potential false positives

Application Tests
• Application • Filesystem • ALPS • Accelerator • ugni

Reservation Tests
• Reservation • Filesystem

Improved CNCU Resiliency

Current Node Health Tests

- Memory test
- Filesystem Test
- Application Exited Check
- Apinit Ping Test
- Ugni Test
- Reservation Test
- Accelerator Test
- Plugin Test
- Hugepage fragmentation test

Node Health Checker

Configuration File Changes

```
[Options]
advanced_features: on
nhcon: on
dumpdon: off
suspectenable: y

[Memory]
Action: Log
WarnTime: 20
Timeout: 30
RestartDelay: 30
Threshold: 600
Sets: Reservation
```

Automation as part of installation to convert existing configuration files to new format

Resource Utilization Reporting

- **Scalable framework for data collection**
- **Site extensible plugins**
- **Multi-stage data collection**
  - Data aggregated on compute nodes
  - Data pulled back to MOM nodes
  - Post-processing of data
- **Support for multiple backing stores**
- **Plugins for use cases delivered incrementally**
  - GPU Utilization
  - Power Management
  - Application Completion Reporting
  - POSIX Accounting
  - CSA

Andrew Barry "Resource Utilization Reporting on Cray Systems" Thursday May 10th 11:00am

Simple Event Correlation

What is SEC?

Event Monitoring System

Correlates events in area of log analysis, system monitoring, network management and system security

- **Deliver SEC RPM with base SMW distribution media**
- **In collaboration with Cray Service, provide a reference set of rules and installation for site use of SEC**
- **Reference implementation provides email notification**
- **Updates delivered by Field Notice between release**
- **Latest Field package incorporated in subsequent release**

Questions ?