

Open Source Cloud
Strategies and Solutions

Event by Sardina Systems

How to Enhance OpenStack Infrastructure Performance with ML and Algorithms

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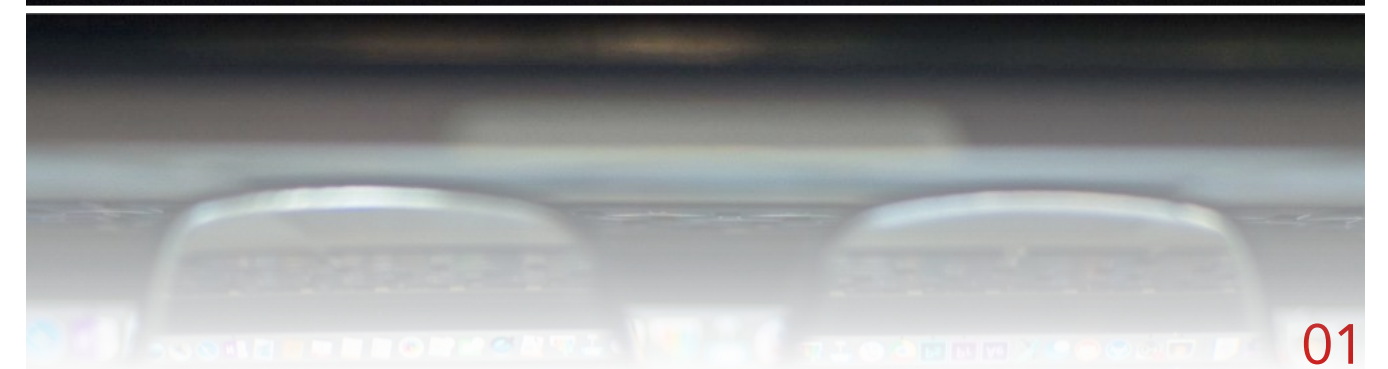
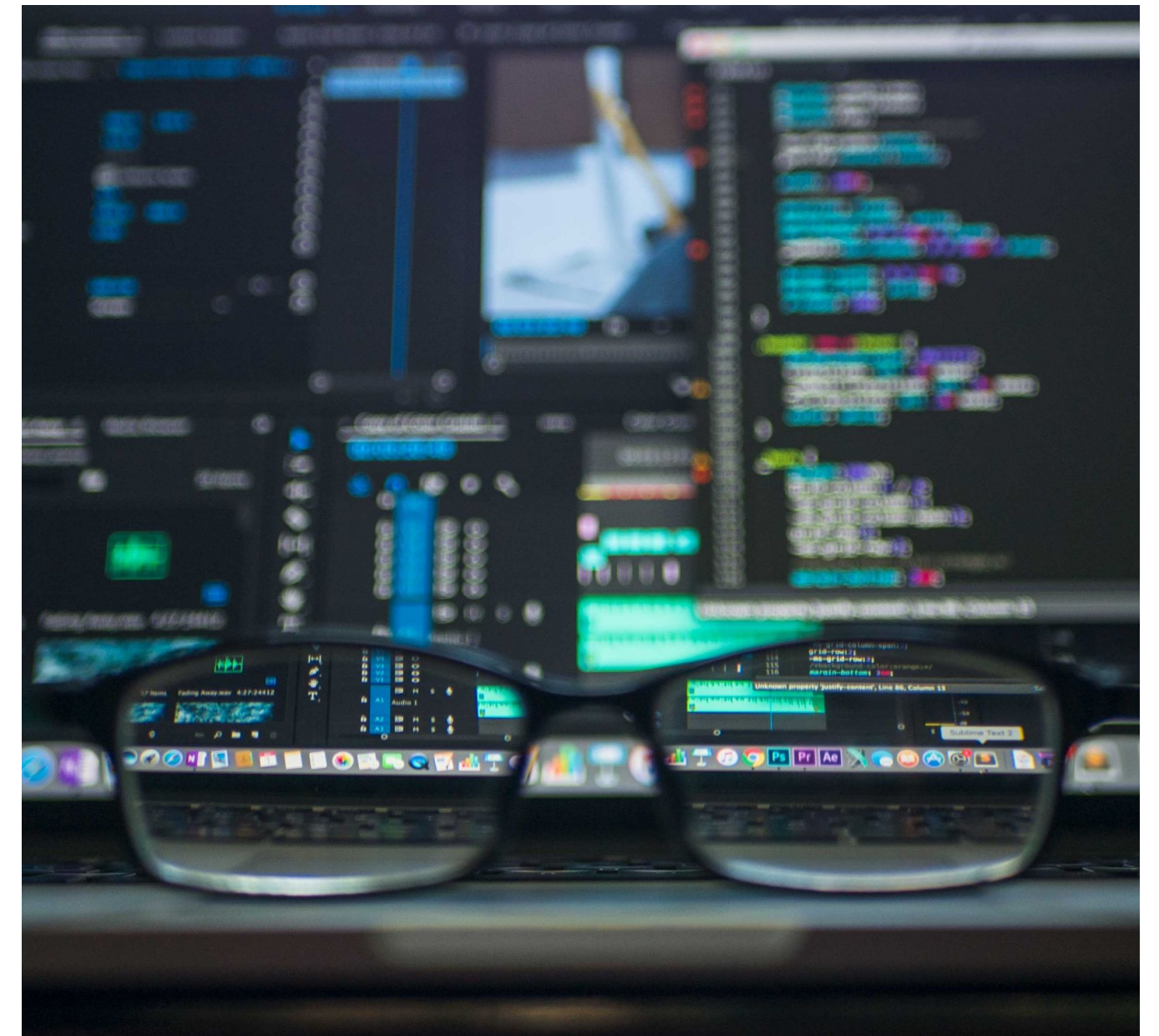


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What We'll Cover Today

- Ways to Efficient Cloud Resources Management;
- Monitoring Advantages with FishOS Health Engine;
- The Role of Machine Learning in Optimizing OpenStack Systems Performance.





We Live in the World of Data

What can we do with data in OpenStack context?

1. Data collection
2. Data analysis and interpretation

Data utilization advantages:

- Informed decision-making
- Competitive advantage
- Improved customer experience
- Cost reduction
- Risk mitigation





Workload Distribution: Uniform VS Dense

	Uniform	Dense
Fault Tolerance	Yes	No
Resource Utilization	Even	Non-even
Communication Overhead	High	Low
Management Complexity	High	Low

FishOS Workload Manager

Workload Manager + OpenStack Cloud = ???

Key components:

- Power manager
- Placement engine
- Rebalancing engine



Placement Engine

Optimizes initial placement of workload (VMs) onto hypervisors

- Analyzes the current workload

Checks for available resources

- Finds the optimal place to put the VM

CPU overprovisioning is possible

No memory overcommitment

Rebalancing Engine

Maintains the infrastructure in an optimal state

- Keeps track of current resources usage
- Prevents hypervisors from overloading
- Performs live-migrations if necessary
- Avoids resource wastage



Power Management

Maintains the lowest possible power consumption

- Monitors power consumption on active hosts:
 - Power Benchmarks are being run upon starting the host*
 - IPMI, Redfish, OpenStack Ironic and MAAS protocols support*
- Uses information about inactive hosts (if available);
- Monitors if new idle hosts appear and decides whether they should be powered off;
- Decides when and which host should be enabled;
- Uses historical data to keep the number of hosts necessary for trouble-free operation.



Optimizing OpenStack with Power Management for Costs Savings

10-35% Average resource usage in data centers

What is the point of running hosts in an idle state?

Power manager can power off idle hosts, which collaborates well with functionality of the Placement and Rebalancing engines

Workload optimization —● Freeing up resources —● Turn off unnecessary hosts

COSTS REDUCTION



Unleashing the Power of Data: Monitor with Health Engine

Smart Monitoring and Machine Learning:

- Logs classification
- Checks
 - Domain-specific
 - Time series forecast
 - Anomaly detection
- Filters and handlers
 - Root cause analysis





Logs classification

1. Checking logs manually;
2. Universal pre-trained classifier;
3. Pre-trained and fine-tunable classifier.





Root cause analysis

- Reduces the number of notifications;
- Effective troubleshooting.





FishOS Workload Manager

Workload Manager



OpenStack Cloud



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Thank you!

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