CATS Metric Description and Definition

IETF 120

draft-du-cats-computing-modeling-description-03

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CATS Metric Description
Modifications on draft-du-cats-computing-modeling-description-03

- Add a new co-author from china mobile
- Mainly modified the Section 3 & 5

draft-du-cats-computing-modeling-description-02.txt

CATS
Internet-Draft
Intended status: Informational
Expires: 25 April 2024

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Computing Information Description in Computing-Aware Traffic Steering
draft-du-cats-computing-modeling-description-02

Abstract

This document describes the considerations and the potential architecture of the computing information that needs to be notified into the network in Computing-Aware Traffic Steering (CATS).

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Computing Information Description in Computing-Aware Traffic Steering
draft-du-cats-computing-modeling-description-03

Abstract

This document describes the considerations and requirements of the computing information that needs to be notified into the network in Computing-Aware Traffic Steering (CATS).

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Background

- We need an enhanced anycast mechanism in CATS, which considering both network and computing metrics in route selection
  - This draft mainly discusses about the computing metrics for CATS
- Current status:
  - **What we are facing:**
    - Compute resources heterogeneity
    - Service diversity
  - **What we want to do:** make decisions based on the choice of some default metrics for CATS, and consider other metrics later
  - **What we have got consensus in the mailing list:**
    - The computing metrics in CATS should be simple, and the number should be few. Only metrics that are needed in route selection should be notified to the network
    - Candidate metrics are, the “predicted computing delay”, the “server capability”, and the optional is the “status indication”

Summary of Metric Definition Principles:

1. **Simplicity:** The computing metrics in CATS SHOULD be few and simple, so as to avoid exposing too much information of the service points.

2. **Scalability:** The computing metrics in CATS SHOULD be evolveable for the future extensions.

3. **Interoperability:** The computing metrics in CATS SHOULD be vendor-independent, and OS-independent.

4. **Stability:** computing metrics SHOULD NOT incur too much overhead in protocol design, and it can be stabilized to be used.

5. **Accuracy:** computing metrics SHOULD be effective for path selection decision making, and the accuracy SHOULD be guaranteed.

The candidate metrics

- The first one is the “**predicted computing delay**”
  - the meaning: “the estimate of the duration of my processing of request”
- The second one is the “**server capability**”
  - For example, one server can support 100 simultaneous sessions and another can support 10,000 simultaneous sessions
- The third one is the “**status indication**”
  - For example, an indication of "please stop sending new sessions to instance A”
  - It is a temp and dynamic value, and can appear independently, or be indicated by the above two metrics with a specific value, such as all zero, or all one

Considerations on the Usage of Computing Metrics in CATS

- In CATS, the C-PS will make a decision about the route selection on the Ingress
- On the Ingress, two kinds of route policies may be applied
  - **Backup mode:** One active route, and others for backup
  - **Load balancing mode:** Several routes are active, and each have a weight
- Indeed, the most important thing the Ingress cares is that how to update the above policies, and the meaning of the metrics is secondly
- Thus we propose an initial mechanism for the metric distribution: always send two metrics, and make them the default ones
  - 1) the **predicted computing delay**, which may trigger the Backup mode on the Ingress, and can lead to a potential minimum latency for the client
  - 2) the **LB weight**, which can be a cardinal value as talked by Dirk in the mail list , it can be the "**server capability**" talked before by default , which will trigger the LB mode on the Ingress, and can lead to a potential better LB result of both the network and computing resources

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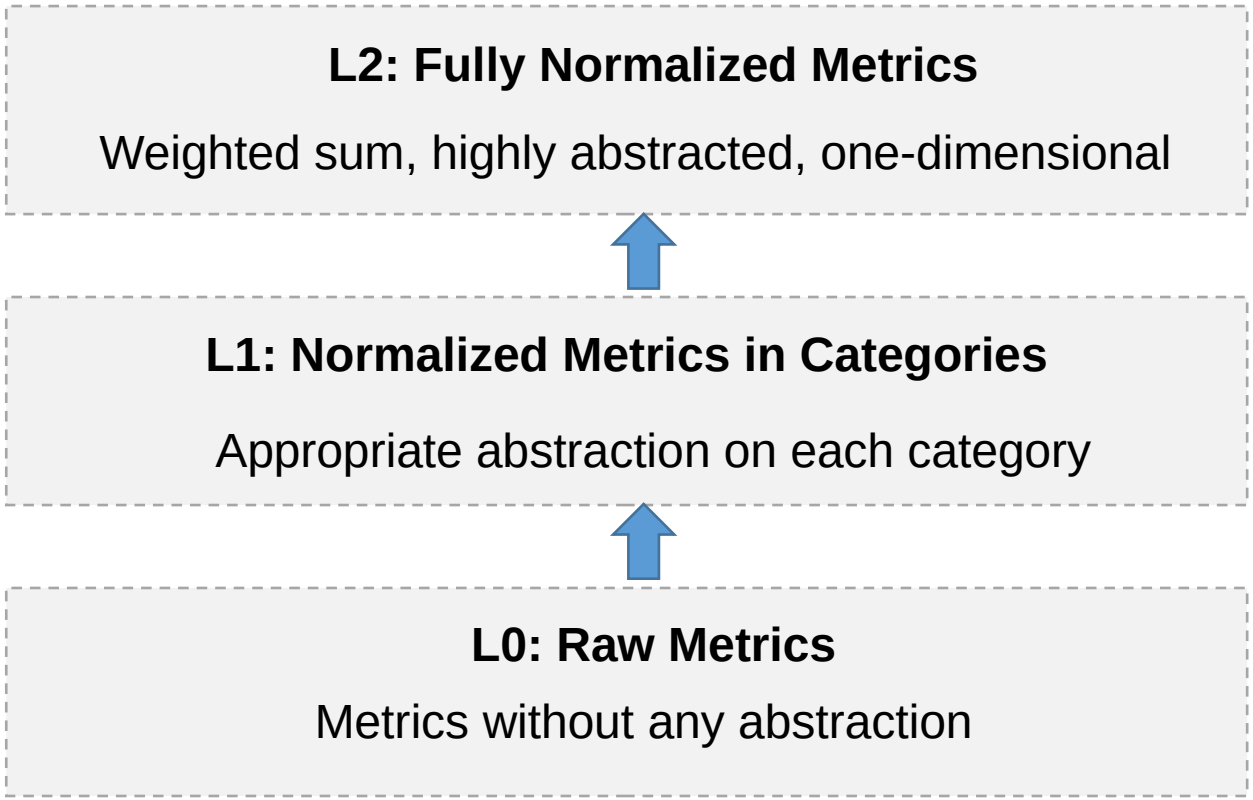
- Based on the considerations of CATS metrics, a preliminary definition method is proposed.
- Three Levels are defined



- don’t have to know how metrics are abstracted.
- simplify complexity.

- Normalized values in categories of networking, computing, storage, or delay

- CPU/GPU: Frequency, Memory BW,...
- Networking: BW, TXBytes, RXBytes, ...
- Storage: Read/Write speed, ...
- Delay: Time to process a request

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- Comparison of Three Levels

Level	Encoding Complexity	Extensibility	Stability	Accuracy
Level 0	Complicated	Bad	Bad	Good
Level 1	Medium	Medium	Medium	Medium
Level 2	Simple	Good	Good	Medium

- Make comparisons by following the design principles.
- Intuitively, L2 metrics are recommended because of its simplicity, extensibility and stability.
- Its accuracy can also be improved by design proper decision making alogorithms.

Next steps

- What we want to get consensus in the WG
  - 1. **Can we agree with making some metrics as the default ones for CATS**, which means all CATS nodes MUST recognize them, so that enabling the basic cooperation
  - 2. **Is the proposed CATS definition and classification appropriate for decision making?**
  - 3. **If 1 is accepted, can we agree on some metrics to be default metrics that have been discussed before, i.e., the predicted computing delay and the LB weight?**