cats
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A Use Cease for Green Computing-Aware Traffic Steering (CATS)
draft-wang-cats-usecase-green-00

Abstract

This ~~draft~~ docuemnt describes a compute-aware use case for services with green energy requirements. This use case considers both network, ~~computation~~ compute, and energy metrics when selecting a service contact instance.

Commenté [MB1]: That is?

Commenté [MB2]: Why these are isolated from the network/compute energy contribution?

Commenté [MB3]: To be consistent with CATS framework

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1. Introduction

As mobile edge computing networks sink computational tasks from cloud data centers to the edge of the network, tasks need to be processed by computational resources close to the user's end as mentioned in [I-D.ietf-cats-usecases-requirements]. ~~Therefore, CATS is proposed.~~ Reducing carbon emissions is a major challenge that needs to be faced ~~in our time~~by the industry. The network is the main enabler to achieve the reduction of carbon emission. The introduction of computational dimension in CATS makes the previous energy saving by considering only the network dimension to be insufficient and hence green for CATS based on the association of network and computation is worth to be explored.

~~Recently, the~~The GREEN WG was ~~formed. It is~~ chartered to explore use cases, derive requirements, and provide solutions for identifying and characterizing energy efficiency metrics, methods related to energy consumption of network devices, and optimizing energy efficiency across the network. network. There are also a number of contributions that explore green networks, ~~and the documente~~.g., [I-D.wang-cats-green-challenges] summarizes a number of challenges faced by ~~cats~~ CATS considering green.

This document provides a green ~~cats~~ CATS use case.

2. Definition of Terms

Computing-Aware Traffic Steering (CATS): Aiming at computing and network resource optimization by steering traffic to appropriate computing resources considering not only routing metric but also computing resource metric.

Service: A monolithic functionality that is provided by an endpoint according to the specification for said service. A composite service can be built by orchestrating monolithic services.

Service instance: Running environment (e.g., a node) that makes the functionality of a service available. One service can have several instances running at different network locations.

3. Use Case

Geared towards green computing-aware traffics Steering, the ~~green~~energy metrics include the energy consumption of network devices as well as the energy consumption of computing resources. The following describes how green metrics are distributed under both distributed and centralized models.

Commenté [MB4]: Is a contributor, but might not be the main.

Commenté [MB5]: That is?

Commenté [MB6]: I don't parse this.

Commenté [MB7]: This is what CATS is supposed to do :-)

Commenté [MB8]: As that draft is short and has common authors. Any reason, why these drafts can be merged?

Commenté [MB9]: Please refer to the terms defined in the CATS framework. No need to redefine them.

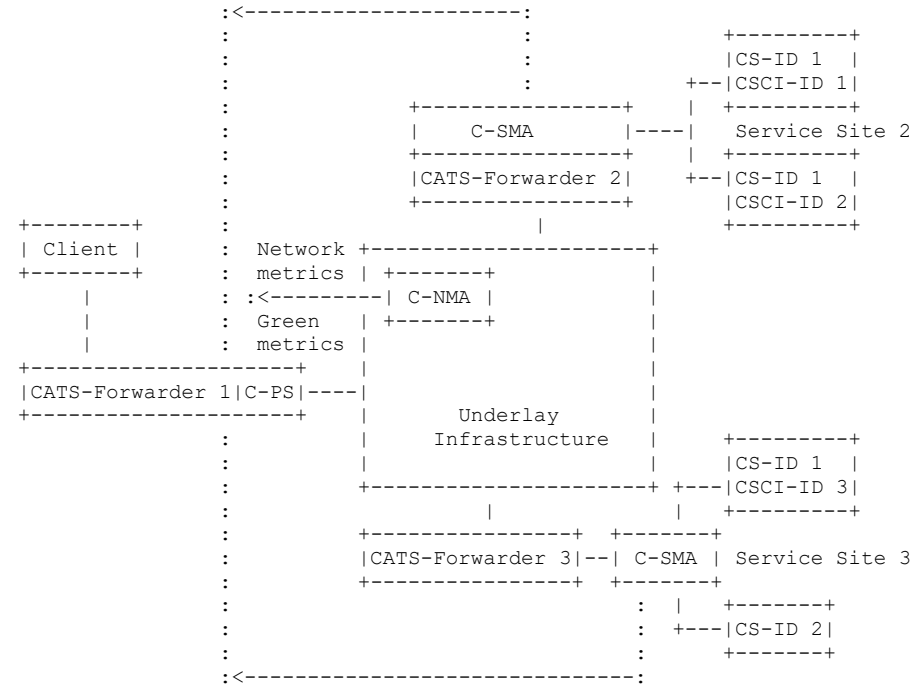
Commenté [MB10]: I'm afraid there is nothing specific to this use case.

3.1. Distributed Model

Figure 1 shows an example of how Green CATS metrics can be disseminated in the distributed model. In this way, green metrics are distributed among network devices directly using distributed protocols without interactions with a centralized control plane.

Commenté [MB11]: Can we define those?

Service CS-ID 1, contact instance CSCI-ID 1 <computing metrics, green metrics>
Service CS-ID 1, contact instance CSCI-ID 2 <computing metrics, green metrics>



Service CS-ID 1, contact instance CSCI-ID 3 <computing metrics, green metrics>
Service CS-ID 2, <computing metrics, green metrics>

Figure 1: An Example of Green CATS Metric ~~Dessimination~~Dissemination in a Distributed Model

3.2. Centralized Model

In Figure 2, network metrics, computing metrics, and green metrics can be distributed in a centralized way. Green metrics are collected by the centralized control plane, and then the centralized control plane calculates the forwarding path corresponding to the energy efficiency demand request and synchronizes with the Ingress CATS-Forwarder.

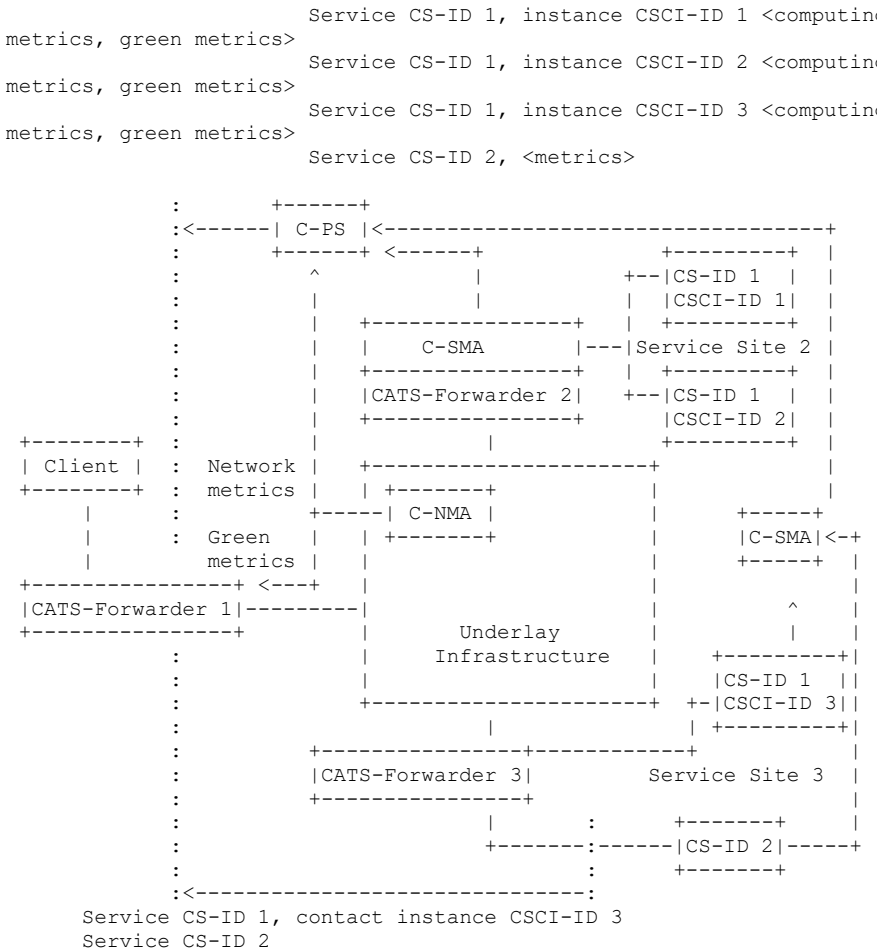


Figure 2: An Example of Green CATS Metric Distribution in a Centralized Model

4. Conclusion

This document gives a CATS use case related to green and further describes how green metrics can be distributed under both distributed and centralized models.

5. Security Considerations

TBD.

6. IANA Considerations

TBD.

7. Informative References

[I-D.ietf-cats-usecases-requirements]
Yao, K., Contreras, L. M., Shi, H., Zhang, S., and Q. An, "Computing-Aware Traffic Steering (CATS) Problem Statement, Use Cases, and Requirements", Work in Progress, Internet-Draft, draft-ietf-cats-usecases-requirements-04, 3 July 2024, <https://datatracker.ietf.org/api/v1/doc/document/draft-ietf-cats-usecases-requirements/>.

[I-D.wang-cats-green-challenges]
Wang, J., Fu, Y., and C. Li, "Green Challenges in Computing-Aware Traffic Steering (CATS)", Work in Progress, Internet-Draft, draft-wang-cats-green-challenges-04, 7 July 2024, <https://datatracker.ietf.org/doc/html/draft-wang-cats-green-challenges-04>.

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