

Green Challenges in CATS

draft-wang-cats-green-challenges-04

J. Wang, China Mobile (Presenter)

Y. Fu, China Mobile

C. Li, Huawei

Update summary from revision 02 to 04

- Add a new co-author from Huawei
- Mainly modified the Section 3

```
cats J. Wang
Internet-Draft Y. Fu
Intended status: Informational China Mobile
Expires: 25 April 2024 23 October 2023
```

```
cats J. Wang
Internet-Draft Y. Fu
Intended status: Informational China Mobile
Expires: 9 January 2025 C. Li
Huawei Technologies
8 July 2024
```

Table of Contents	
1. Introduction	2
2. Definition of Terms	3
3. Challenges	3
3.1. Computing Resource Energy Consumption Modeling	3
3.2. Joint Optimization of Computing and Network	3
3.3. Service Experience Guarantee	4
3.4. Energy Consumption of Other Equipment	4
4. Observation	4
5. Conclusion	5
6. Security Considerations	5
7. IANA Considerations	5
8. Acknowledgements	5
9. Informative References	5
Authors' Addresses	6

Table of Contents	
1. Introduction	2
2. Definition of Terms	3
3. Challenges	3
3.1. Computing Resource Energy Consumption Modeling	3
3.2. Joint Optimization of Computing and Network	4
3.3. Service Experience Guarantee	4
3.4. Energy Consumption of Other Equipment	4
3.5. Evaluation of Computing Equipment Energy Consumption Performance	4
3.6. Using of Green Energy	5
4. Observation	5
5. Conclusion	6
6. Security Considerations	6
7. IANA Considerations	6
8. Acknowledgements	6
9. Informative References	6
Authors' Addresses	7

Background

- Reducing carbon footprint to “Net Zero” is one of mankind’s “grand challenges”
- With the continuous development and progress of the Internet, a large amount of computing resources is required to complete data processing, which would produce a lot of energy consumption
- *Computing-Aware Traffic Steering (CATS) is about the process of selecting service instances for directing traffic to them based on observed metrics for both computing and networking*
- So green in CATS is worth exploring

Challenges Summary

- **Computing resource energy consumption modeling**
- **Joint optimization of computing and network**
- **Service Experience Guarantee**
- **Energy Consumption of Other Equipment**
- **Evaluation of Computing Equipment Energy Consumption Performance**
- **Using of Green Energy**

Challenges

Evaluation of Computing Equipment Energy Consumption Performance

- The energy efficiency level requirements of computing equipments can also be considered when performing traffic steering.
 - **High level:** less energy is consumed
 - **low level:** more energy is consumed
- There is no **standardized definition** of Evaluating computing equipment energy efficiency level.
 - It is difficult to consider the energy efficiency level of computing equipments when performing traffic steering.

Challenges

- **Using of Green Energy**

- Green energy, also known as clean energy, including nuclear energy and renewable energy.



hydroelectric power



wind power



solar energy



geothermal energy

- The development of green CATS cannot be separated from the use of green energy.
 - The more green energy is used in CATS, the least carbon footprint is emitted. And the greener it is.
- The consideration of the consumption of green energy for equipment in traffic steering is incomplete and further research is needed.

Next Steps

- Welcome more people who are interested in this topic!
- Discussions and comments?