Hierarchical Cloud Computing Architecture for Context-Aware IoT Services

Abstract

- This paper presents a new cloud computing model for context-aware Internet of Things (IoT) services. The proposed computing model is hierarchically composed of two layers: a cloud control layer (CCL) and a user control layer (UCL).
- The CCL manages cloud resource allocation, service scheduling, service profile, and service adaptation policy from a system per-formance point of view. Meanwhile, the UCL manages end-to-end service connection and service context from a user performance point of view. The proposed model can support nonuniform service binding and its real-time adaptation using meta-objects.
- Furthermore, it supports intelligent service-context management using a supervised and reinforcement learning-based machine learning framework. We implemented a lightweight prototype of the proposed computing model.
- Evaluations confirm that the proposed computing model offers enhanced performance compared with legacy uniform computing models.

Existing

- AT present, the patterns of application services, networks, and computing are changing very rapidly.
- First, the rapid improvement of networks and end-systems has led to changes in services from simple applications to a variety of intelligent multimedia applications.
- Second, improved ubiquitous interoperability and convergence technologies have led to changes in networks, from cellular- and Wi-Fi-based networks to heterogeneous networks including all-IP, device-to-device, ad-hoc, sensor networks, and Internet of Things (IoT). Lastly, new software-defined radio, resource virtual-ization, and network security technologies have led to user-oriented computing platforms

Proposed

- The proposed model can support nonuniform service binding and its real-time adaptation using meta-objects.
- Furthermore, it supports intelligent service-context management using a supervised and reinforcement learning–based machine learning framework.
- We implemented a lightweight prototype of the proposed computing model.
- Evaluations confirm that the proposed computing model offers enhanced performance compared with legacy uniform computing models

HARDWARE REQUIREMENTS

- Processor – Pentium –III
- Speed – 1.1 Ghz
- RAM – 256 MB(min)
- Hard Disk – 20 GB
- Floppy Drive – 1.44 MB
- Key Board – Standard Windows Keyboard
- Mouse – Two or Three Button Mouse
- Monitor – SVGA

SOFTWARE REQUIREMENTS

- Operating System : Windows 8
- Front End : Java /DOTNET
- Database : Mysql/HEIDISQL

Conclusion

- This paper presented a hierarchical cloud computing model for context-aware IoT services. It supports nonuniform service binding, real-time service-binding adaptation, and intelligent service-context management.
- We implemented a lightweight prototype of the proposed computing model and confirmed that the proposed model offers enhanced performance in terms of system throughput as compared with legacy uniform binding based computing models.
- The proposed computing model can be deployed to all information technology consumer devices and network entities as a key infrastructure.
- In future work, we will investigate advanced service-binding adaptation, cloud resource control, and mobility management frameworks to enhance the utilization of the proposed computing platform.

Reference

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