A Method of Capturing System Stableness Degree in Resource Discovery and Interaction

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Abstract

A method of capturing System Stableness Degree is presented, the results of experiments show that the method can capture this type of Context effectively.

1. Introduction

Reducing Cost of Service (COS, the required resources of computing, networking, power to provide services to others) is one important goal of RDI technologies. Many of the existing RDI technologies such as INS, Salutation, SLP, Jini, UPnP, SSDS and Bluetooth do not deal with reducing COS [1].

We presented a method of reducing COS based on Context-Aware Computing in our foregone works. Here we focus on a key component of this method: capturing Context. Capturing a Context - System Stableness Degree (SSD) is discussed here.

2. Contexts in the courses of devices using RDIs

There are two states in the course of devices using RDIs: Roily State, Stable State. RDI protocols need to communicate continually to discover new resources and detect leaving of resources during phases of Roily States; There are no new resources joining system and no resources leaving system during phases of Stable States. The existing RDI technologies have no response to the Stable States, this brings unnecessary COS: the resources are discovered already, but the devices still talk with each other continually. SSD helps to reduce COS: When SSD is at Stable States RDI could make devices reduce communication, or hibernate awhile.

There are some other Contexts being useful to reduce COS. Some long-term online devices such as sensors, intelligent iceboxes have special Time Spans during which there are usually no new resources joining systems, for example, from 1:00 AM to 6:00 AM.

3. Method of capturing Context SSD

Here defines a event firstly, SameNeighbor: occurs when values of system parameters V are equal during two neighboring time segments (TNTS). We can divide RDI protocols' states into Roily, Stable States, these states alternate between Roily State and Stable State. RDI systems should meet three terms to capture SSD: For values of certain system parameters V, □are not equal during TNTS when system is at Roily States; □are equal during TNTS when system is at Stable State; □are not equal during such TNTS: one is at Stable State and the other is at Roily State. Detailed theoretical proof is omitted. Then we can capture SSD by detecting SameNeighbor: SSD is at Stable State if event SameNeighbor is detected, vice versa. For our experiments system parameters V is selected as Services and Numbers of Services in SAM, viz. V= {Services of SAM, Numbers of Services of SAM} [2].

The results of experiments indicate that we can capture SSD by detecting event SameNeighbor, because in the experiments the probability of event SameNeighbor during roily period is very little, is 0 or very near 0, and is large during stable period.

REFERENCES

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