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A Web Concurrency Control Agent running on a Home M2M Network

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Abstract

Home M2M (Machine to Machine) Network provides standardized communication protocols to interoperate an application with others under dynamically changing situations. Our proposed model is to present the relationship of resources for web concurrency control running on Home M2M Network architecture. This paper proposed a new model running on Home M2M Network for web concurrency control by analyzing the window and attributes of the attributes of the object, and based on this, a mechanism that offers a seamless view without interfering with error and application program sharing is also suggested.

Keywords: *Home M2M Network architecture, web concurrency control, a seamless view*

1. Introduction

Networked computer systems designed to support collaboration allow multiple users to exchange information, share data, interact with ideas, and cooperate on common goals across geographical and time boundaries. The development of communication and data networks enables collaborative systems to support diverse activities such as crisis management, cross-continental conferencing, and distributed learning. Moreover, multimedia is deployed in collaboration to enhance usability and productivity. For example, in addition to the text and graphics information in text-chat and whiteboard, stream-based media such as audio and video are widely used [1-5]. A home network interconnects electronic products and systems, enabling remote access to and control of those products, systems and any available content such as audio, video, or data [6]. Context awareness (or context sensitivity) is an application software system's ability to sense and analyze context from various sources; it lets application software take different actions adaptively in different contexts [7, 13]. In a ubiquitous computing environment, *computing anytime, anywhere, any devices,* the concept of situation-aware middleware has played very important roles in matching user needs with available computing resources in transparent manner in dynamic environments [8, 13]. Thus, there is a great need for concurrency control algorithm in situation-aware middleware such as Home M2M Network to provide dependable services in ubiquitous computing. The system for a web based multimedia distance system includes several features such as audio, video, whiteboard, etc, running on situation-aware middleware for internet environment which is able to share HTML format. Our proposed model is to present the relationship of resources based on Home M2M Network for web concurrency control.

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2. Related Works: Home M2M Network

Figure 1 illustrates a home M2M network that can be built with products that are commercially available today. In Figure 1, three local networks (802.15.4 (ZigBee), 802.11 (Wi-Fi), Bluetooth) tie into a common backhaul. The ability to control home security, HVAC, lighting, appliances, and entertainment systems remotely or from within the home is certainly attractive to the homeowner [9].

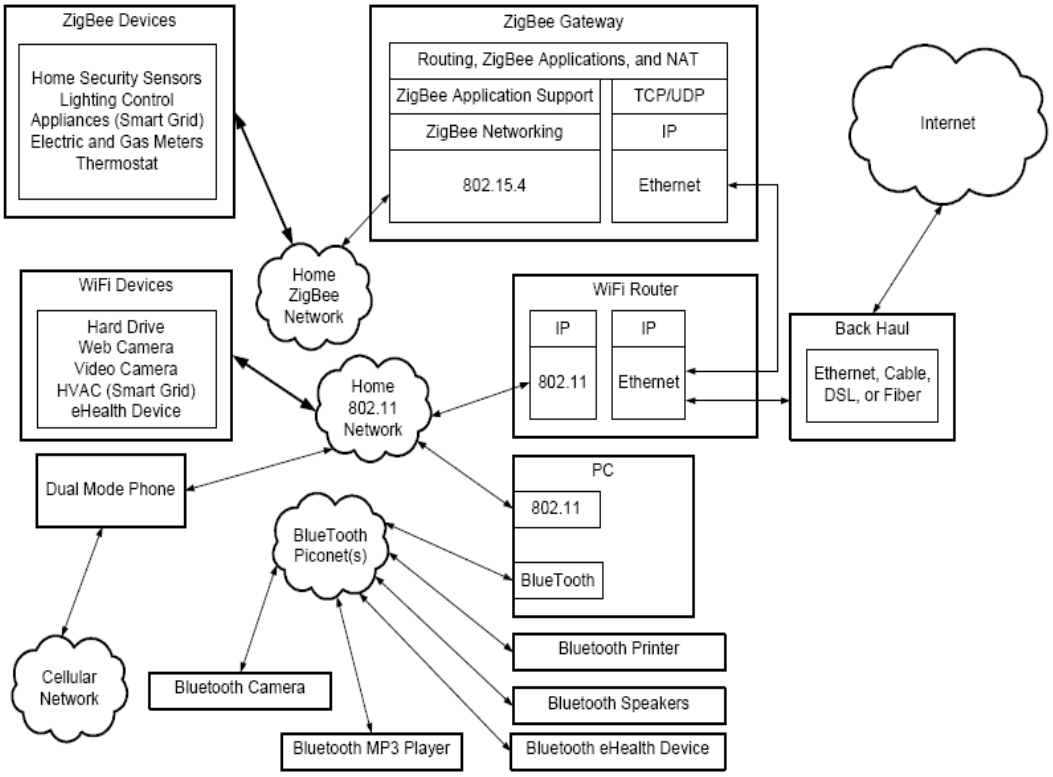

Figure 1. A Environment of a Home M2M Network

An integrated M2M gateway could provide convenient web-based management for the home network [9,10]; it could be a single point of contact that the homeowner can use to manage the entire network. The fact that there are many different physical communication links in the network would be transparent to the homeowner. The always connected, always powered gateway could query and collect data from the network at the most efficient times, and the homeowner could examine or control the network status by logging onto the gateway. The homeowner would not be burdened with managing several gateways [9].

3. Our Approach

DOORAE(Distance Object Oriented collaboRAtion Environment) is a framework technology for computer collaborative work [11, 12]. It has primitive service functions. Service functions in DOORAE are implemented with object oriented concept. We call agent layer. As shown in Figure 2, the organization of DOORAE includes 4 layers.

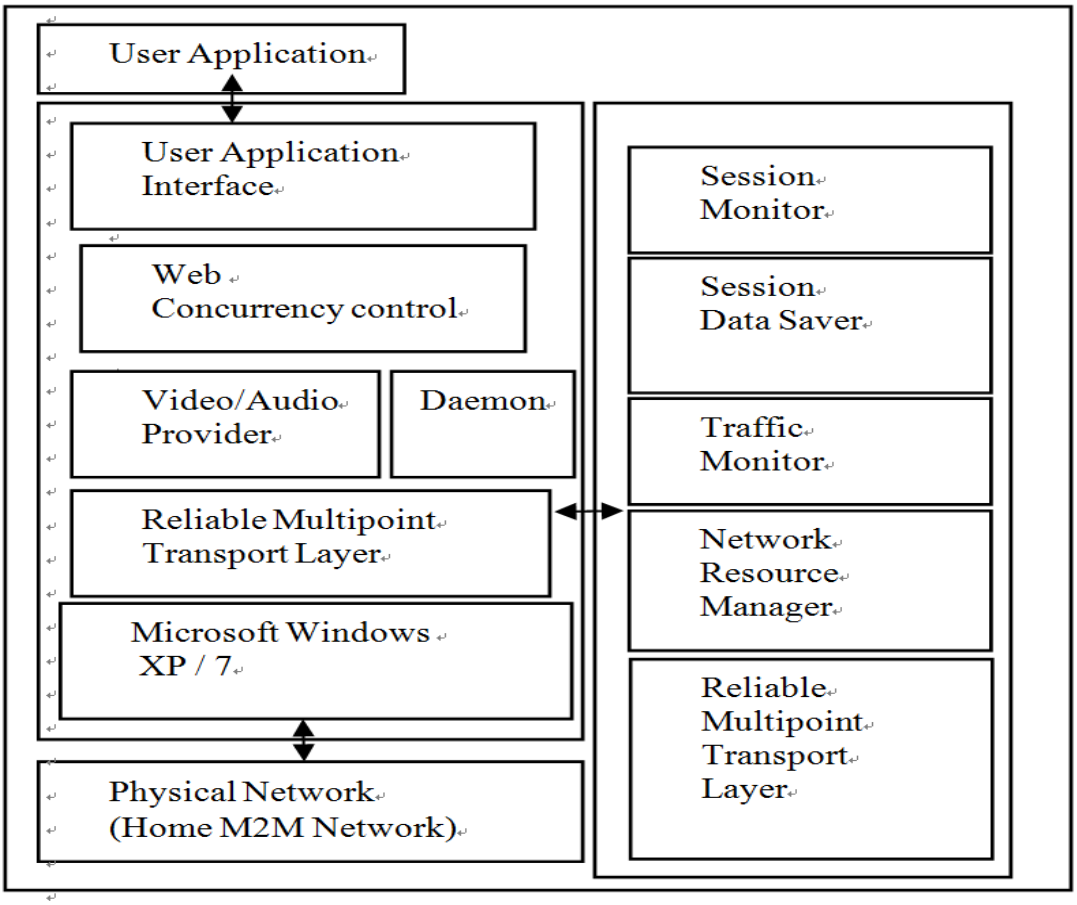

Figure 2. A Multimedia CSCW Architecture of a Home M2M Network

The four layers consist of a communication layer, a system layer, a DOORAE agent layer and a multimedia application layer running on home M2M network. DOORAE services have many agents. They consist of AMA(Application Management Agent), MCA(Media Control Agent), FTA(Fault Tolerance Agent), UIA(User Interface Agent), SMA(Session Management Agent), and ACCA(Access and Concurrency Control Agent) running on home M2M network.

AMA consists of various subclass modules running on home M2M network. It includes creation/deletion of shared video window and creation/deletion of shared window. MCA supports convenient applications using situation-aware ubiquitous computing running on home M2M network. Supplied services are the creation and deletion of the service object for media use, and media share between the remote users. This agent limits the services by hardware constraint. FTA is an agent that plays a role in detecting an error and recovering it in situation-aware ubiquitous environment running on home M2M network. UIA is a user interface agent to adapt user interfaces based on situations running on home M2M network. SMA is an agent which plays a role in connection of UIA and FTA as situation-aware management for the whole information running on home M2M network. ACCA controls the person who can talk, and the one who can change the information for access running on home M2M network.

We assumed throughout this paper the model running on Home M2M Network for web concurrency control shown in Figure 3. There are several constraints which must be satisfied

to provide guarantees during multimedia transmission. They are time, space, device, frequency, and reliability constraints. Time constraints include delays. Space constraints are such as system buffers. Device constraints are such as frame grabbers allocation. Frequency constraints include network bandwidth and system bandwidth for data transmission. In this paper, we focus on how to represent web application synchronization based on Home M2M Network. Applications based on Home M2M Network request to execute a set of missions to Situation-aware Middleware with various requirements.

This system is used to be one of services that are implemented on Remote Education System running on Home M2M Network. This Remote Education System includes several features such as Audio, Video, Whiteboard, WebNote running on Internet environment which is able to share HTML(Hyper Text Mark-up Language) running on Home M2M Network. We have implemented WebNote function running on Home M2M Network to do so either. While session running on Home M2M Network is ongoing, almost all participants are able to exchange HTML documents. For this reason, we need the URL concurrency control running on Home M2M Network. The shared window running on Home M2M Network is a window shared by all the participants, and the modification carried out by the speaker is notified to every other participants. The local window running on Home M2M Network is not shared except initial file. The tool box provides various tools for editing contents of both the shared window and the local window. Teacher and students running on Home M2M Network use their local windows and shared window indivisually. The local window running on Home M2M Network has the lecture plans which is distributed at the beginning, and enables participants to memo and browsing other parts in the lesson plans, and has functions as a whiteboard running on Home M2M Network.

As shown in Figure 3, concurrency control inevitably occurs in a multimedia distance education environment where many users perform collaborative work at the same time. There may be a case where processing cannot be done in order of arrival due to variation according to present load, processing capability of each system and network delay caused by many participants putting in commands. Concurrency control solves such problems.

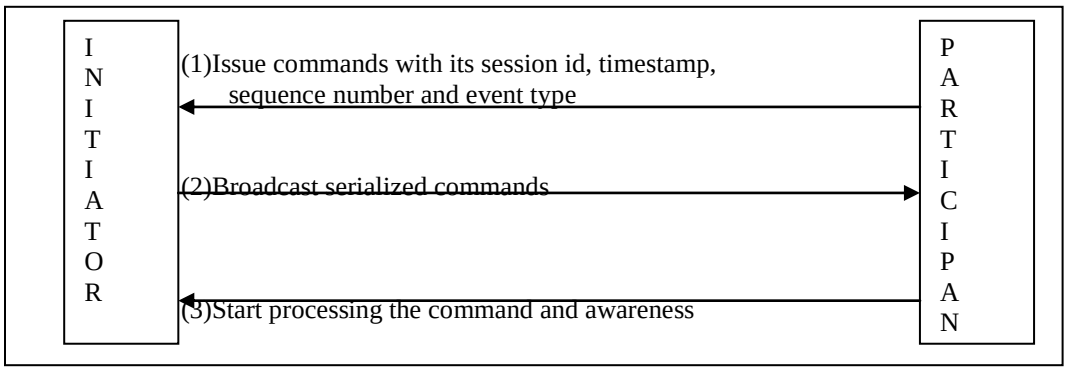

Figure 3. A Concurrency Control Running on a Home M2M Network

4. Simulation Results and Conclusions

As shown in Table 1, you can see the characteristic function of each system function for multimedia distance education.

Table 1. Analysis of Conventional Multimedia CSCW

Function	Shastra	MERMAID	MMconf	CECED
OS	UNIX	UNIX	UNIX	UNIX
Development Location	Purdue Univ. USA	NEC, JAPAN	CamBridge USA	SRI, International
Development Year	1994	1990	1990	1993
Structure	Server /client	Server /client	Centralized or Replicated	Repli-cated
protocol	TCP/IP	TCP/IP	TCP/IP	TCP/IP multicast

This paper proposed a new model running on Home M2M Network for web concurrency control by analyzing the window and attributes of the attributes of the object, and based on this, a mechanism that offers a seamless view without interfering with error and application program sharing is also suggested. We remain an adaptive agent of error and application program sharing with error elimination function for domino effect running on a hybrid software architecture which is adopting the advantage of CACV and RARV running on Home M2M Network for web concurrency.

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