Resource Sharing Through Mobile in Wireless Grid

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Abstract: - *Wireless grids, a new type of resource-sharing network, connect sensors, mobile phones, and other edge devices with each other and with wired grids. Ad hoc distributed resource sharing allows these devices to offer new resources and locations of use for grid computing. This article places wireless grids in context, explains their basic requirements, and provides an example implementation that uses a wireless grid for distributed audio recording. Finally, it introduces articles in this special issue on wireless grid architectures and applications.*

Wireless grids emerged from a combination of the proliferation of new spectrum market business models, innovative technologies deployed in diverse wireless networks, and three related computing paradigms: grid computing, P2P computing, and Web services. Wired grids are typically aggregations of fixed resources between known institutions, be they academic or corporate, in high-trust and relatively static environments.

Keywords: - Wireless, Grid, Mobile Phone, P2P, Web-services.

INTRODUCTION

Mobile technology as of today is widely used all over the word. The continuous demand of it becomes greater and greater. Its development never stops. Mobile technologies are continuous to develop and develop. Now many of us used and have mobile technology. Mobile technology changes and improves our life. We use it and help us in our many activities even though it is easy or complicated. We used it especially in communication or getting, accessing, transferring, storing and receiving information. It‘s widely use in entertainment, relaxing, job, education, emergency, security and management is cannot be denied. Mobile technology affected our daily life even without noticing it. We as the user of the mobile technology do not posses enough knowledge of how great it is and how it become very useful to us.

Mobile technology of today never stops changing. Its application now becomes more and more important. It makes our life so easier. It made things possible and more improve in the thought that we couldn‘t imagine. Today mobile technology can use in learning. It tries to change the type the education we have. It tries to improve its characteristic and lessen the burden its produce. It makes the education more adaptable to the really need of those who wants to learn [6].

The continuous developments of mobile technology make the mobile learning in demand and famous. Grid services in counterpart are a big for the advancement and improvement of mobile learning [7].

WIRELESS GRIDS

Wireless grids resemble networks already found in connection with agricultural, military, transportation, air quality, environmental, health, emergency, and security systems. A range of institutions, from the largest governments to very small enterprises, will own and at least partially control wireless grids. To make things still more complex for researchers and business strategists, users and producers could sometimes be one and the same. Devices on the wireless grid will be not

only mobile but nomadic — shifting across institutional boundaries. Just as real-world nomads cross institutional boundaries and frequently move from one location to another, so do wireless devices.

The following classification offers one way to classify wireless grid applications.

Class 1: Applications aggregating information from the range of input/output interfaces found in nomadic devices.

Class 2: Applications leveraging the locations and contexts in which the devices exist.

Class 3: Applications leveraging the mesh network capabilities of groups of nomadic devices.

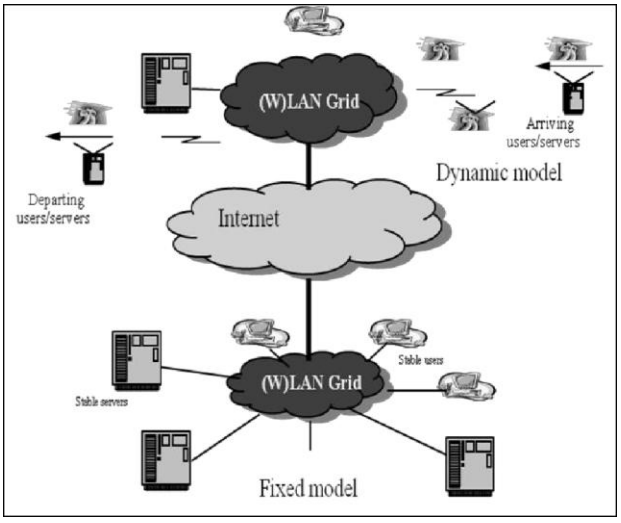

Figure 1. Dynamic and fixed wireless grids

GRID-M

Grid-M is a platform for building Grid Computing applications in embedded and mobile computing devices. It provides the Application Programming Interface (API) to connect Java-developed applications in a Grid Computing environment and its runtime profile is small enough to be used in Mobile Computing applications. Its binary version is distributed in Java 2 Micro Edition and Java 2 Standard Edition compilations. Grid Computing provides the standard protocols to enable interoperability and common Infrastructure. In the context of this work, grid computing is a platform to standardize distributed computing.

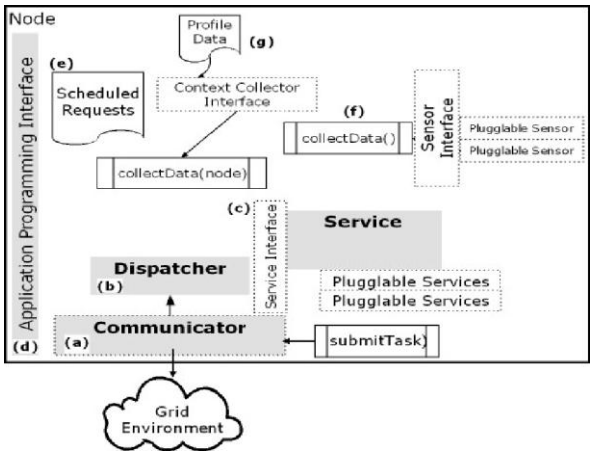

Figure 2: Grid-M Node architecture

CHALLENGES IN WIRELESS GRIDS

Due to mobile nature of wireless devices and limitations of wireless communications a number of unique challenges must be overcome when building a grid application for such devices. Applications must be capable of adjusting to frequent disconnections of specific devices from the grid. Large distributed grid systems pose new challenges in job scheduling due to complex workload characteristics and system characteristics. Due to the numerous parameters that must be considered and the complex interactions that can occur between different resource allocation policies, it encounters lot many challenges. Some of the challenges are listed below.

- Resource description
- Resource Discovery
- Resource status monitoring:
- Resource status updating and communication
- Authentication and Authorization of device/user
- Quality of Service (QoS) provision
- Energy-efficient medium access
- Mobility
- Routing of messages through the grid
- Power consumption

APPLICATIONS OF WIRELESS GRIDS

The increase in the capability/configuration of wireless devices, reduction in the cost, and the craze of people have made a drastic increase in the number of users making the wireless devices a need of today‘s life. However, the grids potentiality is not explored yet; but, the aggregated resource pool can offer a tremendous capacity so that any complex application can be made possible to execute. Wireless grids may support many applications in different areas [3], [4] as mentioned below: *Disaster management, mitigation and response* – includes applications like earthquakes, wildfire, floods, tsunamis, etc.;

Critical infrastructure systems includes condition monitoring and prediction of future capability;

Energy and environment – includes safe and efficient power grids; *Health* – reliable and cost effective health care systems with improved outcomes; *Enterprise-wide decision making* - coordination of dynamic distributed decisions for supply chains under uncertainty.

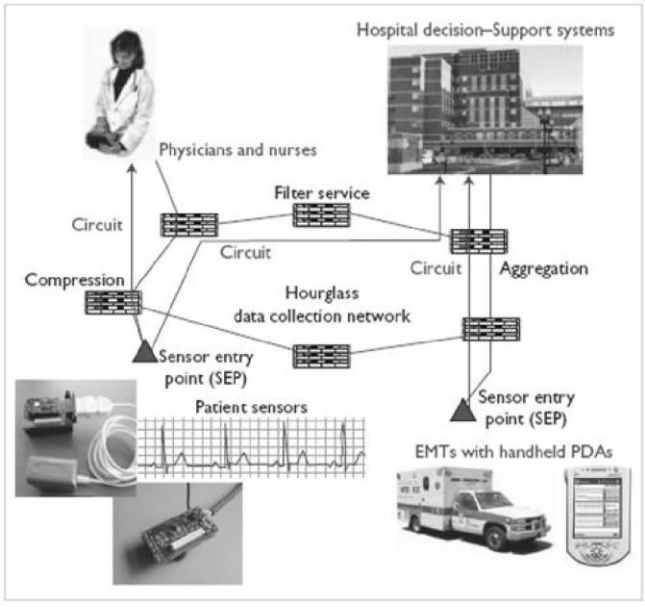

Figure 3*:* A sensor data collection network to integrate sensor data into grid applications

Some of the applications are listed below

- Disaster management
- Emergency Response System
- Musical entertainment
- Health care services

RELATED WORK DONE

IMPLEMENTATION IN WIRED GRID

Alchemi is a .NET based grid computing framework that provides run time machinery and programming environment required to construct the desktop grid and developed the grid application. It allows us flexible application composition by supporting the object-oriented grid programming model. Cross platform support is provided by Web- services and flexible execution model supports dedicated execution by grid nodes.

ALCHEMI FRAMEWORK

The aim of Alchemi grid computing framework is not to develop the grid software as easy as possible but flexible, scalable, reliable, and extensible. The key features of the Alchemi are,

- Internet based cluster computing for desktop computer without a shared File System
- Dedicated execution by cluster and individual nodes.
- Object-oriented grid thread programming model.

THREAD PROGRAMMING

The two central classes in alchemi grid API are GThread and GApplication that represent the grid thread and grid application respectively. GThread is used for the code to be executed remotely and GApplication is for locally executed code.

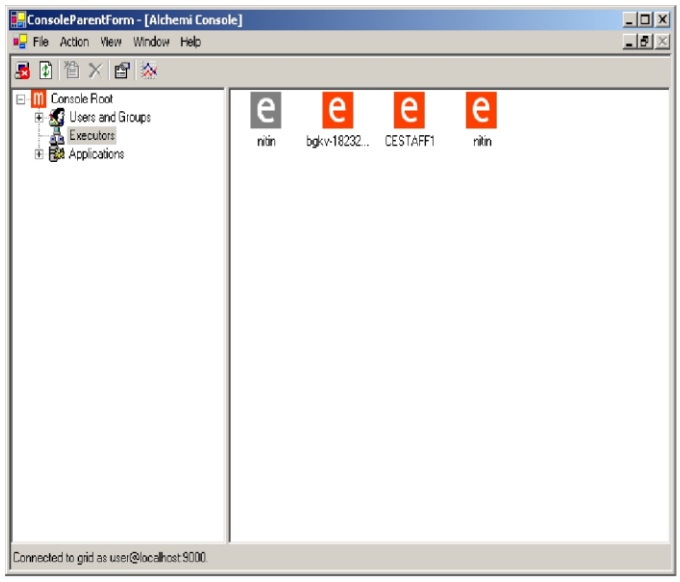

Figure 4: The no. of Executor are connected

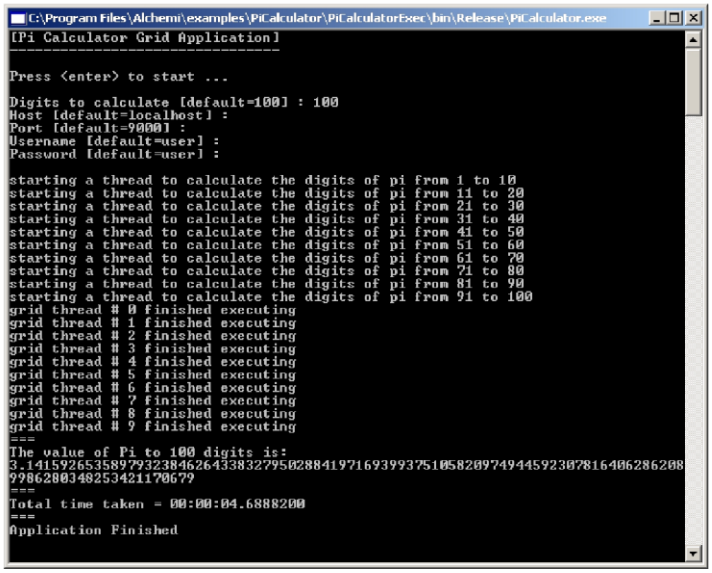

Figure 6: Thread Execution on Executor

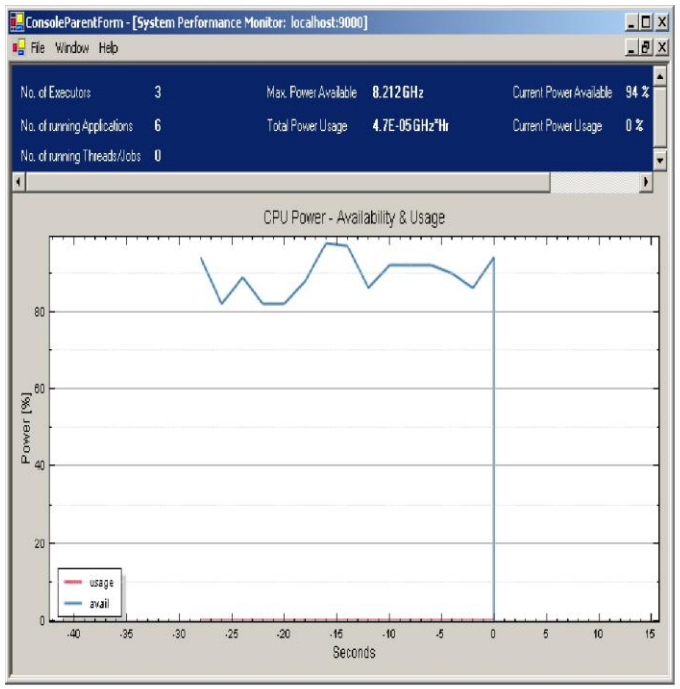

Figure 5: Before the Application executed on the executor the graph of available power and processors

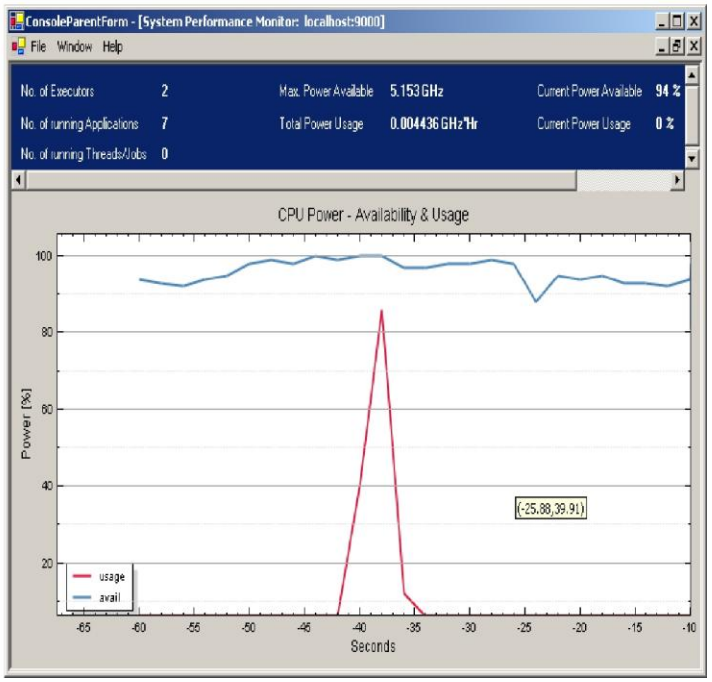

Figure 7: During the application executed on the executor the graph of used power and processor

CONCLUSION

Wireless computational grid using mobile devices can enable ubiquitous computing. However, we also intend to prove the concept of the architecture via experimental means. In the immediate future, we plan to create a wireless computational grid based on the proposed architecture.

The demand for anytime, anywhere connectivity has led to renewed efforts to enable ubiquitous computing. However, current-generation mobile devices lack the resources for prolonged, general computational use, rendering them incapable of supporting a pervasive computing environment. Grid computing provides a solution through which the goal of ubiquitous computing can move a step closer to realization.

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