Review of Grid Computing Using Sensor Network

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Abstract

It is conceivable that by conveying inactive assets either from IT Infrastructure or home, the grid clients can win dollars. In addition, the scope of the thesis is briefed. Finally, the Chapter points out the contributions of the thesis. The concept of a Grid emerged from the “Power Grid” concept (1910). A power grid was used in the power transmission system and is sometimes referred to colloquially as a "grid"; however, for reasons of economy, the network is not a mathematical grid. Excess ways and lines are given with the goal that power can be directed from any power plant to any load focus, through an assortment of courses, in light of the financial aspects of the transmission way and the expense of intensity. Likewise, the Grid additionally gives amalgamation of many inactive resources for handling their applications. "A computational grid is an equipment and software infrastructure that gives reliable, predictable, inescapable, and reasonable access to top of the line computational abilities."

Keyword: Web services, Resource discovery

Introduction

"A computational grid is an equipment and software infrastructure that gives reliable, predictable, inescapable, and reasonable access to top of the line computational abilities." The meaning of Grid computing is given in various structures (Daniel Minoli 2005) as pursues: "Grids empower the sharing, determination, and total of a wide assortment of geologically circulated computational resources and present them as a solitary, bound together asset for explaining vast scale register and information serious computing applications." " The exemplification of grid computing lies in the compelling and perfect utilization of a wide extent of heterogeneous, around coupled assets in an affiliation connected to present day remaining task at hand the board capacities or information virtualization."

Grids support the better utilization of resources such as compute, data, memory, instruments and so forth that are dispersed geographically and anticipate providing enough income to their clients. Taking advantage of the uneven usage of computers, during early morning hours and the time scale difference throughout the world, it is optimistic to share the idle resources for solving large-scale problems and earn currency. Hence, computation-rich applications such as data mining, earth quake forecast, fluid dynamics, weather predictions,

and smart instruments seek the necessity of distributed sharing of large-scale problems, which can be subdivided into finite smaller tasks '*Tn*' and dispersed to Grid sites for the workflow execution.

Milestones in Grid Computing

The Grid Technology has noted a substantial change in the ways global industries, business and home users apply computing devices, including a wide variety of ubiquitous computing resources and advanced Web services.

Table 1. Milestones in IT related to Grid Computing

Year	Event
1967	Computer Network Developed by Donald Davis
1972	International Networking Group Formed
1986	Internet Engineering Task Force Created.
1988	Inauguration of Condor project
1991	CORBA v 1.1 Introduced
1993	Launch of Legion project
1994	Nimrod project launched
1996	SETI@home launched
1997	UNICORE project launch
1998	Released Globus v1.0.0
2000	SUN Grid Engine released
2001	European Union Data Grid project Launched. UK e-Science project launch. US TeraGrid project launch.
2002	Open Grid Services Architecture Developments started.
2003	MyGrid project launch
2004	Web Services Resource Framework Technology. World Community Grid Launch.

2005	Fightaids@home project Launch.
2007	SDSC's Gemstone project.
2008	Grid: The next Generation Internet.

The evolution of Grid computing is broadly classified into three generations. The first two generations concentrated on large-scale resource discovery, utilization, and sharing within the virtual organizational boundaries. Resource discovery addresses the challenge in finding the apt resource for any Grid application. Resource utilization is necessary because the resources that are identified as idle for any time instance may be less compared to the job request that is received by the Grid. These two generations extended the Virtual Organizations as a new trend of Grid technology. The major drawback in these two generations was the lack of transparency among the middleware. In the third generation, the Grid applications and solutions focus on open technology-based, service-oriented, and horizontally oriented solutions. Advances in microprocessor, networking, and storage technologies have been nothing short of astounding. This core technology ensemble has contributed to creating an extremely powerful infrastructure for consumer and business applications. The ever-increasing power and declining costs of these core technologies, have lead to the evolution of new technologies such as Grid computing in the field of Information Technology (IT).

Review of Literature

Wireless sensor network used for variety of applications ranging from low data rate event driven applications to high data rate real time applications (Gavrilovska, 2010). Due to the limited hardware size and battery capacity, WSN requires methods to reduce power consumption in order to extend the longevity of network. To improve the lifetime of sensor network (Akyildiz et al. 2002) studied and proposed many algorithms and protocols for different WSN applications. Since the communication of sensor nodes consumes more energy than computation, it is a major anxiety that the communication should be efficient to optimize the network lifetime. However, it is very difficult to achieve a medium access decision within a dense network of low duty cycle nodes. Hence, to achieve efficient media access scheme, the reasons for energy wastes are to be studied first. Type of application and communication pattern observed are studied and analyzed since these patterns are used to study the behavior of sensor network traffic that is handled by MAC protocol. Design of MAC protocol for WSN is a difficult task due to their challenging application environments and ad-hoc nature of network. Having these in minds, the following section emphasizes peculiar characteristics of MAC protocol including potential reasons for energy waste.

Energy Problems on MAC layer

MAC protocol is used to control the radio part of sensor node. This transceiver is operated in four different states: Transmit, Receive, Sleep and Idle. An energy consumption property of transceiver varies in different operational states. Transmitting is costly and the cost of receiving is often same as transmitting cost. Cost of idling is less compared to transmitting and receiving. Sleeping cost is negligible compared to other costs. Due to these different operating states, the following parameters will introduce the energy problems in the MAC layer design (Yadav et al. 2009)

Collisions

Simultaneous transmission of multiple nodes leads to collision. This will increases the receive cost at destination node and transmit cost at source node. The packet that causes collision is to be discarded and requires re-transmission of collided packets to compensate data loss. Retransmission of packet leads to unwanted energy consumption.

Overhearing

WSN uses the broadcast medium. Therefore all neighbors of source node that are in receive state will hear a data packet and drop it when it is not intended for them. This type of overhearing leads to additional energy consumption.

Protocol overhead

To reduce collision during channel accessing the control frames RTS (Ready To Send) and CTS (Clear To Send) are used in MAC operation. These control packets will induce protocol overhead. Packet headers and trailers also provoke the protocol overhead.

Idle Listening

A node in idle state needs to look for data in channel. In this case, the node keeps its radio on while listening to the channel waiting for potential data frames. Consequently there will be a loss of energy. Thus Idle Listening is one of the major reasons for energy wastage. When a node is not ready to receive data, the message transmission to that node causes over emitting. This leads to data loss and requires retransmission which increases energy consumption.

Conclusion

Ordinarily the extensive number of SNs is sent in unattended condition where it's unrealistic to supplant or revive the battery of nodes. So the using the current battery intensity of SNs in better way is an imperative issues to enhance energy effectiveness and network lifetime of WSN. This section closes the theory by condensing the principle commitments and talks about the future work. The framework models talked about in this proposal is an endeavor to improve the network lifetime of WSNs regarding energy effectiveness as the primary parameter. The unique circumstance and the extent of the problem considered in this examination are affirmed through a point by point and complete study of past work on energy proficiency in WSNs.

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