



Issue for performance improvement in the wireless network

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ABSTRACT

The conception of wireless ATM is currently being actively thought of as a possible framework for next generation wireless communication networks capable of supporting integrated transmission services with different QoS needs. many key system style problems for wired ATM and wireless networks needs to be readdressed within the scope of the wireless ATM, that has the potential to increase the applied mathematics multiplexing of wired ATM network into the wireless medium. one among the key system problems is that the development of applicable medium access management (MAC) protocol. The extension of the ATM network into wireless surroundings faces several attention-grabbing issues. the first ATM network was designed for high speed, noiseless, and reliable channels. None of those characteristics area unit applicable to the wireless channel. one among the vital aspects of a wireless ATM network is that the Medium or Multi Access management (MAC) Protocol utilized by the Mobile station (MS) to request service from the bachelor's degree, that should take into account the Quality of Service (QoS) of the precise applications. This paper analyses recently projected mackintosh protocols, significantly those of Demand Assignment Multiple Access protocols exploitation TDMA technique with Frequency Division Duplex (FDD). It additionally offers performance measures of 2 best suited protocols for wireless network surroundings Distributed Queuing Request Update Multiple Access (DQRUMA) protocol and adjustive Request Channel Multiple Access (ARCMA) protocol.

1. INTRODUCTION

The wired communication network are dominated by the broad band ATM network, which is an integrated transmission wireless network. Therefore, the provisioning of clear transmission packets between wireless and wired network during which packet header process is kept to minimum, is very fascinating. thus the transmitted packets within the wireless medium are within the ATM format encapsulated with a further header and trailer for the usage of wireless network protocols stacks. This state of affairs provides the subsequent advantages: compatibility with wired ATM network and fewer interval of wireless/wired interface.

The conception of ATM is end-to-end communication i.e. during a Wide space Network surroundings, the communication protocol are constant i.e. ATM, and corporations can not have to be compelled to obtain extra instrumentation (like routers or gateways) to interconnect their LANs (local space networks). Also ATM is taken into account to cut back the quality of the network and improve the pliability whereas providing end-to-end thought of traffic performance.

1.1 ATM Cell

ATM could be a mounted size packet-based change and multiplexing technology designed to be a connection-oriented transfer mode that supports a large vary of services. Its transmission theme can operate at either constant or variable bit rates. ATM additionally supports applications of various QoS, that specifies tolerable cell delay and cell loss chance. The first unit (packet) in ATM is named a cell. The ATM commonplace defines a fixed-size cell with a length of fifty three bytes, which is composed of 5-byte header and a 48-byte payload. These fixed-sized cells scale back the complexity of ATM switches and multiplexers permitting cells to be relayed at terribly high speeds. The typical bit rates at the terminals area unit twenty five Mbps, 155 Mbps, and 622 Mbps. The conversion of user knowledge into ATM cells, and contrariwise, is performed by the ATM Adaptation Layer(AAL), which resides directly on top of the ATM layer of the network.

1.2 ATM Services

Users request services from the ATM switch in terms of destination(s), traffic, type(s), bit rates(s), and QoS. These needs area unit sometimes classified along and classified in several ATM classifications. The prototypal ATM services area unit classified as follows: Constant Bit Rate (CBR): Connection-oriented constant bit rate service like digital voice and video traffic. Real-Time Variable Bit Rate (rt-VBR): meant for time period traffic from bursty sources such as compressed voice or video transmission. Non-Real-Time Variable Bit Rate (nrt-VBR): meant for applications that have bursty traffic but don't need tight delay guarantees. this sort of service is acceptable for connectionless data traffic. Available Bit Rate (ABR): meant for sources that settle for time-varying offered information measure. Users solely bonded a minimum cell rate (MCR). AN example of such traffic is computer network emulation (LANE) traffic.



Unspecified Bit Rate (UBR): Best effort service that's meant for non-critical applications. It does not give traffic-related service guarantees.

2. MULTIPLE ACCESS PROTOCOLS

A multiple access protocol could be a theme to manage the access to a shared communication medium among numerous users. Access protocols is classified in keeping with the information measure allocation, which can be static or dynamic, and in keeping with the kind of management mechanism enforced. Multiple access protocols is classified into mounted assignment, random assignment and demand assignment.

2.1 mounted Assignment

Time-division multiple access (TDMA) and frequency-division multiple access (FDMA) area unit fixed assignment techniques that incorporate permanent subchannel assignment to every user. These ancient schemes perform well with stream-type traffic, like voice however area unit inappropriate for integrated transmission traffic thanks to the radio channel spectrum utilization. In a fix assignment surroundings, a subchannel is wasted whenever the user has nothing to transmit. it's wide accepted that almost all services within the broadband surroundings area unit VBR (bursty traffic). Such traffic wastes lots of information measure during a fix assignment theme.

2.2 Random Assignment

Typical random assignment protocols like acknowledgement and Carrier Sense Multiple Access with Collision Detection (CSMA/CD) area unit a lot of economical in service bursty traffic. These techniques allocate the total data rate to a user for brief periods, on a random basis. These packetoriented techniques dynamically apportion the channel to a user on per-packet basis. Although there are few versions of the acknowledgement protocol, in its simplest type it permits users to transmit at can. Whenever 2 or a lot of user transmissions overlap, a collision happens and users have to be compelled to convey after a random delay. The acknowledgement protocol is inherently unstable because of the random delay. That is, there's an occasion that a transmission is also delayed for AN infinite time. Slotted acknowledgement is a simpler modification of the acknowledgement protocol. once a collision, rather than retransmitting at a random time, slotted acknowledgement retransmits at a random interval. In a plain CSMA protocol, a user will not transmit unless it senses that the transmission is idle. In CSMA/CD, the user additionally detects any collision that happens throughout transmission. the mixture provides a protocol that has a high output and low delay. However, carrier sensing could be a major drawback for radio networks. thence carrier sensing needs refined directional antennas and pricy amplifiers for each the bottom station (BS) and mobile station (MS). Such needs aren't feasible for the low steam-powered mobile terminal finish. Code-division multiple access could be a combination of mounted and random assignment. CDMA has many blessings like close to zero channel access delay, information measure potency and wonderful multiplexing. However, it suffers from vital limitations like restricted transmission rate, complex BS, and issues associated with the ability of its transmission signal. The limitation in transmission rate could be a vital downside to exploitation CDMA for integrated wireless networks.

2.3 Demand Assignment

In this protocol, data rate is appointed to users on demand basis, on needed. Demand assignment protocols usually involve 2 stages: a reservation stage wherever the user requests access and a transmission stage wherever the particular knowledge is transmitted. atiny low portion of the transmission channel, referred to as reservation sub channel, is employed only for users requesting permission to transmit knowledge. Short reservation packets area unit sent to request channel time exploitation some simple multiple access schemes, typically, TDMA or slotted acknowledgement. Once channel time is reserved, knowledge is transmitted through the second sub channel contention-free. Unlike a random access protocols wherever collisions occur within the knowledge transmission sub channel, in demand assignment protocols, collisions occur solely within the small-capacity reservation sub channel. This reservation technique permits demand assignment to avoid information measure waste because of collisions. In addition, in contrast to mounted assignment schemes, no channels area unit wasted whenever a VBR user enters AN idle amount. The appointed information measure can merely be allotted to a different user requesting access. because of these options, protocols supported demand assignment techniques area unit best suited for integrated wireless networks. Demand assignment protocols is classified into 2 classes supported the management theme of reservation and transmission stages. they'll be either centralized or distributed. An example of a centralized controlled technique in demand assignment is polling. every user is consecutive queried by the bachelor's degree for transmission privileges. This theme, however, depends heavily on the reliability of the centralized controller. An alternative approach is to use distributed management, wherever MSs transmit supported info received from all different MSs. Network info is transmitted through broadcast channels. Every user listens for reservation packets and performs constant distributed programming algorithmic program based on the data provided by the MS within the network. Requests for reservation area unit typically created exploitation competition or mounted assignment schemes.



3. DEMAND ASSIGNMENT MULTIPLE ACCESS PROTOCOLS

Most Demand Assignment Multiple Access (DAMA) protocols use time-slotted channels that are unit divided into frames. reckoning on the transmission rate and therefore the kind of services, the channel bandwidth is depicted by one or multiple frame(s). every frame is split into transmission and downlink amount (channel). These periods are unit more divided into 2 subperiods or slots. They can be divided on a slot-by slot or amount basis. In the slot-by-slot technique, every transmission and downlink amount consists of one interval. In the method by amount, the transmission and downlink amount contain multiple time slots, encapsulated as a frame. The transmission and downlink communications is physically separated exploitation totally different frequency channels or dynamically shared exploitation the time-division duplex (TDD) system.

A user requests information measure using the RA subperiods (uplink). once the bachelor's degree hears a undefeated request (no collision) it'll notify the corresponding user through the ACK subperiods (downlink). undefeated users are unit then assigned information measure, if offered, within the tantulum subperiods. The Doctor of Divinity periods are unit utilized by the bachelor's degree to transmit downstream knowledge to mobiles. These subperiods (also referred to as slots) vary long depending on the kind and quantity of data they carry (determined by the protocol designer). The RA and ACK slots are unit abundant smaller than the information slots; thence their time intervals are referred to as minislots. reckoning on the protocol, they will not have equal lengths.

4. CONCLUSION

Wireless ATM is taken into account as a promising technique for future broadband wireless networks and is beneath analysis prototyping at numerous establishments. This paper focuses on the role of the medium access management protocol in supporting transmission traffic and QoS. Protocols for multimedia wireless ATM are unit still evolving. several protocols are projected, and most of them are unit solely totally different in details of implementation, or variant style for specific wireless architectures. The common trend discovered in these protocols is requiring the mobiles to request resources through reservations – with or while not contentions. the bottom station is thought to be an ATM switch that statistically multiplexes the wireless links among the mobiles. This approach will give the way to integrate similar packet programming ways on wired ATM network. This paper presents comparison for protocols, that contain most characteristics of current available channel access protocols for wireless ATM. though all the compared protocols have their blessings and limitations once it involves wireless knowledge packet networks, DQRUMA and ARCMA appear to supply the foremost economical theme for wireless ATM. of those protocols compared only DQRUMA and ARCMA are simulated. The simulation results show that ARCMA performs higher than DQRUMA no matter the traffic load. ARCMA produces considerably higher channel output than DQRUMA as a result of its ability to differentiate between the services (CBR, VBR) of ATM. ARCMA brings United States of America one step nearer to coming up with an entire protocol suite that would be employed in the wireless ATM networks.

REFERENCES

- [1] Anna Hac and Boon Ling Chew. "ARCMA – adaptive request channel multiple access protocol for wireless ATM networks" International Journal of network management. Network Mgt 2001, 11:333-363 (DOI: 10.1002/nem.411)
- [2] Osama Kubbar and Hussein T. Mouftah "Multiple Access Control Protocols for Wireless ATM: Problems Definition and Design Objectives" IEEE Communications Magazine Nov 97.
- [3] Ender Ayanoglu, Kai Y. Eng and Mark J. Karol. "Wireless ATM: Limits, Challenges, and Proposals" IEEE Personal Communications Aug 1996.
- [4] Norman Abramson. "Multiple Access in Wireless Digital Networks" Proceedings of the IEEE vol 82, No 9, Sep 1994.
- [5] Rainer Handel, Manfred N. Huber, Stefan Schroder "ATM networks: Concepts, Protocols, Applications".