In-Flight Entertainment Systems Inside aircraft Cabin using hybrid protocol

Ms.M.Anitha[1],Ms. C.Priyadarshini[2], Mrs.R.Ahila[3]
[1] UG Scholar
Department of Information Technology
Faculty of Engineering
Avinashilingam Institute For Home Science and Higher Education For Women
Coimbatore
Email:anithamohanraj17@gmail.com
[2]UG Scholar
Department of Information Technology
Faculty of Engineering
Avinashilingam Institute For Home Science and Higher Education For Women
Coimbatore
Email:Priya061194@gmail.com
[3]Assistant professor
Department of Information Technology
Faculty of Engineering
Avinashilingam Institute For Home Science and Higher Education For Women
Coimbatore
Email:akilaprofessional@gmail.com

Abstract:

In-flight entertainment (IFE) refers to the entertainment available to aircraft passengers during a flight. Today, in-flight entertainment is offered as an option on almost all wide body aircraft. While some narrow body aircraft are not equipped with any form of In-flight entertainment at all. One major obstacle in creating a in-flight entertainment system is system safety. With the sometimes miles of wiring involved, voltage leaks and arcing become a problem. This is of more than theoretical concern. To contain any possible issues, the in-flight entertainment system is typically isolated from the main systems of the aircraft. The companies involved are in a constant battle to cut costs of production, without cutting the system's quality and compatibility. Cutting production costs may be achieved by anything from altering the housing for personal televisions, to reducing the amount of embedded software in the in-flight entertainment processor. Difficulties with cost are also present with the customers, or airlines, looking to purchase in-flight entertainment systems. Therefore, we propose a new wireless heterogeneous architecture for better In-Flight Entertainment (IFE) systems.

I. INTRODUCTION

The basic idea behind IFE systems was to provide passengers with comfortableness during their long range flights, so that services were initially based on delivering food and drinks to passengers. As passengers demand for more services grows, accompanied with an increase in airlines competition and technology advancement, more services were introduced and modern electronic devices played a remarkable role. This caused a change in the basic concept behind IFE systems; it becomes more than just giving physical comfortableness. It is extended to provide interactive services that allow passengers to participate as a part of the entertainment process as well as providing business oriented services through connectivity tools. Moreover, it can provide means of health monitoring and physiological comfort.

II. RELATED WORK

Video on Demand:

IFE systems usually include screen-based, audio and communication systems. The screen-based products include video systems enabling passengers to watch movies, news and sports. These systems had progressed into Video on Demand (VoD), allowing passengers to have control when they watch movies. The general VoD problem is to provide a library of movies where multiple clients can view movies according to their own needs in terms of when to start and stop a movie. This can be solved by using an In-flight Management System to store the pre-recorded contents on a central server, and streams a specific content to passengers privately.

Single and multiplayer games:

Video games are another emerging facet of in-flight entertainment. Gaming systems can be networked to allow interactive playing by multiple passengers. Providing high quality gaming in an aircraft cabin environment presents significant engineering challenges. User expectation of video quality and game performance should be considered because many users had experienced sophisticated computer games with multiplayer capabilities, and high quality three dimensional video rendering. Network traffic characteristics associated with computer games should be studied to help in system design

E-documents:

An in-flight magazine is a free magazine usually placed at the seat back by the airline company. Most airlines are distributing a paper version, and some of them are now distributing their magazines digitally via tablet computer applications. Furthermore, eBooks are widely available electronically with value-added features and search options not available in their print counterparts. Electronic versions are not limited to just text; they may present information in multiple media formats, for example, the text about a type of bird may be accompanied by video depicting the bird in flight and audio featuring its song. Using an electronic version of printed media can change their importance by adding interactive features such as e-commerce services where a passenger can choose his products and buy them instantaneously.

III. E-DOCUMENT ARCHITECTURE

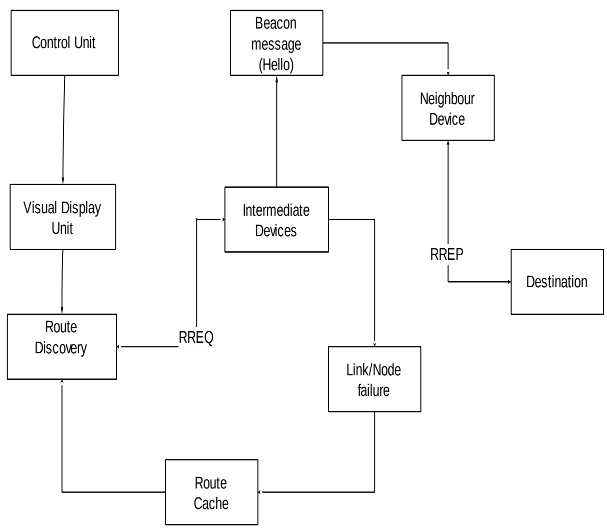

Fig1: Architecture of E-Document

Route Discovery:

When some source node originates a new packet destined to some other destination node , it places in the header of the packet a source route giving the sequence of hops that the packet should follow on its way to destination. Normally, Source will obtain a suitable source route by searching its Route Cache of routes previously learned, but if no route is found in its cache, it will initiate the Route Discovery protocol to dynamically find a new route to destination.

Route Maintenance:

This confirmation of receipt in many cases may be provided at no cost to routing, either as an existing standard part of the MAC protocol in useor by a passive acknowledgement If neither of these confirmation mechanisms are available, the node transmitting the packet may set a bit in the packet'sheader to request a specific software acknowledgement be returned by the next hop; this softwareacknowledgement will normally be transmitted directly to the sending node, but if the link between thesetwo nodes is unidirectional, this software acknowledgement may travel over a different, multi-hop path

IV. IMPLEMENTATION

In an ad-hoc network, it can be assumed that the largestpart of the traffic is directed to nearby nodes. Therefore,ZRP reduces the proactive scope to a zone centered on Each node. In a limited zone, the maintenance of routing information is easier. Further, the amount of routing information that is never used is minimized.

Routing:

A node that has a packet to send first checks whether the destination is within its local zone using information provided by IARP. In that case, the packet can be routed proactively. Reactive routing is used if the destination is outside the zone. The reactive routing process is divided into two phases: the route request phase and the route reply phase. In the route request, the source sends a route request packet toits peripheral nodes using BRP. If the receiverof a routerequest packet knows the destination, v it responds bysending a route reply back to the source Otherwise, itcontinues the process by bordercasting the packet. In this way, the route request spreads throughout the network. If a node receives several copies of the same route request, these are considered as redundant and are discarded.

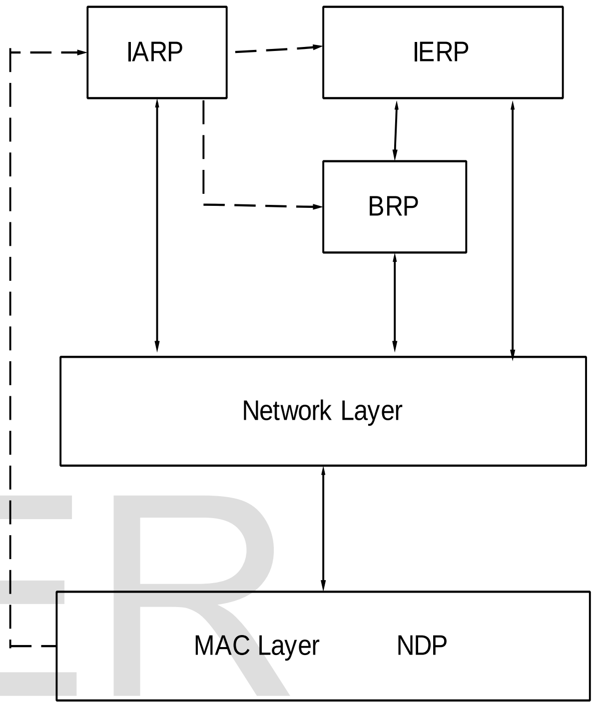

Figure1:Flow diagram of Hybrid Protocol

Border casting:

In the bordercasting process, the bordercasting node sends a route request packet to each of its peripheral nodes. This type of one-to-many transmission can be implemented as multicast to reduce resource usage. One approach is to let the source compute the multicast tree and attach routing instructions to the packet. This is called Root-Directed Bordercasting (RDB). Another approach is to reconstruct the tree at each node, whereas the routing instructions can be omitted. This requires that every interior nodeknows the topology seen by the bordercasting node. Thus, the nodes must maintain anextended routing zone with radius.

Zone Radius:

The zone radius is an important property for theperformance of ZRP. If a zone radius of one hop is used, routing is purely reactive and bordercasting degenerates into flood searching. If the radius approaches infinity, routing is reactive. The selection of radius is a trade off between the routing efficiency of proactive routing and the increasing traffic for maintaining the view of the zone.

IARP and IERP:

ZRP refers to the locally proactive routing component as the IntrA-zone Routing Protocol (IARP). The globally reactive routing component is named IntEr-zone Routing Protocol (IERP). IERP and IARP are not specific routing protocols. Instead, IARP is a family of limited-depth, proactive link-state routing protocols. IARP maintains routing information for nodes that are within the routing zone of the node. Correspondingly, IERP is a family of reactive routing protocols that offer enhanced route discovery and route maintenance services based on local connectivity monitored by IARP.

BRP:

Instead of broadcasting packets, ZRP uses a concept called bordercasting. Bordercasting utilizes the topology information provided by IARP to direct query request to the border of the zone. The bordercast packet delivery service is provided by the Bordercast Resolution Protocol (BRP). BRP uses a mapof an extended routing zone to construct bordercast trees for the query packets. Alternatively, it uses source routing based on the normal routing zone. By employing *query control* mechanisms, route requests can be directed away from areas of the network that already have been covered

V.CONCLUSION

Since the very beginning, IFE systems were targeting passenger comfortableness. This target was the main intention to develop services dedicated to passengers. As time goes, business requirements changes, so IFE systems start to reveal another dimension of services to support crew members and airline companies in order to facilitate crew tasks and increase airline revenue. Recent technological advancements helped designers to offer various designs and services. However, this variations increased system complexity and former design techniques become less efficient. In this work, we showed the design steps for a part of an IFE system and how it can be modelled.

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