| | |
|---|---|
| PROJECT | IEEE P802.16 Broadband Wireless Access Study Group |
| TITLE | System Requirements Agenda and On-the-fly Notes from 5/99 Boulder Meeting |
| SOURCE | Brian Petry                          Voice:   619-674-8533<br>3Com                                  Fax:  619-676-7533<br>12230 World Trade Dr. San Diego        E-mail:  brian_petry@3com.com<br>CA 92128 |
| DIST | IEEE P802.16 Working Group |
| ABSTRACT | This document is a capture of our discussion agenda from the 5/99 Boulder meeting. During this meeting, I chaired a discussion on system requirements and also jotted some notes done on the agenda on-the-fly. I submit this as a contribution as some people in the group requested. |
| NOTICE | This document has been prepared to assist the IEEE P802.16.  It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |

**System Requirements Agenda**

[view in outline mode: View->Outline]


**Sort out the agenda**


**Charter of System Requirements Task Group**

      What are we doing and why are we doing it?

      What sort of document will we produce?

            Scope

                  Provide a terms-of-reference and high level architecture for broadband wireless access systems.  Included is a reference model and high-level description of interfaces.  The document provides a view of the system from customer premises interfaces to network infrastructure interface.  Although the document describes a wide view of the system, its purpose is to provide guidelines, terminology and interface description to aid in standardizing air interface protocols.  The System Requirements will not be a standard or even recommended practice, but the substance of the document may be included in the air interface standard.

                  Specifies what the MAC and PHY need to support.

            Level of detail

                  Short paragraph summaries

                  In the neighborhood of 15-20 pages

                  No PHY or MAC specifics (left to air interface doc)

      What issues need to be resolved to produce a meaningful document?

      When can we get it done?

            Goal: draft on July 5

            Deadline for more submissions: June 7?


**Minutiae and Process**

      Submission/Editing Process

      Email reflector (use SYSREQ: in subject)

## Target Supported Applications and Services

***that affect MAC and PHY requirements***
Bearer services supported by MAC or PHY
      ISDN: BRI?/PRI
      Frame Relay
      STM Sychronous Transfer Mode; PDH/SDH
          Voice services must not affect broadband nature of air interface
      ATM cell relay service
      IP variable length frames
      802.1 bridging

Broadcast and Multicast services
      Video
      Audio

Use classification of traffic ala IETF and atm
      Apps and services boil down to type of service/qos params

~~Best of service IP transport (no QoS)~~
~~IP QoS-based services, including VoIP~~
~~Virtual Private Networks: link small branch offices to central~~
~~Voice~~
~~POTS/Telephone~~
~~PBX Integration~~
~~STM transport (e.g. T1/E1, multiples)~~
~~Video~~
~~Conference~~
~~Broadcast~~
Backhaul services for other wireless services (e.g., cell/pcs)

## Reference Diagram

Include Radio back-haul in diagram
Reference Point/Interface naming
Explicit IWFs: STM, ATM, IP
Mention telco-ish signalling IWFs? (GR 303, H.323, SIP, T1/E1, etc.)

## Summary of ITU-R DOCSIS-over-BWA Requirements

## Capacity and Performance

bps delivered to end user (e.g, in the vicinity of 1.5 – 50 Mbps)
>    ?256Kbps and up
>    Range of upper limits:
>    Scalable w/ no upper limit
>    Optimized for delivery of broadband (> 2Mbps service)
>    Open lower limit

cell capacity in terms of number of users given average/typical per-user b/w
subscribers per cell (e.g., allow scaling from 1 to 1000 terminals)
metric suggestions from John Liebetreu

## QoS Requirements

To support listed applications
Terminology from ATM and IP diffserv world
Separate traffic management from services
Fairness vs. B/W wastage
Service Level Agreements
Enforcement

## Services exported by MAC layer to upper layer

Define support: Provide efficient transport of payload, preserving QoS properties
Multicast
Cells exclusively (no variable length frames; IP must be encapsulated in cells)
Frames exclusively (no cells)
Must support frames; cells optional
Must support cells; frames optional
May support either cells or frames

## Security

Privacy
Authentication

## Summary of Reflector Activity

Outline from Austin

802.6 (DQDB MAN) requirements

802.14 (TV Cable Access) requirements

References to BRAN/HA requirements, 802.14 draft standard, DOCSIS standard

Outline submitted by Gene Robinson et al

Functional Requirements for the 802.16 standard (Jim Mollenauer)

Reference Diagram and Notes (Margarete Ralston)

>From Marianna Goldhammer:

IWF on CPE side; Define IWFs for all services and signalling protocols; beware of IP-in-ATM

>From Steve Farrell:

Standard must accommodate ATM and IP; ATM today w/ voice over ATM, not voice over IP; Need more input from existing industry; need to define applications including Internet and telco services

>From Chet Shirali:

802.14 status summary: MAC, IP and ATM; considering DOCSIS 1.1

>From Jay Klein:

No religious wars---be agnostic, support IP and ATM

>From David Jarrett:

Focus first on applications; diverse services with scalable quality

>From Jack Fijolek (from 802.14 and DOCSIS):

DOCSIS 1.1 supports QoS guaranteed services better than cell based CBR

>From Chris Cant:

Look at BRAN/HA; consider radio back haul; identify 1-N, N-1, N-M on interfaces

>From Paul Nikolich (802 vice chair):

802.16 can choose the most suitable layer 2 protocol

802.14 put cells on the shelf because vendor/market support lagged

>From Peter Ecclesine:

Support both IP and ATM: compromise

>From Jim Mollenauer

Need to handle STM, ATM and packets

Need QoS, regardless of STM/ATM/packets

802.14 failed w.r.t QoS/STM/ATM/packets

>From Moshe Ran:

IEEE Network article in Jan/Feb '99

**Request for Contributions**

Examples of existing systems: protocols and reference architecture that affect system requirements

Cases, pro or con, for each of the bearer services:
ISDN: BRI?/PRI
Frame Relay
STM Sychronous Transfer Mode; PDH/SDH
ATM cell relay service
IP variable length frames
802.1 bridging

Note: Lower bit-rate services such as voice, ISDN-BRI and Nx64 (N < 23) may be transported by the MAC and PHY, but the MAC and PHY protocols are not burdened by their presence.

QoS-based categorization of applications

Revised Reference Diagram

Statement regarding cell size (capacity) in terms of users and user-delivered B/W

Physical layer performance metrics

Security

MAC service optimized for variable length vs. fixed length frames

Any other material (see outlines)

More? (frames vs. cells, TDD requirements, etc.)