Introduction to IEEE 802.20

Technical and Procedural Orientation

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March 10, 2003

Overview

- How 802.20 came to be
- Project Objectives
  - IEEE 802.20 project scope & purpose
  - IEEE 802.20 Five Criteria
  - Mobile Broadband Wireless Access (MBWA) solution characteristics
  - Relationship to other cellular standards activities
  - Project timeline
- Operating Rules
  - Working Group structure and officers
  - Membership requirements
  - Voting rules
- Patent disclosure rules
- Meeting Schedule

Project History

- Initial Call for Interest and Tutorial – March 2002
  - MBWA Study Group formed within 802.16
- 802.16 and MBWA Study conclude that the intent of the two groups addresses two different Markets – July 2002
  - MBWA Executive Committee Study Group ECSG Launched
- MBWA ECSG approves PAR and Five Criteria for MBWA project and recommends formation of new working group – September 2002
- MBWA ECSG refines PAR in response to comments received from other Working Groups – November 2002
  - PAR and Five Criteria approved by 802 Executive Committee
  - Project approved by IEEE-SA – December 12, 2002

Scope of IEEE 802.20

Develop a specification for the PHY and MAC layers of an air interface for interoperable packet-data mobile broadband wireless access systems that:

- operates in licensed frequency bands below 3.5 GHz,
- supports peak data rates per user in excess of 1 Mbps,
- supports vehicular mobility classes up to 250 Km/h,
- covers cell sizes commensurate with ubiquitous metropolitan-area networks, and
- targets spectral efficiencies, sustained user data rates and numbers of active users significantly higher than achieved by existing mobile systems.

Based on PAR (IEEE 802.20 PD-02)

IEEE 802.20 (MBWA) Purpose

- Enable worldwide deployment of cost effective , spectrum efficient, always on and interoperable mobile broadband wireless access systems in order to address user needs for:
  - Mobile and ubiquitous Internet access
  - Transparent support of Internet applications
  - Access to enterprise intranet services
  - Transparent access to Infotainment and Location services
- This specification fills the performance gap between the high data-rate low mobility services currently developed in 802 and the high mobility cellular networks
- Web Address: http://grouper.ieee.org/groups/802/mbwa/index.html

Based on PAR (IEEE 802.20 PD-02)

Broad Market Potential

a) Broad sets of applicability.
b) Multiple vendors and numerous users.
c) Balanced costs

- The capability of the wireless medium to support mobility is a feature unmatched by the capabilities of wireline broadband access networks. The mobile capability has proven vastly successful as can be seen from the abundance of narrow-band mobile devices. Mobile broadband wireless access, based on IP mobility, unlocks all Internet content to the general public, potential addressable market is all users of IP - based services and applications. These include:
  - Secure Enterprise Intranets and VLAN Services
  - Entertainment & Gaming
  - Internet and Location Services
- Mobile station and terminal equipment are provided by multiple international telecommunications equipment vendors, deployed by international carriers and made available to the end-user community. Tutorial and Call for Interest (CFI) sessions were held at the IEEE 802 plenary in March 2002. The CFI was attended by 55 individuals from 45 organizations expressing support for the project. The ECSG meeting in September 2002 was attended by 49 individuals representing 34 organizations. The market potential is further increased by cooperatively developing specifications with 3GPP and 3GPP2 for interfacing MBWA networks with 3G networks.
- This project will achieve cost balance between terminal devices and network infrastructure equipment that is comparable to existing cellular wireless networks and encourage mass deployment of wireless data services. Given that base stations can serve many mobile terminals, the cost of the network equipment can easily be spread over many users. Terminal devices and associated chip-sets are expected to benefit from volume deployment, large-scale integration and an optimized IP-centric design to achieve low cost.

Compatibility

a) Conformance with 802 Overview and Architecture
b) Conformance with 802.1D (MAC Bridges) and 802.1F (VLAN Bridges)
c) Conformance with 802.1F and compatible managed object definitions
d) Identification of any variance in conformance

- The proposed standard will conform with the appropriate IEEE 802 functional requirements.
- Compatibility will be addressed during development of the standard and any variance that may be required will be clearly identified and justified .
- The standard will include the definition of a compliant MIB in support of the PHY and MAC layer capabilities.

Coexistence

- The proposed standard is applicable to licensed spectrum and all issues of coexistence will be subject to the respective constraints imposed by the spectrum license. Deployment related coexistence issues will be addressed during the development of the proposed standard.

Five Criteria (IEEE 802.20 PD-03)

Distinct Identity

a) Substantially different from other IEEE 802 standards.
b) One unique solution per problem.
c) Easy for the document reader to select the relevant specification.

- IEEE 802 presently has no project that supports vehicular mobility. The mobile BWA standard is intended to provide for public access networks operated by a third party, where the user typically makes use of a wide-area network through an access network when mobile. It differs from a wireless LAN, which typically is operated over smaller distances.
- The project has been socialized with the existing 802 wireless working groups.
- The proposed project will specify a unique solution to the PHY and MAC layer of the air-interface operating in spectrum allocated to the Mobile Service. It is envisioned that the standard will flexibly and efficiently support a variety of services, some of which may have stringently bounded delay requirements. This solution will incorporate support for both traffic engineering and QOS for real-time and non-real-time data traffic.
- The specification will be a stand-alone document with clearly defined scope.

Technical Feasibility

a) Demonstrated system feasibility.
b) Proven technology, reasonable testing.
c) Confidence in reliability.

- The technical feasibility of such a system has been demonstrated by proprietary systems currently in deployment and trial. These systems use technological components in wide deployment today, such as modems, radios, antennas and PHY/MAC protocols.
- The solution may use well understood spread spectrum technologies (such as frequency hopping), radio technologies (such as OFDM), advanced signal processing techniques (such as adaptive antennas) and cellular architectures. These technologies have been successfully tested and deployed over the past decades and are finding increased usage in the LAN/MAN and Cellular environments.
- Commercial deployment of cellular wireless networks in the bands licensed for mobile services demonstrates that air interface support for high reliability suitable for commercial deployment can be achieved.

Economic Feasibility

a) Known cost factors, reliable data.
b) Reasonable cost for performance.
c) Consideration of installation costs.

- Cost factors for mobile services and components are well known and understood. Worldwide deployment of mobile wireless networks and burgeoning demand for mobile services demonstrates the economic viability of mobile networks. The willingness of investors to spend large sums to acquire spectrum rights, plus the large additional investment required for hardware in public networks, attests to the economic viability of the mobile wireless access industry as a whole.
- The solution will offer better cost/performance characteristics than existing mobile networking solutions since it is based on a packet-based access network and designed for optimal spectral efficiency. Data services, characterized by high peak demands but bursty requirements overall, are best handled by packet technologies. As demonstrated in many IEEE 802 standards, shared-media packet systems effectively serve users whose requirements vary over time within the constraints of the total available resources.
- Installation costs will be reduced by decreasing the number of base stations required and eliminating the need for frequency planning. The reduction in the required number of base stations is achieved by supporting higher numbers of users per base station, which is accomplished by designing the air interface for frequency reuse of 1 or less and/or other techniques. Frequency reuse of 1 or less also eliminates the need for frequency planning.

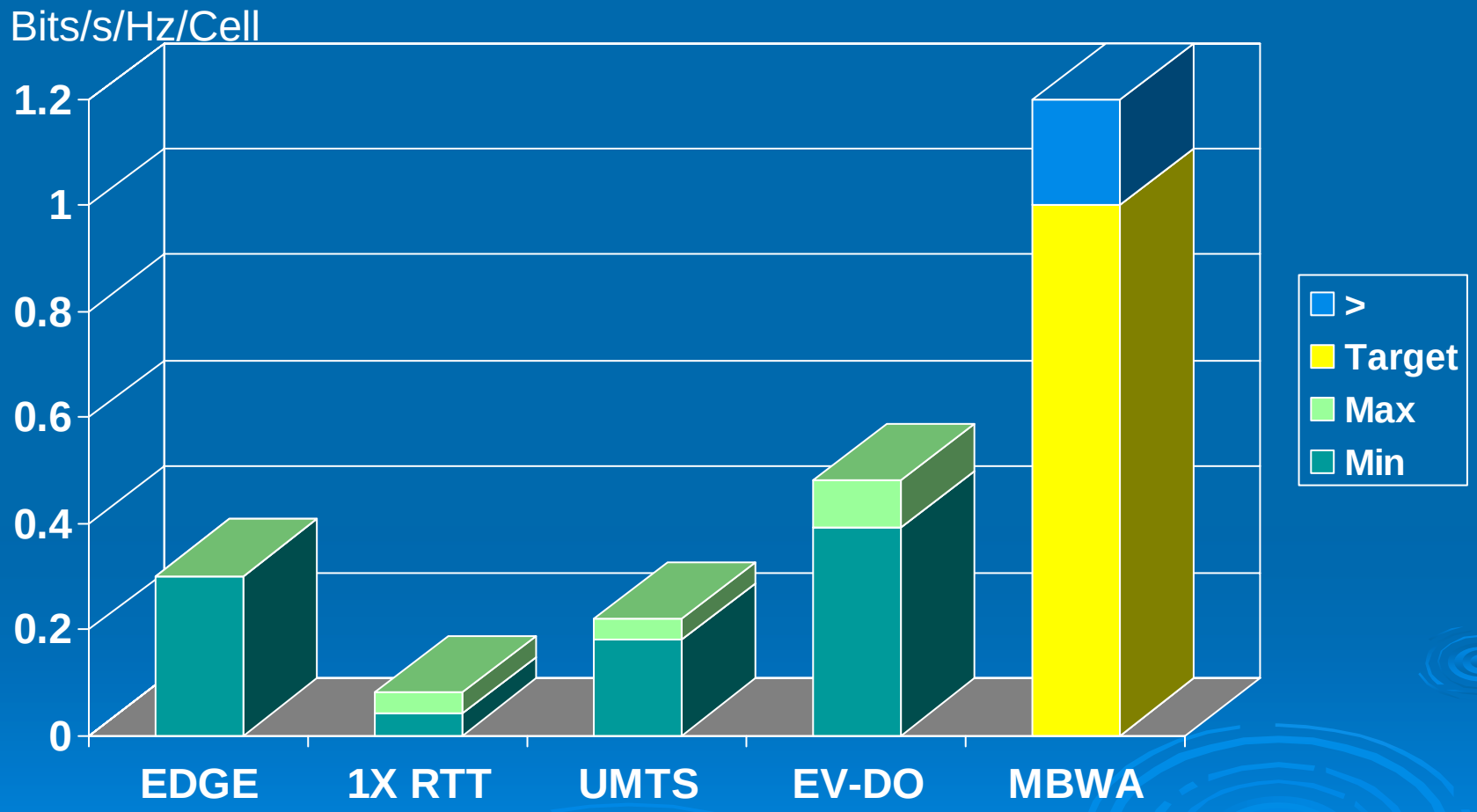
MBWA Solution Characteristics

Characteristic	Value for 1.25 Mhz	Value for 5 Mhz
Mobility	up to 250 km/hr	
Sustained spectral efficiency	> 1 b/s/Hz/cell	
Peak user data rate (Downlink (DL))	> 1 Mbps	> 4Mbps
Peak user data rate (Uplink (UL))	> 300 Kbps	> 1.2 Mbps
Peak aggregate data rate per cell (DL)	> 4 Mbps	> 16 Mbps
Peak aggregate data rate per cell (UL)	> 800 Kbps	> 3.2 Mbps
Airlink MAC frame RTT	<10 ms	
Spectrum (Maximum operating frequency)	< 3.5 GHz	

Spectral Efficiency Targets in Perspective

Sustained Spectral Efficiency Comparisons

(Downlink)



Sources: UMTS -> Qualcomm: The Economics of Wireless Mobile Data (Citing Nokia data)
EV-DO & 1XRTT -> CDMA Development Group:*CDMA2000 Market Facts; October 10, 2002*
EDGE -> 3G Americas: EDGE Compact and EDGE Classic Packet Data Performance
MBWA -> Design objectives

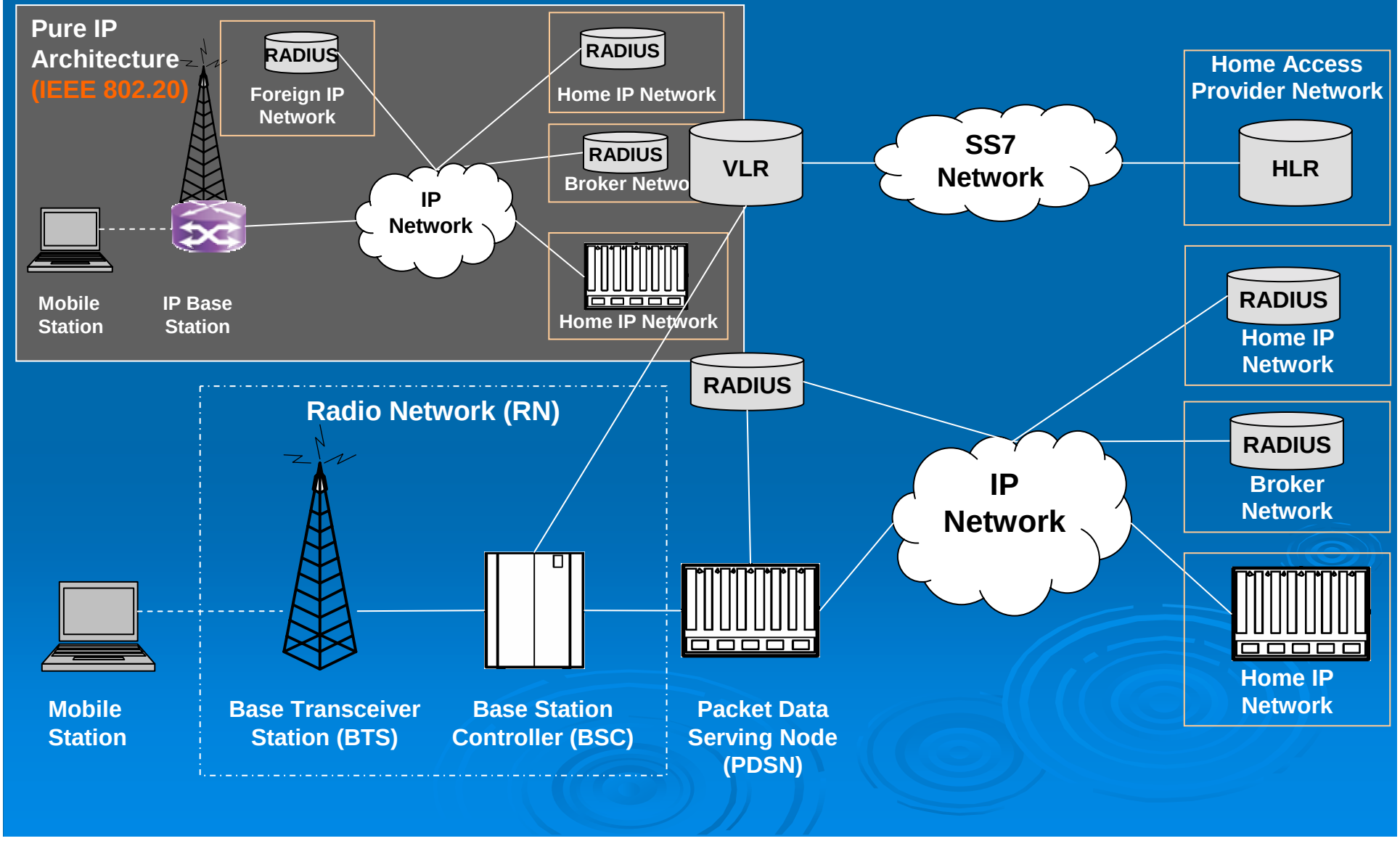
MBWA Solution Characteristics

- Transparent support of real-time and non-real time applications.
- Always on connectivity
- Universal Frequency reuse
- Support of inter-technology roaming and handoff, e.g. from MBWA to wireless LANs.
- Seamless inter-cell and inter-sector handoff.
- QoS support with resolution in the AI consistent with the end-to-end QoS at the Core Networks level.
  - Policy-based
  - Support of both IPv4 and IPv6 enabled QoS resolution
- Support of multiple MAC protocol states with fast inter-state transitions.
- Fast resource allocation for both uplink and downlink .
- User data rate management: Support of automatic selection of optimized user data rates that are consistent with the RF environment constraints.
- AI provides messaging for mutual authentication.
- Allow co-deployment with existing cellular systems.
- Open interfaces between any network entities in the AI that may be implemented by service providers and manufacturers as separate network entities. IETF protocols should be considered and adopted for these wherever possible.

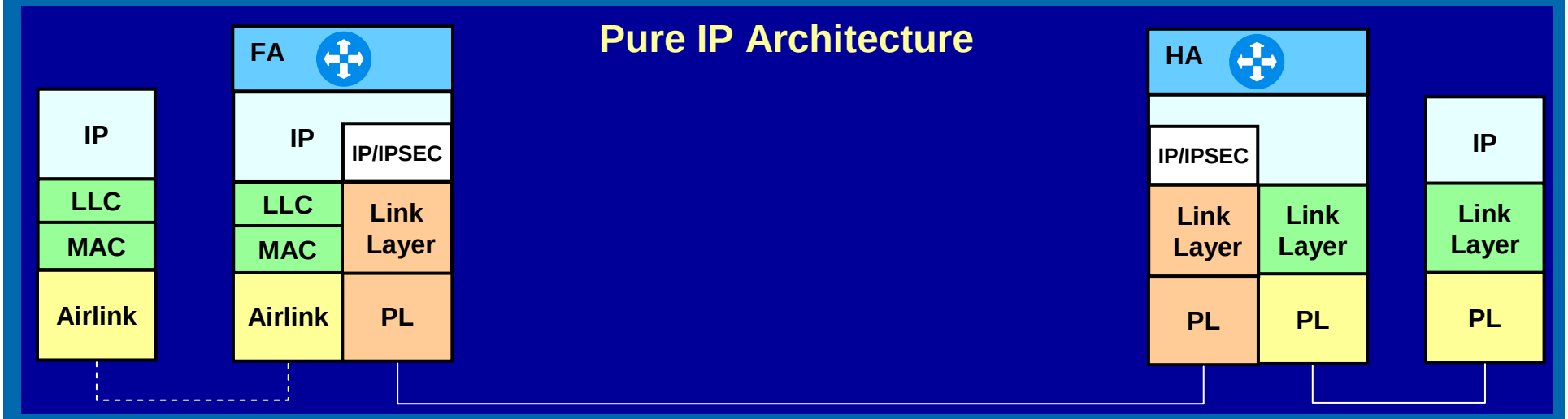
IEEE 802.20 & 3G Architecture Comparison

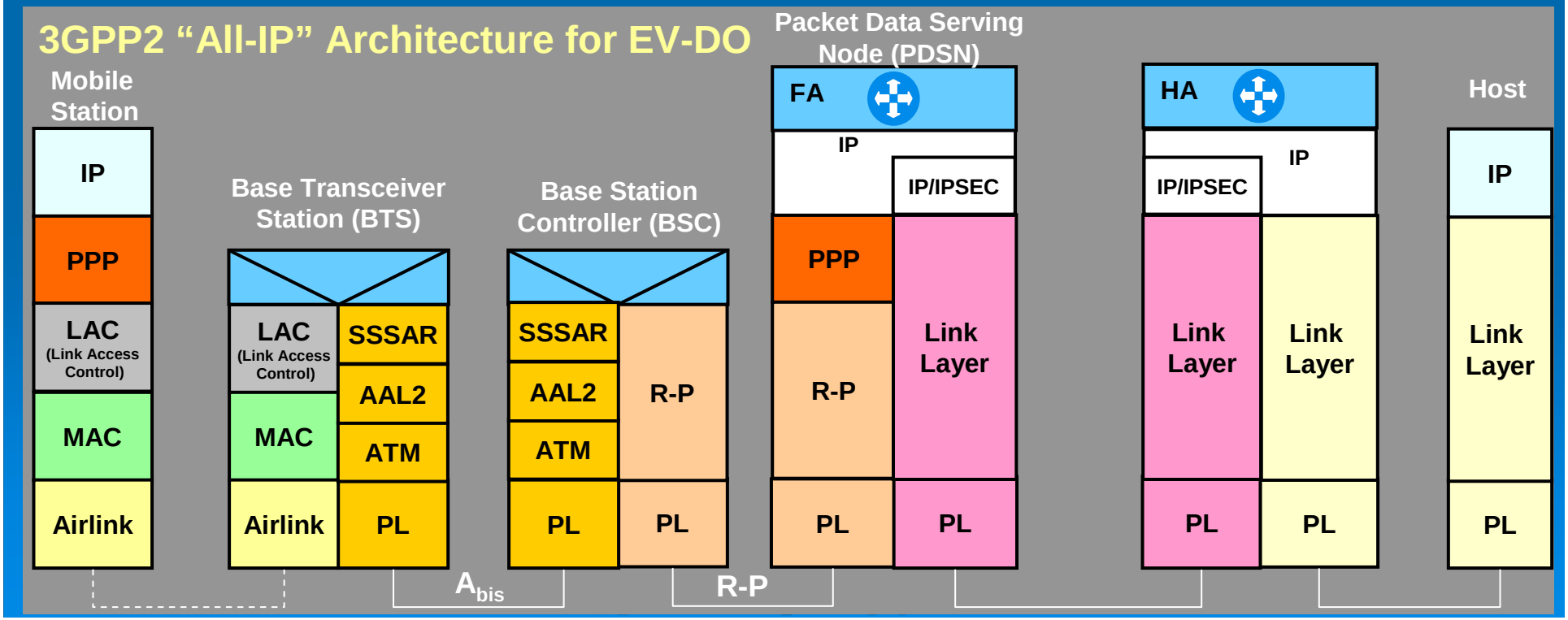
Reference Model for Access with Mobile IP

3GPP2 P.S0001-A



Pure IP versus "All-IP"





New capabilities for systems beyond IMT-2000

- It is anticipated that there will be a requirement for a new radio access technology or technologies at some point in the future to satisfy the anticipated demands for higher bandwidth services.
- Systems beyond IMT-2000 will:
  - Support a wide range of symmetrical, asymmetrical, and unidirectional services
  - Provide management of different quality of service levels to realize the underlying objective of efficient transport of packet-based services.
- In parallel, there will be an increased penetration of nomadic and mobile wireless access multimedia services.
- The technologies, applications and services associated with systems beyond IMT-2000 could well be radically different from the present, challenging the perceptions of what may be considered viable by today's standards and going beyond what can be achieved by the future enhancement of IMT-2000 working with other radio systems.

Ref: ITU-R Draft New Recommendation (DNR): Vision, framework and overall objectives of future development of IMT-2000 and systems beyond IMT-2000

Relationship to other Cellular Standards Activities (1)

Dimension	802.16e	802.20	3G
End-user	High data rate fixed wireless user with adjunct mobility service Symmetric data services End-user devices for fixed subscribers (CPE) and PC Cards for mobile devices Support of low-latency data and real time voice services	Fully mobile, high throughput data user Symmetric data services End-user devices initially PC Card enabled data devices Support of low-latency data services	Voice user requiring data services Highly asymmetric data services End user devices initially data enabled handsets Lack of support for low latency services
Service Provider	Evolving off Fixed Wireless service providers and WISPs adding mobility as enhance-ment to service offering Local/Regional mobility and roaming support	Wireless Data Service provider – Greenfield start or evolving Cellular carrier Global mobility and roaming support	Cellular voice service provider evolving to data support Global mobility and roaming support

Relationship to other Cellular Standards Activities (2)

Dimension	802.16e	802.20	3G
Technology	Extensions to 802.16a MAC & PHY	New PHY & MAC optimized for packet data and adaptive Antennas	W-CDMA, cdma2000
	Optimized for and backwards compatible with fixed stations	Optimized for full mobility	Evolving of GSM or IS-41
	Licensed bands 2-6 GHz	Licensed bands below 3.5 GHz	Licensed bands below 2.7 GHz
	Typical Channel BW >5 MHz	Typical Channel BW < 5 MHz	Typical Channel BW < 5 MHz
	Packet oriented architecture	Packet oriented architecture	Circuit oriented architecture – evolving to packet on the downlink
	Channelization and control for multimedia services with QoS	Channelization and control for mobile multimedia services. Mobile-IP Based	Channelization and control optimized for mobile voice services. MAP/SS7 based
	High efficiency data uplinks and downlinks	High efficiency data uplinks and downlinks	Medium efficiency data downlinks, low efficiency uplinks
	Low Latency architecture	Low latency data architecture	High latency data arch.

IEEE 802.20 Project Development Timeline

ECSG Approval of PAR/5C	September 2002
Submission of PAR/5C to LMSC Executive Committee	October 7, 2002
Conditional Submission of PAR/5C to NesCom	October 31, 2002
First MBWA Technical Meeting (WG #0)	Nov 10-14, 2002
Approval of PAR/5C by LMSC Executive Committee	Nov 15, 2002
Approval of PAR by IEEE-SA Board	Dec 12, 2002
First Meeting of MBWA WG (WG #0)	Jan 13-17, 2003
Initial Membership Meeting	March 10-14, 2003
WG Letter Ballot	Nov 21 – Dec 30, 2003
LMSC Sponsor Ballot	May 26 – July 7 2004
Sponsor Confirmation Ballot	Aug 11 – 26, 2004
(Conditional) Submission to RevCom	October 31, 2004
IEEE-SA Approval	December 10, 2004

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  - Voting rules
- Patent disclosure rules
- Meeting Schedule

General Approach

- Use LMSC Rules
  - Modify only if required
- Additional Clarification as Required
  - Base clarification on other WGs, e.g. 802.11

Organizational Structure

- Working Group
  - Chair
  - Vice-Chair(s)
  - Secretary
  - Technical Editors
- Task Group
  - Chair
  - Vice-Chair
  - Secretary
  - Technical Editors
- Study Group
  - Chair
  - Secretary
  - Editor

802.20 Working Group Responsibility

- The 802.20 WG's charter is to develop Physical layer and MAC layer specifications for a Mobile Broadband Wireless Access network supporting full vehicular mobility in the licensed bands below 3.5 GHz. Individual standards activities within 802.20 WG are, at the discretion of the 802.20 WG, carried out by Task Groups (TG) operating under, and reporting to, the 802.20 WG.
  - 802.20 WG is chartered to:
    - Develop, maintain and revise the 802.20 standards
    - Maintain liaisons with other groups within 802 LMSC, and other relevant standards setting bodies and Radio Spectrum regulatory bodies.

Working Group Officers

- Chair
  - Responsible for presiding over WG Plenary sessions.
  - Only votes on matters before the WG in cases where a deciding vote must be cast.
  - Terms shall end at the end of the first Plenary session of the next even numbered year.
  - An individual who has served as Chair or Vice Chair of a given Working Group for a total of more than eight years in that office may not be elected to that office again.
  - A Working Group may elect a new Chair at any Plenary session, subject to confirmation by the LMSC Executive Committee. A motion to hold an election must be passed by 75% of the voting members of the Working Group present.

Working Group Officers

- Vice Chair(s)
  - Vice Chairs may have various responsibilities, including substituting for the chair in conducting meetings.
  - In the event that there are multiple WG Vice-Chairs, specific responsibilities of each WG Vice-Chair are designated by the WG Chair.
  - Vice Chair(s), except when acting in the capacity of the Chair, may normally vote and comment on issues with the same rights as all other voting members.

Working Group Officers

- Secretary
  - The WG Secretary is appointed by the WG Chair and confirmed by the WG.
  - The minutes of meetings taken by the Secretary (or designee) are to be provided to the WG Chair in time to be available to the membership two weeks after close of each session.
  - Sufficient detail shall be presented in the minutes to allow a person knowledgeable of the activity, but not present at the discussion, to understand what was agreed to and why. (LMSC)
- Technical Editor
  - The WG Technical Editor is responsible for:
    - Organizing, maintaining the draft standards in the format used by the IEEE standards department
    - Prepare an update of the draft standard as soon after a session as possible.
    - Proof read and coordinates changes of documents edited by IEEE staff.

Election of WG Chair and Vice-Chair

- The election of the IEEE 802.20 WG Officers (Chair and Vice-Chairs) is held in March of each even-numbered year. The nominations for the election shall be held at the WG Opening Plenary meeting. The WG Chair shall designate one of the WG Vice-Chairs as an Acting Chair Pro Tem if the WG Chair is running for re-election. If not running for re-election, the WG Chair shall conduct the election process. This election process shall be used for each WG officer election.
  1. The Acting Chair shall open the floor for nominations.
  2. The Acting Chair shall close nominations after the nominations have been made.
  3. Each candidate shall be given a short time (nominally, two minutes) for an introductory statement of acceptance that should nominally contain the candidate's:
     a) Summary of qualifications
     b) Commitment to participate and accept duties and responsibilities
     c) Vision for the WG.
  4. The floor shall be opened for discussion (nominally for five-ten minutes total).
  5. In order to be elected, any candidate must receive a simple majority (over 50%) of the votes cast in the election for the respective position.
  6. Should no candidate receive a majority in the election, a runoff election shall be held. The nominated candidate having received the fewest votes in the previous election round shall not be an eligible candidate.

Working Group Membership

- Establishment
  - All persons participating in the initial meeting of the Working Group become members of the Working Group
  - Thereafter, membership in a Working Group is established by participating in the meetings of the Working Group at two out of the last four Plenary sessions, and (optionally) a letter of intent to the Chair of the Working Group. Membership starts at the third Plenary session attended by the participant.
    - One duly constituted interim Working Group or task group meeting may be substituted for the Working Group meetings at one of the two Plenary sessions
  - Membership may be declared at the discretion of the Working Group Chair (e.g. for contributors by correspondence or other significant contributions to the Working Group).
  - Membership belongs to the individual, not an organization, and may not be transferred.
  - **Participation is defined as at least 75% presence at a meeting.**

Working Group Membership, Contd.

- Retention
  - Membership is retained by participating in at least two of the last four Plenary session meetings.
    - One duly constituted interim Working Group or task group meeting may be substituted for the Working Group meetings at one of the two Plenary sessions
- Loss
  - Membership may be lost if two of the last three Working Group letter ballots are not returned, or are returned with an abstention other than “lack of technical expertise.”
    - This rule may be excused by the Working Group Chair if the individual is otherwise an active participant.
  - **Participation is defined as at least 75% presence at a meeting.**

Working Group Member Rights

- To receive a notice of the next meeting.
- To receive a copy of the minutes.
- To vote at meetings if and only if present.
- To vote in Working Group Letter Ballots.
- To examine all Working Draft documents.
- To lodge complaints about Working Group operation with the Executive Committee.
- To petition the Executive Committee in writing.
- Only members have the right to participate in the discussions.
  - The privilege of observers to participate in discussions may be granted by the Working Group Chair.

Meetings and Participation

- Working Group meetings are open to anyone who has complied with the registration requirements for the meeting.
- Only members have the right to participate in the discussions.
- The privilege of observers to participate in discussions may be granted by the Working Group Chair.
- Interim Working Group or Technical Advisory Group meetings are to have as a goal: 1) Reasonable notification (>4 weeks) in addition to any announcement given at a plenary, and 2) Few last minute shifts in location (<< 1 per year).

Voting at Meetings

- The Working Group Chair decides what is procedural and what is technical.
- The Chair of the Working Group decides procedural issues.
- The Working Group members and the Chair decide technical issues by vote.
  - A vote is carried by a 75% approval of those members voting “Approve” and “Do Not Approve”.
  - No quorum is required at meetings held in conjunction with the Plenary session since the Plenary session time and place is established well in advance.
  - A quorum is required at other Working Group meetings. The Working Group Chair may vote at meetings.
  - A quorum is at least one-half of the Working Group members

Voting by Letter Ballot

- The decision to submit a draft standard or a revised standard to the Sponsor Ballot Group must be ratified by a letter ballot. Other matters may also be decided by a letter ballot at the discretion of the Working Group Chair. The Working Group Chair may vote in letter ballots.
- The ballot shall contain three choices:
  - Approve. (May attach non-binding comments.)
  - Do Not Approve. (Must attach specific comments on what must be done to the draft to change the vote to “Approve”.)
  - Abstain. (Must include reasons for abstention.)
- To forward a draft standard or a revised standard to the Executive Committee for approval for Sponsor Ballot Group voting, a letter ballot (or confirmation letter ballot) must be done first within the Working Group. A 75 percent approval of the Working Group confirmation letter ballot is necessary with at least 50 percent of the members voting. The 75 percent figure is computed only from the “Approve” and “Do Not Approve” votes.
- The letter ballot shall be conducted by electronic means. The response time shall be at least thirty days.

Ballot Comment Resolution

- The Working Group meets to resolve the negatives or assigns the task to a ballot resolution group.
- Submission of a draft standard or a revised standard to the Executive Committee must be accompanied by any outstanding negative votes and a statement of why these unresolved negative votes could not be resolved.

Task Group Responsibility

- The function of a Task Group (TG) is to produce a draft standard, recommended practice, guideline, supplement, or portion of a draft standard for the WG.
- All business brought to the floor of the WG that deals with a topic assigned to a TG shall be automatically referred to the TG by the WG Chair, without discussion on the floor of the WG.

Task Group Officers

- Task Group Chair
  - The TG Chair is elected by a WG majority approval.
- Task Group Vice-Chair
  - TG Vice-Chair is elected by a WG majority approval.
- Task Group Secretary
  - The TG Secretary shall be appointed by the TG Chair and confirmed by a TG motion that is approved with a minimum 50% majority.
- Task Group Technical Editor
  - The TG Technical Editor shall be appointed by the TG Chair and confirmed by a TG majority approval.

Task Group Membership and Operation

- Members from WG 802.20 make up the TG membership.
- Only TG members can make and vote on motions.
- On a technical motion, a vote is carried by a minimum 75% approval of the sum of those voting "Approve" or "Do Not Approve". On a procedural motion, a vote is carried by a greater than 50% approval of the sum of those voting "Approve" or "Do Not Approve".
- The decision by the TG to request the WG to submit a draft standard or a revised standard to the WG ballot group must be ratified by the TG as a technical vote.

Public Relations and Marketing Communications

- The Chair and Vice-Chairs shall be the sole point of contact for all official IEEE 802.20 marketing communications and public relations with industry technical journals, editors, press, other industry media bodies, and government bodies.

Liaisons

- Liaison relationships are established with other groups within 802 LMSC, other relevant standards setting bodies, industry promotional bodies, Special Interest Groups (SIGs), and Radio Spectrum regulatory bodies (liaison groups). Liaisons shall be recommended by the WG Liaison Vice Chair or WG Chair and confirmed by the vote of the WG.
- The Liaison Vice Chair shall coordinate the 802.20 Liaison activities.
  - Liaisons are responsible for providing updates and status reports to the WG at plenary and interim sessions.
  - Liaisons cannot pass on responsibilities, nor have other individuals represent their post without having the Liaison Vice Chair or WG Chair approval.
  - Liaisons are given 802.20 WG attendance credit for attending liaison group meetings that are concurrent with 802.20 WG sessions.

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Instructions for the WG Chair

- **At Each Meeting, the Working Group Chair shall:**
- **Advise the WG membership that:**
  - The IEEE's Patent Policy is consistent with the ANSI patent policy and is described in Clause 6 of the *IEEE SA Standards Board Bylaws*;
  - Early disclosure of patents which may be essential for the use of standards under development is encouraged;
  - Disclosures made of such patents may not be exhaustive of all patents that may be essential for the use of standards under development, and that neither the IEEE, the WG nor the WG Chairman ensure the accuracy or completeness of any disclosure or whether any disclosure is of a patent that in fact may be essential for the use of standards under development.
- **Instruct the WG Secretary to record in the minutes of the relevant WG meeting:**
  - that the foregoing advice was provided and the two slides were shown;
  - that an opportunity was provided for WG members to identify or disclose patents that the WG member believes may be essential for the use of that standard;
  - any responses that were given, specifically the patents and patent applications that were identified (if any) and by whom.

IEEE-SA Standards Board Bylaws on Patents in Standards

6. Patents

IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard. This assurance shall be provided without coercion and prior to approval of the standard (or reaffirmation when a patent becomes known after initial approval of the standard). This assurance shall be a letter that is in the form of either

a) A general disclaimer to the effect that the patentee will not enforce any of its present or future patent(s) whose use would be required to implement the proposed IEEE standard against any person or entity using the patent(s) to comply with the standard or

b) A statement that a license will be made available without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination

This assurance shall apply, at a minimum, from the date of the standard's approval to the date of the standard's withdrawal and is irrevocable during that period.

Approved by IEEE-SA Standards Board – December 2002

Inappropriate Topics for IEEE WG Meetings

- Don’t discuss licensing terms or conditions
- Don’t discuss product pricing, territorial restrictions or market share
- Don’t discuss ongoing litigation or threatened litigation
- Don’t be silent if inappropriate topics are discussed… do formally object.

If you have questions,
contact the IEEE Patent Committee Administrator
at patcom@ieee.org

Approved by IEEE-SA Standards Board – December 2002

IEEE 802.20 Meeting Schedule

IEEE 802.20 Meeting Schedule			
Date	**Session No.**	**Type**	**Venue**
10-14 March 2003	1	Plenary	Hyatt Regency DFW, Dallas, TX, USA
12-16 May 2003	2	Interim	Singapore
20-25 July 2003	3	Plenary	Hyatt Regency San Francisco, San Francisco, CA, USA
September 2003	4	Interim	USA (TBD)
9-14 November 2003	5	Plenary	Hyatt Regency Albuquerque, NM, USA
11-16 January 2004	6	Interim	The Fairmont Hotel Vancouver, Vancouver, BC, Canada
14-19 March 2004	7	Plenary	Hyatt Orlando, Kissimmee, FL, USA
May 2004	8	Interim	TBD
11-16 July 2004	9	Plenary	Portland Hilton & Executive Tower, Portland, OR, USA
September 2004	10	Interim	TBD
14-19 November 2004	11	Plenary	Hyatt Regency San Antonio, TX, USA