IEEE SDN Initiative

A Proposal

Nov 13, 2013

IEEE SDN4FNS Workshop Trento, Italy

Prepared by a Team of Experts

Presented by Mehmet Ulema, Manhattan College, USA

Outline of the Proposal

1. **Overview**
2. **Analyses and Opportunities**
3. **Components of the Initiative**
    3.1 **Publications** – Journals, Magazines, Newsletters, Books, …
    3.2 **Conferences** – Academic, Trade, Regional, Topical, …
    3.3 **Standards** – Framework, Interoperability, Test Bed, …
    3.4 **Training/Education** – Short courses, Tutorials, ….
    3.5 **Certification** - Professional, personal,
    3.6 **Web Portal and Communications** – Repository, Announcements, Jobs,
4. **Project Management**
5. **Conclusion**

Overview

- Prepared by a team of experts supported by an advisory board (see next slide)

- A comprehensive proposal for an IEEE wide initiative on Software Defined Ecosystem,

- Was prepared after an extensive a gap analysis on the field and related technologies and associated activities in publications, conferences, standards, etc.,

- Identifies opportunities and specific proposals for IEEE in the areas of publications, conferences, standards, education, certification, and web portal.

- Includes a 3-year program with a schedule and associated budget (After 3 years, the program will be integrated into participating societies of IEEE..

Proposal Development Team

- Web Portal - **Mehmet Ulema**, Manhattan College, USA - **Contact**

- Regulatory, Business - **Antonio Manzalini** – Telecom Italy, Italy

- Analyses - **Cagatay Buyukkoc**, AT&T Labs, USA

- Publications - **Alex Clemm**, Cisco, USA

- Conferences - **Raouf Boutaba**, University of Waterloo, Canada

- Education – **Jiang** (**Linda) Xie**, University of North Carolina, Charlotte, USA

- Standards - **Nirant Amogh**, Huawei, India

- Certification – **M. Can Vuran**, University of Nebraska-Lincoln, USA

- Advisory Board:
    - **Jean Walrand**, Professor, UC Berkeley
    - **John Medamana**, VP, AT&T Labs
    - **Alex Gelman**, VP-Standards, ComSOC
    - **Doug Zuckerman**, Director, Div III, IEEE
    - **Steven Bush**, Director, Standards, ComSoc
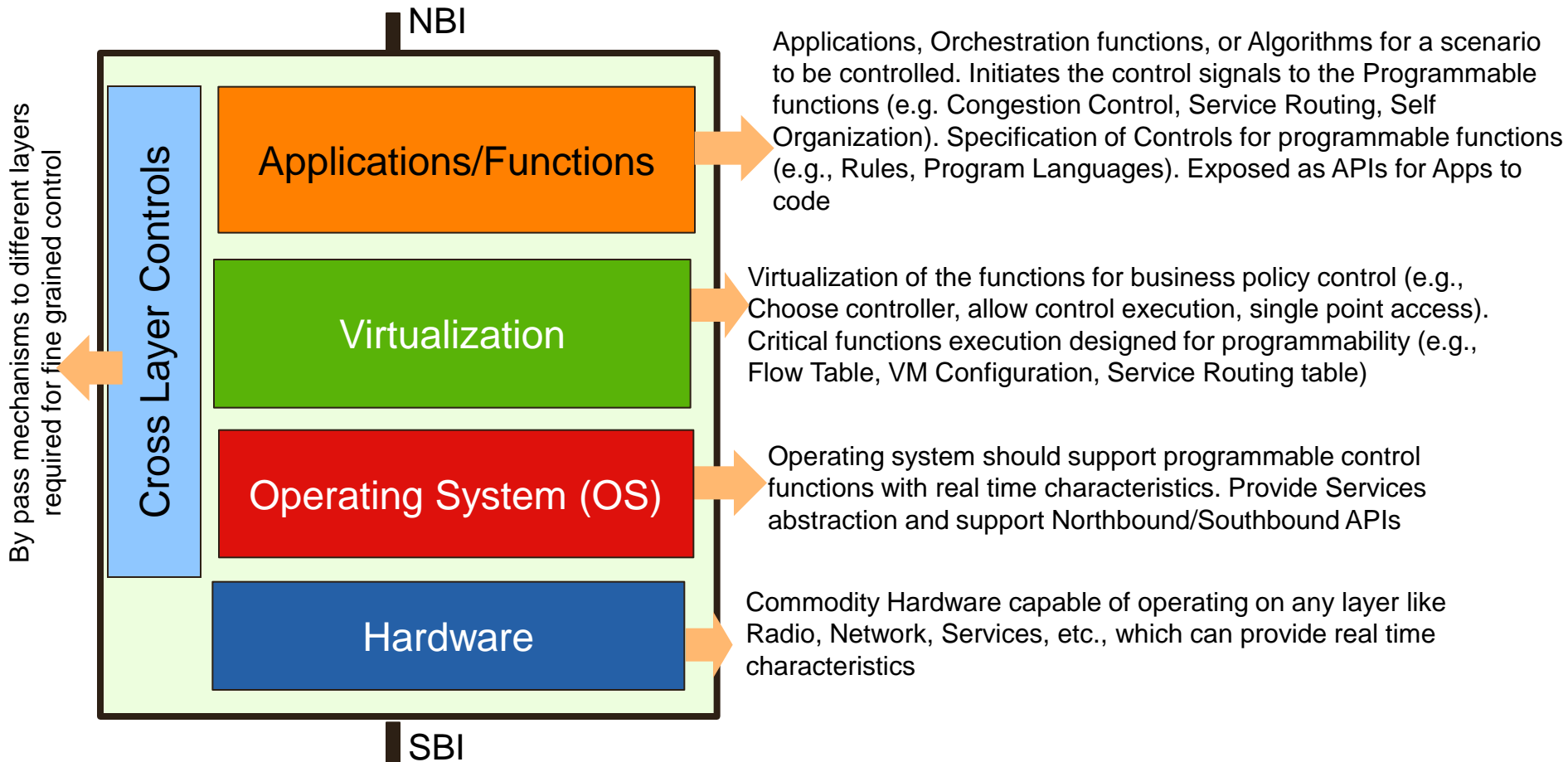
A Broader Vision for IEEE

- SDN is originally perceived to be a "Networking or Transport" specific technology, however, SDN can be used in all areas of networks.

- The broad vision encompasses the whole Information, Communications, Entertainment Technology (ICET); aims and objectives of many technologies (e.g., Cloud) can be realized using some general principles or characteristics.

- Technologies and applications where "Software Defined" concept are applicable to create an ecosystem:

  - Software Defined - Networks (SDN)
  - Software Defined Networks- Service Providers (SDN-SP)
  - Software Defined - Antenna (SD-A)
  - Software Defined - Radio (SD-R)
  - Software Defined - Cloud (SDN-C)
  - Software Defined - Security (SDN-Sec)
  - Software Defined - Data Center (SD-DC)
  - Software Defined - Management (SD-NM)
  - Software defined - Optical networks (SD-O)
  - Software Defined - Smart Grids (SD-SG)
  - Software defined - Information Centric Networking (SD-ICN).
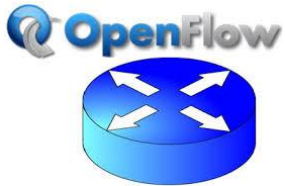
Software Defined Ecosystem (SDE)

A General Framework for the Broad Vision

Can be instantiated and used recursively for a variety of environments including SD-A, SD-RAN, SDN, SDN-SP, NFV, NGSON, Cloud etc.

NBI

Applications, Orchestration functions, or Algorithms for a scenario to be controlled. Initiates the control signals to the Programmable functions (e.g. Congestion Control, Service Routing, Self Organization). Specification of Controls for programmable functions (e.g., Rules, Program Languages). Exposed as APIs for Apps to code

Applications/Functions

Cross Layer Controls

By pass mechanisms to different layers required for fine grained control

Virtualization

Virtualization of the functions for business policy control (e.g., Choose controller, allow control execution, single point access). Critical functions execution designed for programmability (e.g., Flow Table, VM Configuration, Service Routing table)

Operating System (OS)

Operating system should support programmable control functions with real time characteristics. Provide Services abstraction and support Northbound/Southbound APIs

Hardware

Commodity Hardware capable of operating on any layer like Radio, Network, Services, etc., which can provide real time characteristics

SBI

North Bound Interface/South Bound Interface: Business applications, Interworking with other SDNs like Controller–Controller, OS-OS, Orchestration, Cross Layer

Who is Who on SDN?

What IEEE Should Do?

<u>Establish an IEEE wide initiative with a comprehensive program based on a broad vision of SDN</u>

- One IEEE and a community around IEEE SDN Initiative
  - A community for IEEE professionals, academia, industry leaders and government who work at this new paradigm
- Position IEEE as essential to the SDN community of members & customers

- Provide sufficient resources to expand and extend the IEEE-wide effort in this new paradigm
- Prioritize launch of products of services to utilize resources efficiently and <u>to keep up and to lead</u>
- Co-branding as much as possible

Time is of the essence!

Key Aspects of the Proposal

- Establishing an IEEE wide initiative with a comprehensive program based on a broad vision of SDN

- Prioritized launch of products of services to utilize resources efficiently and to keep up and to lead

- Individual Areas highlights:

    - An IEEE Magazine on SDE and a Transaction on SDE

    - A major conference and regional and topical conferences

    - A Standards Committee on SDE to drive standardization

    - Tutorials, e-courses, training courses, Webinars

    - Certification programs for people, devices, test-bed

    - Web Portal for links to IEEE SDE programs, repository, publicity

- An organizational structure with a Steering Committee and Executive Committee to consist of well known IEEE leaders and experts

Organizational Structure

Co-Chairs*
Vice-Chair*

Program Manager
(IEEE Staff)

Steering Committee
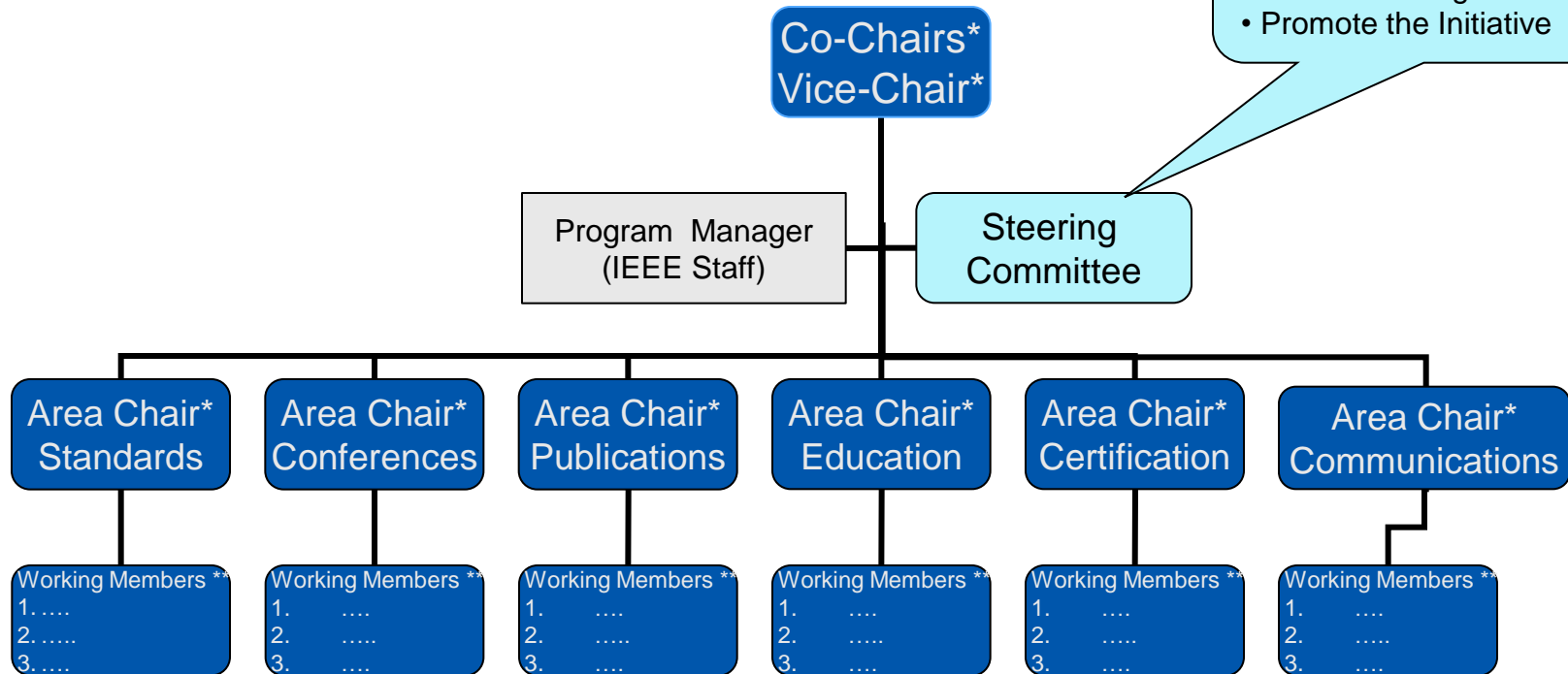
- Provide high level guidance
- Set priorities
- Provide strategic oversight
- Promote the Initiative

Area Chair*
Standards

Area Chair*
Conferences

Area Chair*
Publications

Area Chair*
Education

Area Chair*
Certification

Area Chair*
Communications

Working Members **
1. ….
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3. …..

Working Members **
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Working Members **
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* Member of the Executive Committee

** Each area may have its own steering committee

- Responsible for managing the project
- Establish milestones, schedules, budget,
- Focus on implementation
- Monitor progress and resources

Steering Committee

- **John Vig**, Former President of IEEE

- **Steve Diamond**, Chair of Cloud Computing Initiative, Former President of IEEE Comp Society,

- **John Mademana**, VP, AT&T Labs

- **Jean Walrand**, Professor, UC Berkeley

- **Doug Zuckerman**, IEEE Div III Director; Former President of Comsoc,

- **Alex Gelman**, ComSoc VP-Standards

- **TBD***

* More members to be added to represent sponsoring Societies

First Milestones of Major Components

• SIGN OFF

Milestones		Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Conferences	SDN Industry Forum			■									
	SDN Workshops			■									
	SDN World Confrence				■								
	Regional SDN Conferences					■							
Publications	SDN Magazine				■								
	JSAC on SDN						■						
	SDN Journal											■	
	SDN Book									■			
Education	eTutorials			■									
	eCourses				■								
	Webinars		■					■					
Certification	Device					■							
	Test bed						■						
	Professional				■								
Standards	Standards Committee		■										
	First PAR			■									
	SDN TAG			■									
Web Portal & Communications	Portal Launch			■									
	Press Release		■										
	Social Media			■									
Program Management	Formation of committees	■											
	Detailed project plan		■										
	First Progress report				■								

Status and Next Steps

- Submitted the proposal to IEEE New Initiation Committee – October 2013

- Revise the proposal based on the feedback from the NIC and SDN4FNS Workshop

- Resubmit it to the NIC for funding

- Form the committees and working groups

- Launch the program!

IEEE From A to V

IEEE societies impacted by the Software Defined Ecosystem

IEEE Aerospace and Electronic Systems Society
IEEE Antennas and Propagation Society
IEEE Broadcast Technology Society
IEEE Circuits and Systems Society
IEEE Communications Society
IEEE Components, Packaging, and Manufacturing Tec
IEEE Computational Intelligence Society
IEEE Computer Society
IEEE Consumer Electronics Society
IEEE Control Systems Society
IEEE Dielectrics and Electrical Insulation Society
IEEE Education Society
IEEE Electron Devices Society
IEEE Electromagnetic Compatibility Society
IEEE Engineering in Medicine and Biology Society
IEEE Geoscience and Remote Sensing Society
IEEE Industrial Electronics Society
IEEE Industry Applications Society
IEEE Information Theory Society
IEEE Instrumentation and Measurement Society
IEEE Intelligent Transportation Systems Society
IEEE Magnetics Society
IEEE Microwave Theory and Techniques Society
IEEE Nuclear and Plasma Sciences Society
IEEE Oceanic Engineering Society
IEEE Photonics Society
IEEE Power Electronics Society
IEEE Power & Energy Society
IEEE Product Safety Engineering Society
IEEE Professional Communication Society
IEEE Reliability Society
IEEE Robotics and Automation Society
IEEE Signal Processing Society
IEEE Society on Social Implications of Technology
IEEE Solid-State Circuits Society
IEEE Systems, Man, and Cybernetics Society
IEEE Ultrasonics, Ferroelectrics, and Frequency Contr
IEEE Vehicular Technology Society

New "Software Defined" functions and capabilities will drive *Aerospace Systems* and *Vehicular Technology* in a controllable and manageable framework that was not possible until now!