TinyOS Alliance: Birds of a Feather

http://www.tinyos.net/scoop/special/tinyos_alliance

SenSys 2006

core: Philip Levis, David Gay, Vlado Handziski, Jan Hauer, Cory Sharp, Henri Dubois-Ferriere, Martin Turon, Ben Greenstein, Jonathan Hui, Kevin Klues, ...
8051: Philippe Bonnet, Martin Leopold, ...
net2: Rodrigo Fonseca, Omprakash Gnawali, Kyle Jamieson, Sukun Kim, Arsalan Tavakoli, Gilman Tolle, ...
alliance: David Culler, Jack Stankovic, Ramesh Govindan, Deborah Estrin, Robert Szewczyk, Adam Wolisz, Matt Welsh, Mike Horton, ...

Agenda

- Update on Alliance Legal and Organization Structure
- TinyOS Enhancement Proposal (TEP) community process
- Working group – progress and new starts
- Call for Participation
- Other discussion

Alliance Working Group

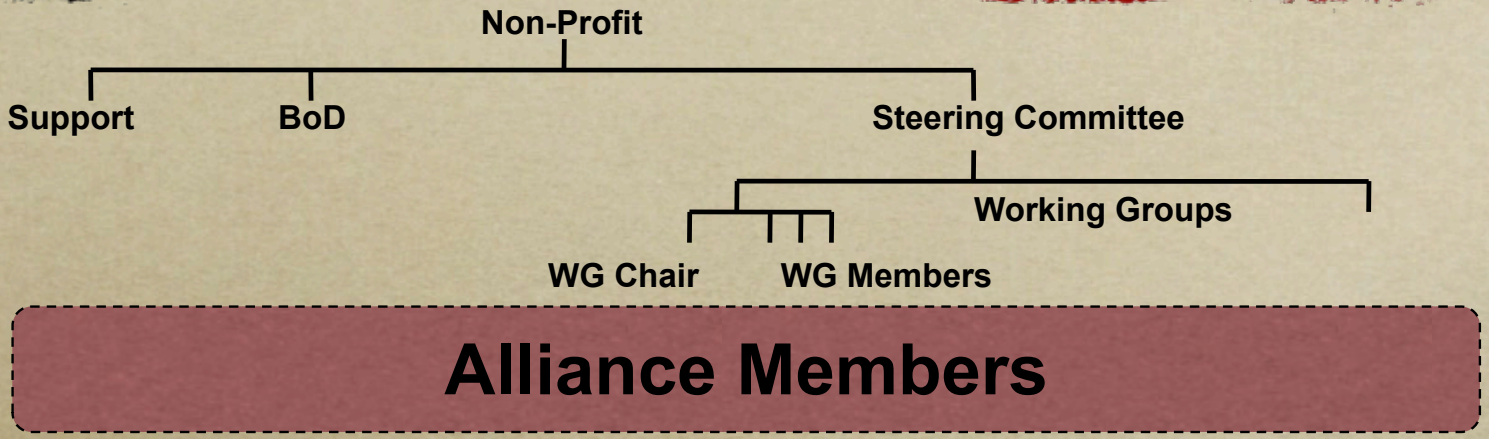
- Charter
  - Formulate a legal and organizational framework for an alliance that can facilitate the continued advancement of the open embedded network ecosystem around TinyOS and support the activities, interactions, and development of the worldwide academic and industrial TinyOS community.
- Members
  - David Culler (Ch) – UCB/Arch Rock culler@cs.berkeley.edu
  - Ralph Kling – Crossbow rkling@xbow.com
  - Adam Wolisz – TU Berlin awo@ieee.org
  - Philippe Bonnet – Diku bonnet.p@gmail.com
  - Deborah Estrin – UCLA destrin@cs.ucla.edu
  - Matt Welsh – Harvard mdw@cs.harvard.edu
  - Rob Szewczyk – Moteiv rob@moteiv.com
  - Jack Stankovic – UVA stankovic@cs.virginia.edu
  - Ramesh Govindan – USC ramesh@usc.edu
  - Jeonghoon Kang – KETI budge@keti.re.kr
  - Lama Nachman – Intel lama.nachman@intel.com
  - Philip Levis – Stanford pal@cs.stanford.edu

Mission

Provide a forum to facilitate:

- the continued growth of a healthy TinyOS developer and user community with support for innovation as well as industry advancement,
- the development and maintenance of a stable, technically-sound base of TinyOS technology and surrounding tools through the creation of standard interfaces and protocols, vetted extensions, open reference implementations, technical documents, testing and verification suites, and educational materials,
- the contribution of innovative technology from a world-wide research community and the maturation and dissemination of these contributions, and
- the promotion of the technology, the community, and the impact of networked embedded systems.

TinyOS Alliance Organization Structure



- Individual Member
- Contributing Individual Member
- Institutional Member
- Contributing Institutional Member

Membership Policy

- Focused in individuals – like IETF, Apache
  - rather than corporations – like OSDL, Zigbee, WINA, OSGI
- Recognizes important role of institutions
  - Corporate, academic, government, …
- Keeps barriers low while recognizing contribution
- Avoid heavy legalese around voting rights

- Individual Member (no annual dues)
  - Joins, basic participation, typically as consumer of tech.
- Contributing Individual Member => Vote, Elect
  - Joins, Attends Meetings, Working Groups, Code, other assets
  - By Request
- Institutional Member
  - Joins, appears on material, administrative fee
  - $500 small or non-profit, $1000 larger
- Contributing Institutional Member
  - $'s, resources, facilities, technical contributions, intellectual property, marketing support, or other ($2000 / $5,000)
  - May appoint CIMs – who vote

Working Groups

- Long-standing – develop important areas or subsystems
  - Routing, management, platform, testing
- Short-term – fixed-mandate
  - Develop protocol X, establish IP policy, …
- Formation
  - Grass roots
    - Individuals or groups have a preliminary version of something important and want to make it part of TinyOS
  - Chartered
    - SC or BoD recognize a need for an important area of development and form a WG to make it happen
- Output
  - Typically technical documentation AND working code, interface definition or standard proposal
    - Steering committee engaged in major ratification
  - WGs may be formed to tackle a new challenge
  - WGs may be formed for organizational or marketing goals
- Participation is key!
  - Chairs, members, TEP shepherds, TEP reviews, member comments

Current Working Group Status

- Active
  - Alliance
  - Core System
  - Networking
  - 8051 (newly revived ☺)
- Inactive
  - Testbed --- ☹
- Completed
  - Host Mote ☺
- Suggested
  - Tools
  - Storage
  - Community Communication
  - Instructional Resources

- Volunteers needed! Chairs?

Core WG Report

- Charter: core abstractions and hardware platforms
  - Sensors, timers, single hop networking, storage, scheduler, power management
- 7 supported platforms
  - mica2, mica2dot, micaz, telosb, intelmote2, eyes, tinynode
- Power management
  - Integrated MCU power management
  - Low power CC1000 stack
  - Experimental low power CC2420 stack (David Moss)
  - Standardized low power interfaces

Net2 WG Report

(filling in for Rodrigo)

- Charter: multihop protocols
  - Specification, APIs, implementations
  - [illegible]
  - [illegible]imation
  - [illegible] API
  - Extend dissemination to medium and large objects?
- Future primitives: jittered send, random timer

Collection Tree Protocol (CTP)
92 micaz nodes, low network utilization (16s)
Indoor environment (802.11 interference)
Minimum e2e delivery: 98.2%
Nodes delivering all packets: 55%
Expected transmissions/hop: 1.2

Important Developments

- TinyOS 2.0 release (Monday)
- Commercial releases of TinyOS-based Technology
- New Platforms
- New Tools
- New Applications

Working Groups (WGs)

- Working groups have a charter and a chair
- Small (<20), but all proceedings are public
  - Larger discussion is on tinyos-devel
- Each defines its own policies for membership
  - net2: voting
  - core: consensus
- WGs products include documentation, TEPs, and reference implementations

TEPs

- TinyOS Enhancement Proposal
  - A cross between an IETF RFC and a Python PEP
- Four classes
  - Best Common Practice/BCP (start at 1)
  - Documentary, Informational, Experimental (start at 100)
- Examples:
  - TEP 2: Hardware Abstraction Architecture (BCP)
  - TEP 102: Timers (Documentary)
  - TEP 120: TinyOS Alliance (Informational)

Producing TEPs

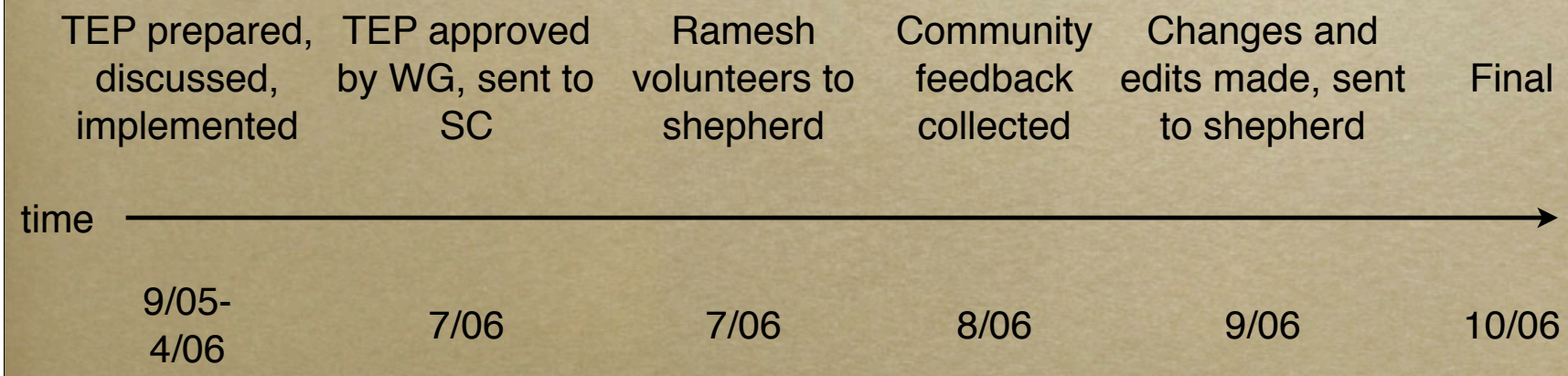
- Working group chair decides what documents from the WG become TEPs
  - Predominantly generated by WGs
  - Individuals may submit TEPs to a relevant WG
- Working group discusses TEP internally
  - Reaches consensus on when the TEP is ready: last call
- Chair submits TEP to Steering Committee

TEP Review Process

- Chair submits TEP to Steering Committee
- SC assigns a shepherd for finalization (4 weeks)
- Shepherd gathers comments and reviews
  - Community feedback/discussion
  - Targeted reviews
  - Sometimes technical, sometimes presentation
- Shepherd confers with authors
- WG and authors respond, authors revise according to community comment

Example: TEP 103 (Storage)

- Authors: David Gay, Jonathan Hui
- Shepherd: Ramesh Govindan
- First finalized TEP
- Documentary: has reference implementations



Current TEP Review Status

http://www.tinyos.net/scoop

T2 contrib

- tinyos-1.x/contrib has been a tremendous resource to the community
  - Makes research and development publicly accessible
  - Two problems: finding useful code and bit-rot
- T2 contributions have a caretaker
  - One year terms (renewable)
  - Caretaker maintains index of working modules
  - Caretaker establishes a schema for organizing code
- First caretaker: Henri Dubois-Ferriere

Source License

- Lots of WG discussion on approaches
  - BSD, APL, GPL, lGPL, NPL, …
- Want to encourage adoption and give credit
- Want to avoid litigious environment

- Alliance posts
  - preferred source license based on the BSD framework
  - small set of accepted licenses (incl. grandfathered code)
- Submissions use one of these or (rarely) requests acceptance of addition

- Copyright
  - Retained with Author Institution as today (unlike Apache)

- Accreditation
  - Provided by tools, demanded by alliance code of conduct

Intellectual Property

- Follow IETF model
  - Promote the use of non-proprietary policy, eyes open
  - rely on disclosure of known IP of relevance, an open process, and a code of conduct
  - No members-only IP pool (Zigbee, W3C)
  - No complete IP inventory required of institutions
- Meeting are non-confidential
- Members required to disclose “known IP” in making proposals to working groups, drafts, interfaces, TEPs, etc.
- Working groups seek approaches that do not require the use of proprietary IP
  - Multiple implementations without accusation
- Code must conform to source licensing terms

Steering Committee

- Members: WG chairs + elected members at large
- Tenure: two years with opportunity for renewal
- Charter: Oversee working groups, maintain architectural coherence, monitor progress
  - Working group: policy, creation/extinction, arbitration, resolution
  - TEP: review process
  - Procedures: election, membership criteria, selection of venues, oversight of access to code repositories and Alliance web sites, and regular Alliance meetings.
- Initially formed from Alliance WG and WG chairs till election in place.

Legalese

- Articles of Incorporation
- ByLaws
- Board
- Officers

- … WSGR pro bono

Articles of Incorporation…

- The purpose of the corporation is to facilitate the continued advancement of open embedded network technology and applications by developing and promoting the TinyOS ecosystem within a worldwide academic and industrial embedded sensor network community.

- The corporation achieves this purpose by supporting processes for the development
of technologies with technical excellence, fostering the exchange of technical ideas
and education.

Board of Directors

- Corporate governance for the non-profit
  - “trustees” in IETF
- Max: 15, Term: 3 year,
- Turn-over: staggered, Max 2 successive terms
- Demography - diverse
  - industry, educational, nonprofit, and government
  - International
  - Areas of specialization
- Affirmative Actions: 2/3 majority of BoD
  - Appointments, Articles,
  - Bylaws requires 4/5s
- Quorum: Majority
- Action: Majority Attending
- Forms Committees, Appoints Officers (annual)

- Volunteers and Suggestions Welcome

Officers

- President
- Secretary
- Treasurer
- …

- Interested? Please let us know.

Participation

- Please….