IEEE 802.1 Minutes, July 2003, San Franciso

Note: Link Security Meeting Notes are posted separately. They are referenced here and to be found in
http://www.ieee802.org/linksec/meetings/Jul03/minutes_linksec_july03.doc

Link Security Session, Monday morning, July 21, 2003

http://www.ieee802.org/linksec/meetings/Jul03/minutes_linksec_july03.doc
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Opening Plenary, Monday, July 21, 2003

Agenda – Tony Jeffree

Administrative stuff – Tony Jeffree
Voting Membership rules
Allyn Romanow taking notes for Michael Wright who couldn't be present

Website – Tony Jeffree
Web site http://www.ieee802.org/1
Username p8021
Password go_wildcats

Executive Meeting Review – Tony Jeffree

- 802.10 was disbanded and standard was withdrawn. Apparently there are no IP issues if Linksec wants to draw on material from 802.10, Tony has checked.
- Tutorials this week – One on cabling. A tutorial series for editors and chairs – this is the first one, primarily on the balloting process. Plenary on Ethernet history – with famous people
- 802.20 elected officials weren't re-affirmed by the Exec, an appeal has been launched. There were issues relating to IEEE accounting procedures, some funds spent without approval.
- Until now, Linksec has been a study group. At end of meeting we will have a PAR. We should place other security in LinkSec - 802.1x, in particular. Convert LinkSec into an 802.1 task group. Dolors will remain chair and Allyn will remain secretary.
- New handoff group will remain a separate WG and not join 802.1.

802.1 Patent Policy – Tony Jeffree
Review of the patent policy. Tony showed the required slides to the committee.

Interim Meetings – Tony Jeffree

- It was too late to make arrangements to go to Barcelona in Sept. - not enough hotel space is available. We will try again.
- Sept 2003, week of 22nd, Sacramento at the Embassy Suites, arranged by HP, Paul Congdon. There will be no meeting fees. HP is picking up the costs.

Week's Schedule – Mick Seaman
Monday 9.00-10.30 LinkSec (presentations, opportunity to discuss with other groups)
Monday 1.00- 3.00 802.1 WG opening Plenary
Monday 3.30- 5.00 LinkSec (start time nominal, after WG plenary done)
(document structure proposal)
Monday 5:00- 5:15 Presentation on "IEEE and 802 Brand Identification"
Karen McCabe, IEEE Standards Office

Tuesday 9.00-12.30 Interworking (1D sponsor ballot res, 1ab progress)
Tuesday 2.00- 5.00 Interworking (Provider Bridging)

Wednesday 8.30-12.30 LinkSec (1aa ballot resolution)
Wednesday 2.00- 5.00 LinkSec (presentations)

Thursday 9.00-12.30 Interworking (Provider Bridging)
Thursday 2.00- 3.30 Interworking (presentations, NWI/FYI)
Thursday 3:30- 5:00 802.1 WG closing Plenary

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Task Group – Mick Seaman

- Norm wants a letter to ITU on Provider Bridges
- Scheduling task group work- FIFO - oldest work first, get it out
- .1D sponsor ballot, one negative response on well-discussed topic. We will look at all comments in detail
- Will show RSTP simulation for educational value - ongoing quality of 802.1 work depends on multiple people understanding the technology
- Liaisons- there will be time for discussion of liaisons

Link Security Meeting Monday PM, July 21, 2003

http://www.ieee802.org/linksec/meetings/Jul03/minutes_linksec_july03.doc

Task Group Monday PM, July 21, 2003

Discussion of P802.1aa Ballot – Tony Jeffree

- Jim Burns - Bernard Aboba's issues with .1aa. Bernard is a chair of EAP. He had problems with .1aa, to which we need respond.
    - .1aa has an annex that refers to EAP state machine, but there is no document that can be referenced – none exists. EAP state machine document was just accepted in IETF as a work item. Therefore, the state machine isn't cooked. The .1aa annex says, here's an example of how EAP would work, there is no reference to an IETF doc, and there cannot be one soon. If leave as is, it would confuse industry. Choices:
        a. Remove annex, reference EAP, and not reference the EAP state machine
        b. Reference the EAP state machine, can get an RFC number in IETF by fast track. This requires knowing the relationship between the .1aa and EAP
        c. Say, this is the kind of thing we're expecting to work with our interface
        d. There are additional unattractive alternatives-
        - .1aa defines an interface. The purpose of the annex was to show an example of what's on the other side of the interface
        - Mick - difference between a reference item in the standard and a bibliographic item. The reference item must be a bona fide document; the bibliographic reference can be just informational, a more loose type of reference. The EAP state machine can be a bibliographic item not a reference item.
        - Agreement on choice c.
    - Need to replace “authentication server” with “EAP layer” in the document. Actually, get info from AAA layer, not EAP layer. References need to be changed, not sure how yet.
    - Need to make modifications to the MIB values, because they are incorrect.

- Jim made suggestions on how to remove the values, and then EAP can do some MIBs.
- But it's hard to get people to use new MIBs. Right now 802.1x is the MIB that people use and it is useful.
- Is it okay to have a MIB that references a state machine we don't have? Or, remove MIB from ours and have EAP do it; this will cause confusion. Can we just leave MIB alone? Even though we don't talk about the value that the MIB references? The MIB is normative. Having values in it that you don't talk about is problematic, causes confusion. Take out, or leave in and say something. What would we say? That the MIBs are there for backward compatibility, and EAP will populate them? Would like to reference where they will be defined, but can't. Have them in the doc, but deprecate, make clear not to be used.
- This issue will be resolved during Weds. meeting.

Presentation on "IEEE and 802 Brand Identification" - Karen McCabe, IEEE Standards Office

Tuesday AM, July 22, 2003

RSTP Simulation – Mick Seaman
http://www.ieee802.org/1/files/public/docs2003/RstpSimulation2401.zip

Tuesday PM, July 22, 2003

802.1D/D3 ballot resolution - Tony Jeffree

- More than 75% in favor, most comments from yes votes. One no vote. See disposition of comments
- There was a lengthy discussion on the negative vote which wanted to retain STP. This change would only be made if we changed the scope of the PAR, which is not going to be done.

802.1AB, LLDP, Connectivity Discovery ballot resolution – Bill Lane
See status report, 802-1AB - July 2003 status.pdf at
http://www.ieee802.org/1/files/private/ab-drafts/d5/

- There was agreement that we would have to define addressing requirements and usage rules for a new 802.1 slow-protocols-like protocol to be used by LLDP. For the moment, at least, this will be published as an annex to 802.1AB.

802.1ad/D1.1 Provider Bridging Issues- Mick Seaman

- Discussion of “user priority” and “access priority”- layering of priority designation. See figure 6.2 in the .1ADdraft.
- Access priority is what the Provider wants; user priority is what user wants. Each layer takes what user wants from above, and decides what priority it wants to use from the medium below, depending on what kind of service it bought from the service below.
- See the diagrams Mick used for showing where MACsec goes in the stack.
- It was pointed out that clause 6.4.2 doesn't properly specify function to get message up to the LLC. ISS was split to put in the MACsecY

ITU-t SG 15 liaison report – Glenn Parsons
What the ITU wants from us, slides available,
http://www.ieee802.org/1/files/public/docs2003/802.1-ITU SG15 update.ppt

- Same presentation given in Ottawa, will go over what needs to be worked on tomorrow
- A MEF Service, from a customer's viewpoint, over an ITU service- from Provider's viewpoint

- Defines different kinds of service - private service, private virtual service, line service, LAN service.

There are 3 docs:
(1)G.ethna
(2)G.eota
(3) G.ethserv - services

- The docs describe what is in 802.1D, 802.1Q, and 802.3, in G-model and language. Intended not to change anything. Worry that ITU will come up with different answers based on their different modeling of the IEEE standards. This would be problematic because it would be difficult for an implementation to be in compliance with two different standards. The purpose is for education, to understand. Compliance is to IEEE standards, not to a re-description. The intention is to work with IEEE802.1.
- ITU-SG13 working on Ethernet OAM, end-to-end Ethernet OAM. A liaison will come to IEEE 802.1 with details.
- Immediately, the SG15 request is to look at L2 control frame processing and respond. How do we do this? Someone will draft something, then have an ad hoc group, produce something for group review on Thursday.

Wednesday AM, July 23, 2003

Meeting joint with EFM 802.3ah – Matt Squire

- Item 1. IEEE response to ITU. MEF and ITU SG 15. They are both doing the same thing. Read the 802.3 response to the ITU.
  - How much latency can PAUSE tolerate? PAUSE over Sonet?
  - Geoff Thompson -What are they asking us to do? They want to emulate our physical layer and have us guarantee it will work - bad idea. They should make their own MAC, then if they break it, they're responsible
  - Alan - doesn't think this response is strong enough, we have a different idea than they have. We are not expert in what they are doing - Ethernet over Sonet, so we should not tell them what they should do.
  - We will work jointly on a response to ITU. What's causing the problem is the attempt to use the Ethernet brand. If they define new MACs that's fine. Ethernet transport and Ethernet network are different. From our point of view, it's different no matter what they call it. 802.1 transport, 802.3 Ethernet, ITU- something else
- Dolors – There was another liaison to 802.3 on OAM that said something about LinkSec, and there is a note about it that was forwarded to 802.1

- Item 2. 802.3 comments on Link Security PAR, list of questions
  (1.) Compatibility - downward looking compatible, compatible with .3, .17 and what else? PAR should say this.

  (2.) Is this a revision PAR? - Tony responded, this is still a maintenance PAR, not revision. 802.1 has done PARs introducing new functionality, we use amendment, rather than revision PAR.

  (3.) The relationship between .1 and .3 is already very close, but we need more mechanism for communication, so that the two groups can be held to binding statements. There could be supplementary letters, letters of understanding, and part of an archive. A new mechanism would be useful to make collaborative process better

  (4.) At what layer might security be applied? And, what might be encrypted? If it is CRCs and MAC addresses – 802.3 cares a lot. They don't think we should worry about traffic

analysis, so there is no reason to encrypt MAC addresses. We're not encrypting either MAC addresses or CRCs. The PAR doesn't stipulate encryption of either.

- Encryption is in the media independent part of our stack, we can only encrypt what 802.3 thinks of as data.
- OAM frames are not encrypted. OAM that is originated in the MAC is not encrypted. What if .3 has an OAM frame it wants encrypted? They can place the function where they want. Scope as stated in the PAR - media access independent, means we don't mess with .3
- .3 says it's not clear in the PAR - can we add some more lines to clarify?
- What about encryption of other fields? For example, type fields? It depends on where the field is in relation to the security function. It depends whether type is part of user data, whether it's been encapsulated. This adds length to the MAC frame, they have concerns about the length of MAC frame.

- Item 3. Request for liaison volunteers between 802.3 and 802 .1. Contact Matt Squire if you are interested. He will make a list, they want several people. Rich Brand is the 802.3 recorder - gives liaison report on .1 in the .3 Plenary meeting. He is the single point of contact.

- Item 4. LLDP in relation to 802.3.
  - Issue 1. OAM should be handled by LLDP. How serious was this suggestion? Want to be clear about any related issues. LLDP- a one way protocol, it doesn't support OAM requirements. It has a set of info to communicate. Organizationally specific info – for example, 802.3 or IETF, etc. defines info it wants to share thru LLDP Some things are defined for .3, but the issue needs to be addressed by .3
  - Also proposing now that LLDP runs as an 802.1 slow protocol not a 802.3 slow protocol
  - LLDP may be at a higher layer than you want OAM – this is to be taken up in OAM Task force in .3
  - Expect to use LLDP for a customer to detect Provider Bridge. The large number of hellos when link comes up is a problem. LLDP could be used to detect whether device plays OAM. LLDP is good at advertising capabilities. LLDP well suited for this - not a request response protocol.

- Issue 2. LLDP is below link aggregation and above individual links. Where are MAC boundaries? Between link aggregation and the MAC. Don't allow two bindings to the MAC, have to multiplex using priority. This is something that needs to be worked on.

<u>Discussion of 802.1aa – Joint with 802.11i</u>

- pre-authentication mechanisms
  1. confusion on what do
  2. need a different Ethertype
- pre-authentication - if use .1x, there is ambiguity about what you're doing. In .1x, the pre-auth frame is used is to set up keys in advance, to establish the key state. It is not an authorization. It can be misinterpreted as an authorization, which is not what it is intended to be. To resolve this ambiguity, use a distinct Ethertype for pre-authentication.
- New Ethertype makes it possible to move forward now, but it doesn't solve underlying issue of how to deal with a .1x session with multiple clients. This is because the notion of a port is a missing concept. This issue is being dealt with in Link Security group.
- The model of an 802.11 AP needs to be brought under the umbrella of the 802 architecture. The AP is odd compared to the rest of 802 entities. There needs to be clarification of 802.11 architecture.
- Exactly what is the BSSID connected to?
- Question whether pre-auth should be at L2, or whether it is really an L3 problem. Response to Norm- L2 roaming is for restricted areas, so there is no need for a L3

solution, AP becomes visible on all VLANs. Going beyond isn't helpful because don't want to roam on a campus-wide basis.
- 802.11i has debated this. Other mechanisms to develop key provisioning require development by groups they can't control.
- Discussion of how to specify pre-authentication and AP
- A list of questions from Mick for .11i to address. Result is document posted http://www.drizzle.com/~aboba/IEEE/preauth.doc

802.1aa Resolution of Comments- Tony Jeffree
See comment resolution document on web page, 802-1aa-d6-1-proposed-dis.pdf

Link Security Session - Wednesday PM, July 23, 2003

http://www.ieee802.org/linksec/meetings/Jul03/minutes_linksec_july03.doc

Wednesday PM, July 23, 2003

802.1aa Comments – Tony Jeffree
See disposition of comments

Thursday AM, July 24, 2003

802.1ad Discussion– Mick Seaman
Presentation on General models, History, Architecture, will be posted to the web page

- In a sense this isn't new, it was discussed in early days of 802.1P. Mindset that customers equip doesn't change. Initial model 1994 - network composed of subnets, subnets can be composed of sub-subnets

802.1ad- Architecture Diagrams - Steve Haddock
http://www.ieee802.org/1/files/public/docs2003/802-1ad-architecture-Haddock.pdf

- Originally for the MEF. Access priority tells MAC what priority to transmit. They observed that Provider Bridge didn't require major changes to change a VLAN Bridge into a Provider Bridge. Just requires a new Ethertype and block of Bridge addresses.
- A perfectly simple Provider service is when all traffic coming in to PE gets same service, default priority, gets parameters from the port. Provider Bridge slaps a Provider tag on all frames and sends it on.
- This proposed architecture makes minimal changes to VLAN Bridge to make it into a Provider Bridge
- access priority is the incoming priority, it becomes the box's user priority
- break the management of the box – into customer and Provider parts
- Can this be made recursive? Large corporations will have their own Provider network, want to go to a Provider's Provider. Nothing fundamental breaks. There are decisions that would need to be made. Scalability is an issue.
- Norm- patent issue. Routers using VLAN use proprietary Spanning Trees. If CE comes from one vendor and CPE comes from another vendor, they won't interoperate.

- There was general agreement that this model should be the specification going forward. It maps to what has been talked about previously. When first take this model to people who have been working on this under a different model, they will initially think this is too complex.

- What do you do with MIBs? Do you need two sets for either side? Mick thinks better to keep MIBs as they are, meaning have two MIBs.
- This model also makes sense for linksec.
- Unintended consequences and complications. What if you have a new shim, and it only makes sense to implement on one side, Provider say, and not the other? Conformance would require you to implement on two sides.
- Need to describe customer functionality, and Provider functionality, and Customer Provider Bridge
- How does this relate to the 5 rules that Norm presented? It doesn't, but it will be looked into

Disposition of comments on 802.1ad Ballot- Mick Seaman

Response letter to ITU-SG15 – Tony Jeffree

- People wanted to add material to the current draft, based on Steve's architecture presentation. Norm is going to write some more text today.
- Suggestion to have a co-located meeting with ITU SG15. Their plenary is in October in Geneva. Maybe they can come to Sacramento during the Sept. 22 meeting.
- Clarification of domains of SG-13 and SG-15. SG-13 owns Ethernet OAM. They are doing requirements at their meeting this week and next. SG-15 covers the Ethernet transport network over whatever. They are defining services and architecture

Thursday PM, July 24, 2003

Interworking - Large Scale Q-in-Q presentation- Mick Seaman
It scales as the number of customer * number of Bridges. The solution - don't learn unless learning will affect where frames are forwarded

Closing Plenary Thursday PM, July 24, 2003

Administrative Issues – Tony Jeffree

- Neil Jarvis is stepping down as Vice Chair and as website manager after November meeting. The two positions will become vacant.
- John Messenger will take over website.
- Tony is looking for nominations for Vice Chair. The position will run till March when chair and vice chair get re-elected.

Patent policy- Tony Jeffree

The required slides were shown.

Placement of the Handoff study group.

- They are recommending they become a new WG, and not join 802.1. They want to be able to have meetings where and when they want. The decision will be voted in November. Tony wants input on whether people think handoff should be in 802.1.

Review of response to ITU SG-15
On Website, http://www.ieee802.org/1/files/public/docs2003/

- Norm will be going to IT SG-15 and he will represent our position

Response to Mr. Vucetic's inquiry dated July 17 from E-LMI group in MEF about Slow Protocols.

- Decided that decided Tony will get in touch with him.

Liaison with 802.3

- What are we going to do about liaisons to 802.3? Since Jonathan Thatcher isn't in the room, we'll take up the topic next time.
- Think if you want to be a liaison from 802.1 to 802.3. The liaison from .3 to .1 will come to our meetings and see if we are doing anything they in which are particularly interested. Richard Brand has the job of reporting to 802.3 Plenary about things 802.1 is doing in which they are interested. If we have formal liaisons to .3, their attendance in .1 to retain voting rights will be appropriately adjusted. If interested, let Tony know. The job is to keep track of interesting things in .3, and report to .1. There are a number of .3 meetings. Have to spend most time going to .3 meetings rather than .1 meetings.
- Argue that right now EFM is the only .3 group we need to monitor.
- Tony not convinced of need or lack of need.
- What's the alternative? Vehicle have used in past is the joint session such as earlier in the week, and send people to .3 for specific purposes.
- Liaisons have voting rights in the other groups.

Motions

802.1 resolves to hold an interim session in Sacramento, Mon 9:00 through Fri Noon of the week of 22nd Sept 2003 (22nd through 26th Sept), hosted by Paul Congdon/HP
Proposed:Seaman
Second:Lane

- For:22 Against:0 Abstain: 0

802.1 approves the March '2003 and June '2003 meeting minutes.
Proposed: lane
Second: larsen

- For: 15 Against: 0 Abstain: 4
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802.1 resolves to hold a pre-meeting on the Monday morning of the November 2003 plenary session.
Proposed: Sala
Second: Larsen

- For: 15 Against: 2 Abstain: 1

802.1 instructs the Editors for P802.1D to revise the document in line with the Sponsor Ballot comment dispositions agreed during this meeting and issue the next draft for Sponsor confirmation ballot.
Proposed: Seaman
Second: Thorsen

- For: 17 Against: 0 Abstain: 0
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802.1 requests conditional approval from the SEC to forward P802.1D to RevCom following completion of its upcoming Sponsor recirculation ballot.
802.1 Proposed: Seaman Second: Lane

- For: 19 Against: 0 Abstain: 1

802.1 instructs the Editor for P802b to revise the document in line with the comment dispositions agreed during this meeting and issue the next draft for a WG confirmation ballot.
Proposed: Lane
Second: Larsen

- For: 17 Against: 0 Abstain: 1

802.1 requests conditional approval from the SEC to forward P802b to Sponsor Ballot following completion of its WG recirculation ballot.
802.1 Proposed: Larsen
Second: Lane

- For: 16 Against: 0 Abstain: 2

802.1 instructs the Editors for P802.1ab to issue the next draft for Task Group ballot in time for comment resolution at the September interim, and possible WG ballot prior to November plenary
Proposed: Lane
Second: Sala

- For: 21 Against: 0 Abstain: 0

802.1 instructs the Editor for P802.1aa to revise the document in line with the comment dispositions agreed during this meeting and issue the next draft for a WG confirmation ballot.
Proposed: Sala
Second: Finn

- For: 18 Against: 0 Abstain: 1

802.1 requests conditional approval from the SEC to forward P802.1aa to Sponsor Ballot following completion of its WG recirculation ballot.
Proposed: Sala
Second: Finn

- For: 19 Against: 0 Abstain: 1

802.1 requests approval from the SEC to forward the 802.1Q Reaffirmation to RevCom.
Proposed: Finn
Second: Haddock

- For: 23 Against:0 Abstain: 0

802.1 approves forwarding the ITU Q12/15 liaison statement.
Proposed: Finn
Second: Patton

- For: 21 Against: 0 Abstain: 1

802.1 instructs the Editor for P802.1ad to incorporate the technical material from Steve Haddock's presentation from the Thursday AM meeting of 802.1 as part of the ongoing development of the draft.
Proposed: Seaman Second: Thatcher

- For:20 Against: 2 Abstain: 1

802.1 requests permission from the SEC to forward the P802.1Q PAR to NesCom.
Proposed:Thorsen
Second: Lane

- For: 18 Against: 0 Abstain: 0

802.1 requests permission from the SEC to forward the P802.1X PAR to NesCom.
Proposed: Lane
Second: Jarvis

- For: 19 Against: 0 Abstain: 0

802.1 requests permission from the SEC to forward the P802.1AE PAR to NesCom.
Proposed: Sala
Second: Lane

- For: 19 Against: 0 Abstain: 1

802.1 requests permission from the SEC to issue a reaffirmation ballot for 802.1F.
Proposed:Finn
Second: Lane
For: 15 Against: 1 Abstain: 3

802.1 resolves to create a Link Security Task Group to conduct our ongoing work on 802.1X, MacSec, and other security topics as they arise in the future.
Proposed: Sala Second: Lane
For: 22 Against: 0 Abstain: 0

Attendance

The number after each name gives the number of meetings (1/2 days) attended by each.

Bernard Aboba 4
Alan Albrecht 1
Kenneth Alonge 6
Siamack Ayandeh 1
Siamack Ayandeh 5
Stephen Bailey 3
Guna Bala 4
Brandon Barry 7
Paul Bottorff 7
Richard Brand 1
Rudolpf Brandner 6
Rudolph Brandner 1
Jennifer Bray 1
Mitchell Buckman 7
Jim Burns 6
Dirceu Cavendish 6
Ted Chang 4
Jacob Christensen 1
Byung Ho Chung 4
Paul Congdon 8
Ken Cook 1
Arjan de Heer 8
Thomas Dineen 1
Linda Dunbar 8
Craig Easley 1
Anush Elangovan 7
David Elie-Dit-Cosaque 8
Norm Finn 8
David Frattura 7
Yukihiro Fujimoto 4
Floyd Gerhardt 1
Byung Gil 1
Gerard Goubert 7
Steve Haddock 8
Amer Haider 4
David Halasz 2
Onn Haran 1
Marc Holness 3
Raghib Hussain 6
Tohru Inoue 6
Atsushi Iwata 6

Kyung Hun Jang 1
Neil Jarvis 7
Tony Jeffree 7
Ho-In Jeon 1
Daniel Jiang 1
Teruo Kaganoi 6
Mohan Kalkunte 2
You Sung Kang 1
Neil Katin 1
Manu Kaycee 6
Khurram Kazi 1
Lior Khermosh 1
Chan Kim 1
Yongbum Kim 7
Takuya Kitamura 7
Shantanu Kothavale 7
Tom Kurihara 1
Bill Lane 8
Roger Lapuh 8
Loren Larsen 8
Yannick Le Goff 8
Byunggri Lee 2
Insun Lee 3
Marcus Leech 6
Rick W. Li 1
Seyonn Lim 1
Tommy Long 7
Mahalingam Mani 5
David Martin 1
Bill McIntosh 4
John Messenger 8
Tim Moore 1
Bob Moskowitz 4
Satoshi Obara 3
Karen O'Donoghue 4
Sean O'Hara 1
Yoshihiro Ohba 6
Peter Oomen 1
Don Pannell 6
Jae Park 8
Glenn Parsons 7
Nayan Patel 6
Ken Patton 8
Michael Pereira 1
Rob Reed 3
Max Rigel 1
Allyn Romanow 8
Jessy V Rouyer 8
Dolors Sala 8
B Sambasivian 1
Mick Seaman 8
Koichiro Seto 4
Tricci So 1
Bill Spurgeon 1
Ken Steck 1
Rene Struik 1

Muneyoshi Suzuki 7
Kazuo Takagi 7
Pek Yew Tan 1
Jonathan Thatcher 7
Geoff Thompson 1
Michel Thorsen 8
Sandra Turner 1
Dennis Volpano 6
Jesse Walker 2
Ludwig Winkel 7
Robert Wu 8
Stephen Yang 8
Alper Yegin 2
Tap-Whan Yoo 3
Hong Yu 1