

Meeting of the IEC/IEEE 60802 Joint Project

2018-01-15

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

TC65: Industrial-process measurement, control and automation

SC65C: Industrial communication networks

Institute of Electrical and Electronics Engineers, Inc. (IEEE)

IEEE 802: LAN/MAN Standards Committee

IEEE 802.1: Higher Layer LAN Protocols Working Group

IEEE 802.1 TSN: Time-Sensitive Networking Task Group

Meeting: IEC/IEEE 60802 Joint Project

Meeting was based on the meeting announcement; see IEC collaboration tool <http://collaboration.iec.ch/> and <http://www.ieee802.org/1>

Date: 2018-11-12 — 2018-11-14

Location: Bangkok, Thailand

IEC MT9 Convenor and IEC/IEEE 60802 Joint Project chair: Ludwig Winkel

Daily minutes by: Josef Dorr

Minutes compiled by: Ludwig Winkel and Jessy Rouyer

Published minutes: Collaboration tool <http://collaboration.iec.ch/>, and IEEE 802.1 web site <http://www.ieee802.org/1/files/public/60802>

Ludwig Winkel, IEC MT9 Convenor, and János Farkas, IEEE 802.1 TSN Task Group Chair, presided. Josef Dorr wrote the minutes.

At the beginning of the meetings on each day:

- The IEEE-SA PatCom Patent Slides for Standards Development Meetings and the IEEE 802 Participation slide were presented (<http://standards.ieee.org/about/sasb/patcom/materials.html>).
- The Call for Potentially Essential Patents was made. There were no responses to the calls prior to the end of the week's session.
- The IEC MT9 Convenor reminded the IEC participants that patent rules similar to those of IEEE-SA apply in IEC, reminded all that patents required for use of the IEC/IEEE 60802 profile must be announced to IEC and IEEE and made available using the IEC licensing form, and reminded that presentations shall not have copyright marks or confidentiality information.
- The agenda and the expected results of the day were reviewed and approved. The final agenda is in Annex A.

Draft minutes were reviewed at the end of the meeting.

Attendance:

Last name	First name	Affiliation	Mon AM/1 TSN & 60802 JP Pre-Meeting	Mon PM IEC/IEEE 60802 JP	Tue AM2 IEC/IEEE 60802 JP	Tue PM IEC/IEEE 60802 JP	Wed AM IEC/IEEE 60802 JP	Wed PM1 IEC/IEEE 60802 JP	Wed PM2 TSN & 60802 JP
Bao	Shenghua	HUAWEI	•						
Belitz	Tobias	Renesas Electronics Corporation	•						
Berger	Louis	LabN Consulting, L.L.C.	•	•					•
Bierschenk	Jens	Robert Bosch GmbH	•	•					
Boiger	Christian	b-plus GmbH	•		•			•	
Bottorff	Paul	Hewlett-Packard Development Company, L.P.	•						
Canchi	Radhakrishna	Kyocera International Inc.	•	•	•				
Chen	David	Nokia	•			•			
Chen	Feng	Siemens AG	•				•	•	•
Chen	Lihao	Huawei Technologies Co. Ltd	•	•	•	•	•	•	•
Cheng	Weiyang	Coriant	•						•
Chou	Vincent	Marvell Semiconductor, Inc.		•	•	•			•
Congdon	Paul	Tallac Networks; Huawei	•						
Cummings	Rodney	National Instruments Corporation	•					•	•

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Dorr	Josef	Siemens AG	•	•	•	•	•	•	•
Duan	Shihui	China Academy of Information and Communications Technology (China Academy of TeleCommunication Research, MIIT) CAICT (CATR)					•		
Elbakoury	Hesham	Huawei Technologies Co. Ltd	•	•	•	•	•	•	•
Enzinger	Thomas	B&R Industrial Automation	•	•	•	•	•	•	•
Fang	Yonggang	ZTE TX Inc							•
Farkas	Janos	Ericsson	•						•
Finn	Norman	Huawei Technologies Co. Ltd	•						•
Garner	Geoffrey	Huawei Technologies Co. Ltd	•						•
Gray	Eric	Ericsson AB							•
Gunther	Craig	Craig Gunther Consulting, LLC	•						
Gutierrez	Marina	TTTech Computertechnik AG		•					•
Haddock	Stephen	Stephen Haddock Consulting, LLC	•						
Hantel	Mark	Rockwell Automation	•	•	•	•	•	•	•
Harima	Taro	Mitsubishi Electric Corporation	•	•	•	•	•	•	•
Hemmer	David	PILZ	•	•	•	•	•	•	•
Holness	Marc	Ciena Corporation	•						•
Hotta	Yoshifumi	Mitsubishi Electric Corporation	•	•	•	•	•	•	•
HUH	WOOJUNG	Microchip Technology, Inc.	•						•
Itaya	Satoko	National Institute of Information and Communications Technology (NICT)	•	•	•	•	•	•	
Ito	Yoshihiro	Nagoya Institute of Technology	•	•	•				•
Joung	Jinoo	Sangmyung Univ.	•	•					•
Kabra	Lokesh	Synopsys, Inc.		•	•	•			
Kanuri	Mrudula	NVIDIA Corporation	•	•					
Karl	Michael	Marvell Semiconductor, Inc.	•						•
Kehrer	Stephan	Hirschmann Automation and Control, Inc.	•		•	•	•	•	•
Kelsey	Randy	Engineering Solutions, Inc					•	•	•
Kim	Ryangsoo	ETRI	•			•			•
Kim	Yongbum	NIO		•					
Koga	Hidetsugu	YASKAWA ELECTRIC CORPRATION	•	•	•	•	•	•	•
KONDO	Kenji	Yaskawa Electric Corp	•	•	•	•	•		
Kondo	Yoshihisa	Advanced Telecommunications Research Institute International (ATR)	•	•	•	•	•		

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KOTO	Hajime	National Institute of Information and Communications Technology (NICT)	•	•	•		•		
Mangin	Christophe	Mitsubishi Electric Corporation	•		•		•	•	•
Mansfield	Scott	Telefon AB LM Ericsson	•						
Maruhashi	Kenichi	NEC Corporation	•		•	•	•	•	
Messenger	John	ADVA Optical Networking Ltd.							•
Mustala	Tero	Nokia Networks						•	•
Ohba	Yoshihiro	Toshiba Memory Corporation		•					
Ohsawa	Tomoki	NICT	•	•	•	•	•		
ohue	hiroshi	panasonic	•	•	•	•	•	•	•
Osagawa	Daisuke	Mitsubishi Electric Corporation	•	•	•	•	•	•	•
Pannell	Donald	NXP Semiconductors	•	•	•	•			•
Parsons	Glenn	Ericsson AB		•					
Petre	Razvan	Spirent Communications		•				•	•
Potts	Michael	General Motors Company	•	•					•
Randall	Karen	INDEPENDENT	•						
Riegel	Maximilian	Nokia Networks			•				
Rouyer	Jessy	Nokia	•						•
Ryoo	Jeong	ETRI	•	•	•	•			•
Sato	Atsushi	Yokogawa Electric Corporation	•	•	•	•	•	•	•
Schewe	Frank	Phoenix Contact	•	•	•	•		•	
Seewald	Maik	Cisco Systems, Inc.	•	•	•	•	•	•	•
Sinicrope	David	Ericsson AB	•						
Soeda	Tatsuo	Yaskawa			•	•	•	•	
Specht	Johannes	University of Duisburg-Essen and General Motors Company	•						
Stanica	Marius	ABB AB	•	•	•	•	•	•	•
Steindl	Guenter	Siemens AG	•	•	•	•	•	•	•
Tarui	Isao	Mitsubishi Electric Corporation	•	•	•	•	•	•	
Unbehagen	Paul	Avaya Inc.	•						•
Varga	Balazs	Ericsson AB	•	•	•	•	•		
Wamsser	Reiner	IEC SC65C MT9-Member	•		•	•	•	•	•
Wang	Hao	Fujitsu Research & Development Center	•		•				
Wang	Tongtong	Huawei Technologies Co. Ltd	•						
Wang	Xinyuan	Huawei Technologies Co. Ltd	•						
Winkel	Ludwig	Siemens AG	•	•	•	•	•	•	•

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Wood	Graeme	British Standards Institution (BSi), Rockwell Corp	•						•
Woods	Jordon	Analog Devices Inc.	•	•	•	•	•	•	•
Yamaura	Takahiro	TOSHIBA Corporation	•		•	•			•
Yoo	Hark	Electronics and Telecommunications Research Institute (ETRI)	•		•	•			•
YU	XIANG	Huawei Technologies Co., Ltd	•						
YU	Yi	Rockwell Automation	•	•	•	•	•	•	•
Yun	Jinhwa	Hyundai Motor Company		•	•	•			•
Zein	Nader	NEC Europe (NLE)	•	•					
Zhang	Jiayi	Huawei Technologies Co. Ltd	•						•
Zuponic	Steven	Rockwell Automation	•		•		•	•	•

Monday 12 November 2018

8:00 AM (call to order by Ludwig Winkel and János Farkas) to 10:00 AM

The TSN Task Group and IEC/IEEE 60802 Joint Project met together for a joint session.

Ludwig Winkel and János Farkas:

- Welcomed the participants of the IEC/IEEE 60802 Joint Project, a joint effort of the:
 - IEC 65C/MT9/PT 60802 (TSN) Project Team, led by Ludwig Winkel; and
 - IEEE 802.1 Time-Sensitive Networking Task Group, led by János Farkas.
- Provided information about internet access, lunch, attendance log to the IEC/IEEE 60802 Joint Project.

Ludwig Winkel, IEC/IEEE 60802 chair, provided his new email address:

Ludwig.Winkel@online.de (that is also provided on the IEC/IEEE 60802 Joint Project page).

János Farkas gave an oral status report of the DetNet - TSN joint workshop that was held in Bangkok, Thailand on Sunday 11 November 2018.

Josef Dorr gave an oral status report on the IEC/IEEE 60802 use cases

(<http://www.ieee802.org/1/files/public/docs2018/60802-industrial-use-cases-0918-v13.pdf>) and requirements (<http://www.ieee802.org/1/files/public/docs2018/60802-industrial-requirements-0918-v10.pdf>) documents.

Jordon Woods, IEC/IEEE 60802 editor, gave an oral status report on the draft IEC/IEEE 60802 profile (<http://www.ieee802.org/1/files/private/60802-drafts/d0/60802-d0-4.pdf>).

Ludwig Winkel and Steven Zuponic presented *Motivation for a Collaborative Conformance Assessment for IEC/IEEE 60802*

<http://www.ieee802.org/1/files/public/docs2018/60802-zuponic-conformance-assessment-1118-v01.pdf>. The presentation was discussed.

Disposition: The joint IEC/IEEE/AVNU approach was supported by the IEC/IEEE 60802 Joint Project. The discussion of the subject continued on Wednesday.

Jordon Woods, IEC/IEEE 60802 editor, presented *Status of Accumulated latency in industrial applications Call for Interest*

<http://www.ieee802.org/1/files/public/docs2018/new-woods-accumulated-latency-1118-v00.pdf>

Disposition: Further discussion needed

The TSN TG and IEC/IEEE 60802 Joint Project met separately after this joint session.

1:30 PM to 6:00 PM

Taro Harima presented *Proposal for IEC/IEEE 60802 conformance section structure*

<http://www.ieee802.org/1/files/public/docs2018/60802-harima-Requirement-Structure-1118-v02.pdf>. The presentation was discussed.

Disposition: Further discussion needed

Taro Harima presented *TSN domain*

<http://www.ieee802.org/1/files/public/docs2018/60802-harima-TSN-Domain-1118-v02.pdf>. The presentation was discussed.

Disposition: Further discussion needed

Taro Harima presented *Common bridge requirements*

<http://www.ieee802.org/1/files/public/docs2018/60802-harima-TSN-Common-Requirements-1118-v02.pdf>. The presentation was discussed.

Disposition: Further discussion needed

Lihao Chen presented *TSN – brownfield compatibility*
<http://www.ieee802.org/1/files/public/docs2018/60802-chen-TSN-brownfield-compatibility-1118-v00.pdf>. The presentation was discussed.

Disposition: Further discussion needed

Kenichi Maruhashi presented *Enhancement Considerations for Flexible Factories with Wireless Links*

<http://www.ieee802.org/1/files/public/docs2018/new-FFIoT-maruhashi-enhancement-considerations-for-flexible-factories-1118-v00.pdf>. The presentation was discussed.

Disposition: Further discussion needed

Yoshihisa Kondo presented *Gap analysis in 1Qcc for enhanced mechanism for Flexible Factories*

<http://www.ieee802.org/1/files/public/docs2018/new-FFIoT-kondo-gap-analysis-in-1Qcc-for-enhanced-mechanism-for-flexible-factories-1118-v00.pdf>. The presentation was discussed.

Disposition: Further discussion needed

Mark Hantel started to present *Industrial Automation Traffic Types and their Mapping to QoS/TSN Mechanisms* in comparison to the traffic types that are described in the use case document.

<http://www.ieee802.org/1/files/public/docs2018/60802-ademaj-traffic-type-characterization-1118-v01.pdf>. The presentation was discussed.

Disposition: Further discussion needed

Tuesday 13 November 2018

10:30 AM (call to order by Ludwig Winkel) to 6:00 PM, with a 1-hour lunch break

Mark Hantel continued to present *Industrial Automation Traffic Types and their Mapping to QoS/TSN Mechanisms* in comparison to the traffic types that are described in the use case document.

<http://www.ieee802.org/1/files/public/docs2018/60802-ademaj-traffic-type-characterization-1118-v01.pdf>. The presentation was discussed.

Disposition: Further discussion needed. Contributions about expected Traffic Type mappings and Traffic Queue setups are highly welcomed.

Steven Zuponic presented *Avnu Alliance™ Best Practices Theory of Operation for TSN-enabled Systems Applied to Industrial Markets*

http://www.ieee802.org/1/files/private/liaisons/liaison-Avnu_Industrial_TheoryOfOperations-1118.pdf

Disposition: The Avnu Alliance granted rights to use the document as informational input for the joint project. There is a copyright permission form submitted by Avnu to IEEE/IEC on file. Further discussion needed.

Steven Zuponic presented on *Industrial Bridged and non-Bridged End Stations*

<http://www.ieee802.org/1/files/public/docs2018/60802-Zuponic-Bridged-non-Bridged-End-Stations-1118-v01.pdf>

Disposition: Further discussion needed.

Günter Steindl presented on *IEEE802.1Q identified gaps – Rules for gates control vs. inter packet gap*

<http://www.ieee802.org/1/files/public/docs2018/60802-Steindl-TasGateControl-1118-v02.pdf>

Disposition: The current version of IEEE 802.1Q does not specify the IPG positions at gate open and close time. The discussion of the questions in this presentation

continued on Wednesday and the questions were further discussed with the TSN Task Group as a whole.

Günter Steindl presented on *Expected behavior when receiving a frame containing the own MAC address as Source Address*

<http://www.ieee802.org/1/files/public/docs2018/60802-Steindl-OwnMacAsSA-1118-v01.pdf>

Disposition: The current version of IEEE 802.1Q does not specify the required behavior. The discussion of the questions in this presentation continued on Wednesday and the questions were further discussed with the TSN Task Group as a whole.

Thomas Enzinger and Marius Stanica presented *comments*

<http://www.ieee802.org/1/files/public/docs2018/60802-enzinger-comments-industrial-requirements-1118-v01.pdf> on the requirements document and led a discussion on the provided comments.

Disposition: The requirements document will be updated according to the outcome of the discussion.

Thomas Enzinger presented *Additional requirements to 60802-industrial-requirements-0918-v10.pdf*

<http://www.ieee802.org/1/files/public/docs2018/60802-enzinger-more-industrial-requirements-1118-v03.pdf>. The presentation was discussed.

Disposition: Further discussion needed.

Wednesday 14 November 2018

8:00 AM (call to order by Ludwig Winkel) to 1:50 PM

Josef Dorr summarized *IEC/IEEE 60802 Profile Contribution*

<http://www.ieee802.org/1/files/public/docs2018/60802-Dorr-ProfileContribution-0918-v02.pdf> The proposed feature selection approach of the contribution was discussed.

Disposition: Further discussion needed.

Jordon Woods, IEC/IEEE 60802 editor, presented *Editor's Report 60802 Draft 0.4*

<http://www.ieee802.org/1/files/public/docs2018/60802-woods-D04update-1118-v00.pdf> providing an overview of the current status and structure of the draft IEC/IEEE 60802 profile.

Disposition: The approach of the editor to describe functional requirements in an additional device-type specific Conformance column of the selection tables was agreed by the IEC/IEEE 60802 Joint Project. Further discussion needed.

Marius Stanica presented *Event based Control*

<http://www.ieee802.org/1/files/public/docs2018/60802-stanica-event-based-control-1118-v02.pdf>.

Disposition: Further discussion needed.

Marius Stanica presented *Link aggregation with TSN*

<http://www.ieee802.org/1/files/public/docs2018/60802-stanica-link-aggregation-1118-v02.pdf>.

Disposition: The topic was added as a gap to Annex Z of the draft IEC/IEEE 60802 profile, to be discussed with the TSN Task Group. Further discussion needed.

3:30 PM (call to order by Ludwig Winkel and János Farkas) to 5:00 PM

The TSN Task Group and IEC/IEEE 60802 Joint Project met together for a joint session.

The IEC/IEEE 60802 Joint Project agreed to start Conformity Assessment activities under the umbrella of IECEE. Ludwig Winkel was encouraged to start an ad-hoc working group on this behalf in IECEE in collaboration with Avnu (optionally with IEEE CAP and others). Information exchange between this ad-hoc working group and IEEE 802.1 shall be established.

The IEC/IEEE 60802 Joint Project agreed not to have an additional interim meeting in February 2019, which had been discussed at the September 2018 interim meeting in Oslo, Norway. For future interim and plenary meetings after the January 2019 interim meeting in Hiroshima, Japan, the IEC/IEEE 60802 Joint Project asks the IEEE 802.1 meeting planner to schedule IEC/IEEE 60802 Joint Project meeting time from Wednesday to Friday.

Jordon Woods, IEC/IEEE 60802 editor, presented the IEEE 802.1Q identified gaps that were discussed in the IEC/IEEE 60802 Joint Project on Tuesday November 13, 2018:

Gates control vs. inter packet gap

<http://www.ieee802.org/1/files/public/docs2018/60802-Steindl-TasGateControl-1118-v02.pdf>

According to IEEE 802.1Q-2018:

- For bandwidth calculation, IPG and Preamble have to be included; and
- For latency calculations, the worst-case scenario has to be used.

Expected behaviour when receiving a frame containing the own MAC address as Source Address

<http://www.ieee802.org/1/files/public/docs2018/60802-Steindl-OwnMacAsSA-1118-v01.pdf>

IEEE 802.1Q-2018 does not mandate to drop such frames. Static FDB entries are not changed.

Annex A

Final agenda of the IEC/IEEE 60802 Joint Project meeting held in Bangkok, Thailand November 12-14, 2018

**Meeting Agenda of IEC 65C/MT9.PT 60802 and the
IEC/IEEE 60802 Joint Project of IEEE 802.1
held in Bangkok (Th) at 2018-11-12 ... -14**

Ludwig Winkel (Convenor IEC SC65C/MT9 and chair IEC/IEEE
60802 Joint Project);
János Farkas (TG chair of IEEE 802.1 TSN)
Common session of "IEC/IEEE 60802 Joint Project" & "TG TSN"

Rev: rev2
Key: means

Mon	12.11.2018	[h:min]	[min]	Topics	Responsible
Common session Room	08:00 - 08:10		10	Welcome and organizational issues (IEEE intro, IEC intro)	Ludwig, János
	08:10 - 08:15		5	Membership, attendees registration (IEEE imat), roster; administrivia	János, Ludwig
	08:15 - 08:40		25	Agenda	Ludwig, János
	08:40 - 08:45		5	Report of the IETF(DETNET)/TSN joint workshop in Bangkok	János, Ludwig
	08:45 - 08:50		5	Status of use cases, requirement list and Draft Std.	Josef
	08:50 - 08:55		5	Draft IEC/IEEE 60802	Jordon
	08:55 - 09:00		5	Liaison	János
	09:00 - 09:30		30	Conformity Assessment	Stephe, Ludwig
	09:30 - 09:40		10	Next meetings	Ludwig, János
	09:40 - 09:50		10	Status of NEA on accumulated latency	Jordon
	09:50 - 10:30		40	Break	
	10:30 - 13:00		150	IEEE 802.1 opening plenary	Glenn
	13:00 - 13:00				
	13:00 - 13:00				
	13:00 - 13:00				
	13:00 - 13:40		40	Lunch	
Trk A: 60802 Room	13:40 - 13:40				
	13:40 - 14:10		30	Requirement Structure	Taro
	14:10 - 14:40		30	TSN Domain	Taro
	14:40 - 15:00		20	TSN Comon Requirements	Taro
	15:00 - 15:30		30	Break	
	15:30 - 15:50		20	TSN – Industrial Ethernet compatibility'	Lihao
	15:50 - 16:40		50	Enhancement considerations for flexible factories with wireless links	Kenichi Maruhashi
	16:40 - 17:30		50	Gap analysis in 1Qcc for enhanced mechanism for Flexible Factories	Yoshihisa Kondon
	17:30 - 17:30				
	17:30 - 18:00		30	Traffic Types and their Mapping to QoS/TSN Mechanisms	Mark
18:00 - 18:00					
	18:00 - 18:00		0	Review of minutes of the day	Minute maker

18:00	Recess of 60802 JP meeting
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Tue		13.11.2018		Topics	Responsible
		[h:min]	[min]		
Room Trk A: 60802 Room	08:00 - 10:00	120	Not mandatory for IEC members but offer to attend the IEEE 802.1 Maintenance Group	Paul	
	10:00 - 10:30	30	Break		
	10:30 - 10:40	10	Review Agenda; expected results of the day	Ludwig	
	10:40 - 11:30	50	Use case cont discussion	Mark, Marius	
	11:30 - 11:55	25	Theory of Operation for TSN-enabled Systems	Stephe	
	11:55 - 12:30	35	Bridged and non-Bridged End Stations	Stephe	
	12:30 - 12:30				
	12:30 - 12:30				
	12:30 - 13:30	60	Lunch		
	13:30 - 14:10	40	Rules for gates control vs. inter packet gap	Günter	
	14:10 - 15:00	50	Comments on Requirement list	Thomas, Josef	
	15:00 - 15:45	45	Break		
	15:45 - 16:20	35	Comments on Requirement list	Thomas, Josef	
	16:20 - 17:30	70	Additional requirements for the Requirement list	Thomas	
	17:30 - 17:30				
	17:30 - 17:30	0	Profile contribution (Recap of GoTo)	Josef	
	17:30 - 17:30	0	Drafting 60802	Jordon	
	17:30 - 18:00	30	Review of minutes of the day	Josef	
18:00		Recess of 60802 JP meeting			

Wed		14.11.2018		Topics	Responsible
		[h:min]	[min]		
Trk A: 60802 Room	08:00 - 08:10	10	Review Agenda; expected results of the day	Ludwig	
	08:10 - 08:30	20	Profile contribution (Recap of GoTo)	Josef	
	08:30 - 10:00	90	Drafting 60802	Jordon	
	10:00 - 10:30	30	Break		
	10:30 - 10:30				
	10:30 - 11:00	30	Drafting 60802	Jordon	
	11:00 - 12:30	90	Recess		
	12:30 - 12:30				
	12:30 - 13:30	60	Lunch		
	13:30 - 13:40	10	Event based control	Marius	
	13:40 - 13:50	10	Link aggregation	Marius	
	13:50 - 13:50				
	13:50 - 15:15	85	Break		
	Common	15:15 - 15:25	10	Recap past days	Ludwig, János
	15:25 - 15:35	10	Next steps on Conformity Assessment	Stephe, Ludwig	
session	15:35 - 15:45	10	Timeline 60802, work process	Ludwig	

Room	15:45 - 16:00	15	Next interim	
	16:00 - 16:45	45	Identify and discuss IEEE 802 gaps for TSN-IA profile	Ludwig, János
	16:45 - 16:45			
	16:45 - 16:45			
	16:45 - 16:45	0	Any other business	Ludwig, János
	16:45 - 16:55	10	Review of the minutes	Minute maker
	16:55		Adjournment of IEC/IEEE 60802 JP meeting	
Social	17:00 - 18:00	60	Preparation for Social	All
	18:00		Social	All