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Pragmatic Web as a Service Provider for the Internet of Things

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Abstract—***In this paper, we present the Pragmatic Web architecture and how it can be used to improve automation for the Internet of Things. Pragmatic Web system is the next advancement on the Web, where the application provides context dependent data and services, hence improves its usefulness for service consumers. We argue that the Pragmatic Web is a good match for the Internet of Things, especially for home automation which involves service requests to the Web. Our contributions in this paper are software architecture of the Pragmatic Web and how the interaction between the Pragmatic Web and smart device can be implemented: (1) three-phase of interaction mechanism, and (2) an improvement of FIPA ACL message and message content for communication. Our contributions will enable Web developers to develop Web applications that provide context dependent data and services for the Internet of Things or any other software agents. To this end, an E-Commerce scenario is presented.***

Keywords—Pragmatic Web, Internet of Things, E-Commerce, Software Architecture, Web of Things, Speech Act Theory, Theory of Communicative Action, FIPA ACL, Sofware Agent.

I. INTRODUCTION

The Web, as previously innovated by Tim Berners-Lee[1], has been a great influence for human life. Arguably, the Web has reach almost every side of human life, from their birth to their death. However, despite of this advancement, the Web has reach a level where information are really very big and very much unstructured. As we may know, the core building block of the Web is HTML (HyperText Markup Language) and its components (JavaScript and multimedia files). This HTML was invented and created to be rendered by Web browser software for human viewing pleasure. It was not inteded for machine processing. This era is known as Syntactic Web era where most of the Web consist of only HTML and its components for human processing. It has no known problems until human realize that there are too many information on the Web that most people feel impossible to fit in human processing capabilities.

The information flood has led to the next advancement of the Web: Semantic Web. When people use mostly only HTML and its components for the website, it proves to be difficult for automatic machine processing. This difficulties stem from HTML-based contents of the website which is possible for machine processing but difficult to infer exact meaning since all tags in HTML are related with human view (such as <B></B> for bold, <table></table> to draw table but machine will never "understand" what is inside the table or the word with bold font). Also, one word may denotes more than one meaning. For example, the word "Java" as an island in Indonesia is different with "Java" as the name of a programming language. A search engine will return both result (Java island and Java programming language) when user uses "Java programming" for keyword in his/her searching criteria. If we can "annotate" the word "Java" with its associated meaning then any search engine can use the "annotation" to revise its search result. The Semantic Web and Linked Data initiatives are used to enable the Web with semantic processing and inferencing capabilities.

Although the Semantic Web has proved to be useful[2], there are gaps between the original Semantic Web vision and current situation of so-called the Semantic Web. In its original Semantic Web vision [1], Berners-Lee et.al elaborated some components of the Semantic Web so that human can use it to help them in doing their daily activities. Those components are some standards and specifications to give well-defined meaning for Web contents so that machine can "understand"[3], and software agents - created by people or organizations - that collect Web contents from diverse sources, process the information, and then exchange the results with other

1 http://www.w3.org/History/1989/proposal.html

2 see http://www.w3.org/2001/sw/sweo/public/UseCases/ for example of Semantic Web case studies and use cases

3 in this case, ontologies become an important part

programs. Unfortunately, despite of its advancement, the Semantic Web now still in the "give well-defined meaning to the Web contents" phase, in line with the meaning of "Semantic" in linguistic theory. To move the Web to the original Semantic Web vision, we need to shift our way of thinking about Web into the pragmatic level: the Pragmatic Web [2], [3]. Pragmatic Web is the next advancement of the Web. It is intended for context dependent Web. Pragmatic Web is not meant to replace current Web, but complement current Web with pragmatic level infrastructure. Enriching Web with pragmatic level infrastructure means enable the Web to provide semantic infrastructure while still provide context-dependent Web components such as rule processing and contextual processing components. That way, the Pragmatic Web will become an intelligent software agent which can communicate with other software agent toward an agreement or disagreement.

Web is not the only advancement that happens on the Internet. Current standards, specifications, and technologies has been proposed and recommended for the Web and they are all contribute to a more connected people. Nowadays, not only people connected to the Internet but more research and advancement has been dedicated for more connected objects (sometimes also called "smart object" or "things" or "smart device", in this paper we will use "smart device"). Internet of Things (IoT) is the new paradigm for connecting real world objects to the Internet. There are many definitions of IoT, but we will cite definition from [4]:

> IoT is interconnection of sensing and actuating devices providing the ability to share information across platforms through a unified framework, developing a common operating picture for enabling innovative applications. This is achieved by seamless large scale sensing, data analytics and information representation using cutting edge ubiquitous sensing and cloud computing

The phrase "Internet of Things" was coined by Kevin Ashton when he made a presentation at Procter and Gamble (P&G) in 1999 about linking the new idea of RFID in P&G's supply chain [5]. The idea is simple: current Internet data is still mainly driven by people and people have limited capability in handling all of those data, therefore, the IoT will enable real world object/thing to capture the data for automated processing. IoT was considered the next future advancement on the Internet since it enables many things to be done automatically without (or with minimum) human intervention and then capture. When the devices and objects are connected and integrated with the Web infrastructure, they are called "the Web of Things" (WoT). There are many devices and objects that can be used on the IoT and / or WoT: wireless sensor networks, ambient devices, household appliances, RFID and NFC tagged objects, etc.

This paper is an initial effort to integrate the smart device with the Web application. In this context, we consider a service oriented architecture for this integration where the service provider ("the Pragmatic Web application") provide services for smart device as service consumer. Both meet in a service encounter. To this end, this paper is organized as follows. In section II, we present a scenario of daily commerce activities. Our proposed solution will be based on that scenario. In section III, we propose an overview of block diagrams for service interaction between the Pragmatic Web application and the smart device. Based on the block diagrams, in section IV, we present the Pragmatic Web software architecture and its service interaction components. We conclude our paper in section V with an overview of what we try to solve and possible future research.

II. E-COMMERCE: SCENARIO, COMPONENTS AND AUTOMATION

Our scenario is based on our daily life activities. Suppose we have a rice box which we use to store our rice. Our activities regarded our stock of rice in the rice box are usually very simple: we check the rice box to see if we ran out of rice. If we have only 1 kg or less, then we decide we must buy some more rice. We will go to the supermarket to buy some more rice. In doing so, we usually have a specific supermarket that we usually visit for shopping, or probably we need to find more options. When we reach a consensus with the seller in the supermarket, then we pay them for the rice. Finally we return back home with some kilograms of rice and put the rice into the rice box.

From the E-Commerce scenario above, we can identify three main components: (1) service provider: rice seller, (2) service consumer: consumer who want to buy some kilograms of rice, and (3) service encounter: supermarket is the place for consumer to meet rice seller and making a commitment to buy some kilograms of rice. We will imitate these components in our proposed system. We also acknowledge that in a system where provider and consumer meet for a commitment, conversation / negotiation become the most important issue, therefore we must also discuss these components extensively later.

Degrees of automation depend on interaction complexities, and interaction complexities depend on whether the area is well-structured or not. In a relatively well-structured area, automated negotiation is suitable but in most business settings where communication and negotiation are less well-structured, human are the negotiators. In this situation, negotiation are performed by human, while a software system is needed to support human in doing negotiation [6], [7]. The less complex transaction interaction and rules, the more interaction can be automated.

III. B LOCK D IAGRAMS

Our previous analysis of E-Commerce scenario above has identified three most important components. On the Internet, we may transform those components into a request-respond cycle between Web client ("consumer") and Web application ("seller / provider") and they both "meet" at a specific "place" (a service encounter: "port" at low level or "Web API" / "RESTful Web Services" at application level) on top of TCP/IP Network infrastructure. We may use many kind of smart device as consumer but basically we will use Raspberry Pi and Arduino. Arduino[4] is a programmable microcontroller

4 http://www.arduino.cc

and designed to read data from sensors, compute the data, and (for this paper purpose) send the data to a PC. Therefore, the PC can be used as Pragmatic Web service consumer. Raspberry Pi [5] is a fully fledged operating system (Linux) and other software / development tools that loaded on an SD card. They both can be used as smart device for fully automated processing as well as to support human collaboration.

A. Raspberry Pi

In a fully automated processing category, we use Raspberry Pi as a smart device. Figure 1 shows an overview of block diagram for fully automated processing with Raspberry Pi device. We put weight sensors into the fridge and the sensor will transform the amount of weight into electricity. For weight sensors, we use strain gauge, strung together to form a wheatstone bridge. The output of weight sensors are changed into digital amount by ADC (Analog to Digital Converter). Conversion result will be read by Raspberry Pi using I2C interface on port GPIO. The result of this read process is digital data which shows the weight of rice inside the rice box. Using this block diagram, ADC is fully controlled by Raspberry Pi and the logic for decision to buy or to not-buy can be embedded inside Raspberry Pi using Python[6] programming language[7].

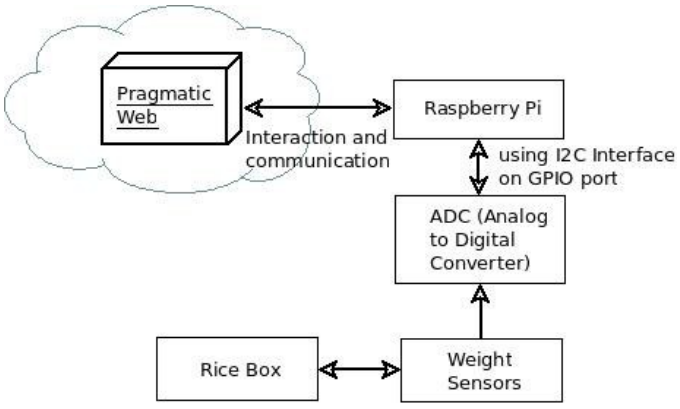


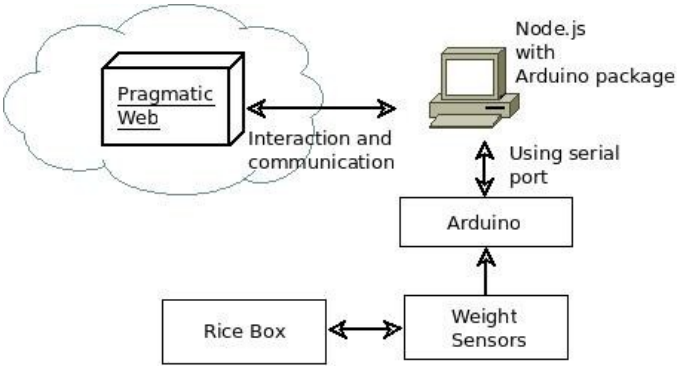
Fig. 1. Block diagram for Raspberry Pi

Development tools availability is the key to embed intelligent processing capabilities into smart device. Supporting this kind of interaction is not a trivial task. Beside communication and interaction protocol, both need to have an automated negotiation capability.

B. Arduino

- In this category, we use Arduino as a sensor reader. In Figure 2, a weight sensor will be plugged into a fridge to monitor the basket. The weight sensor will transform amount of weight into electricity. The result will be read by Arduino using its analog input pins. Arduino uses microcontroller which has been equipped with 12 bit ADC (Analog to Digital Converter). This 12 bit ADC is precise enough to convert data from sensors to digital data. The digital data can then be sent to the PC using serial port. Inside the PC, we use Node.js and related packages (such as noduino[8] or johny-five[9]) to control Arduino. Since processing part is done in PC with Node.js, we may use any available Node.js packages from NPM[10].

- Using this block diagram, it is possible for smart device manufacturer to put intelligent processing logic, data storage, and decision support capabilities into the PC. Therefore, smart device manufacturer should bundle sensors, Arduino, and special software to manage the Arduino and support human in E-Commerce activities. Whenever the special software inside the PC received the digital data, it will check whether the rice box has run out of rice or not. If yes then the software will do basic interaction activities to the Pragmatic Web application. This interaction is explained more details in section IV.



- Fig. 2. Block diagram for Arduino

- The special software that reside on a PC (or gateway) is used by the user to connect to the Pragmatic Web and manage its interaction. Since it resides on a PC with more computing power, we may put more tasks onto the computer:

1. Storage
2. Business logic
3. User interface
4. Rule base and rule / inference engine
5. Libraries

IV. PRAGMATIC WEB AND ITS SERVICE INTERACTION WITH SMART DEVICE

In this section, we present a conceptual software architecture for the Pragmatic Web application. Since it will communicate with the smart device, it should be viewed as one integrated system with the smart device. The smart device will need to have more or less the same components as the Pragmatic Web, especially the rule base and inference engine

5 http://www.raspberrypi.org
6 http://www.python.org
7 Other development tools also available, for example Oracle Java on Raspbian, see http://www.raspberrypi.org/archives/4920

8 http://semu.github.io/noduino/
9 https://github.com/rwaldron/johnny-five
10 http://npmjs.org

because both will communicate their policies and rules toward commitments.

A. Pragmatic Web Architecture

We propose the Pragmatic Web software architecture in Figure 3. Service discovery will not be disclod in more details in this paper since it desevers its own discussion. We will concentrate on one-to-one communication between the Pragmatic Web and smart device.

In this architecture, we conceptually use server side Web API as its service encounter. Although we can use some protocols and / or specification[11], we strongly suggest RESTful web services for its maturity and its stability (it is based on HTTP). By using RESTful web services, any smart device - directly or indirectly - with ability to send HTTP requests, can contact and communicate with the Pragmatic Web.

Any requests will be processed by request handler components. It comes as a routing library which will accept HTTP request and its parameters and then based on message contents, this routing component will forward them to other components (libraries, data, ontologies/triplestore, rule base and its inference engine) and return the results back to the client. This interaction and message contents will be explained more details in section IV-B.

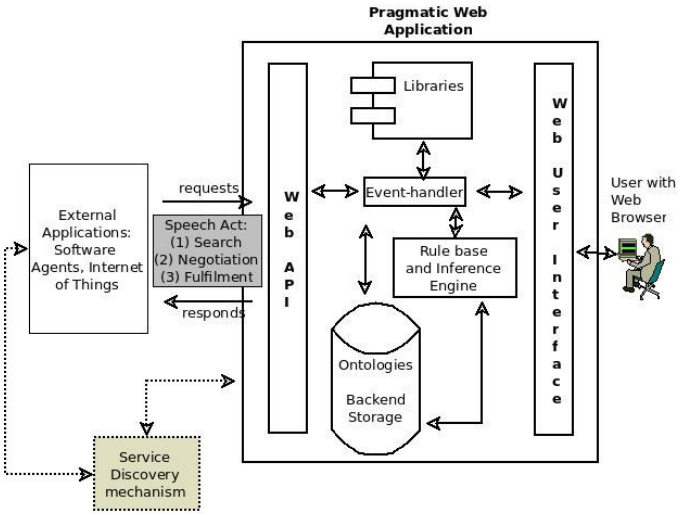


Fig. 3. Conceptual architecture of the Pragmatic Web

B. Interaction Mechanism

There are three phases in E-Commerce: search, negotiation, and fulfilment [8]. The Pragmatic Web is designed to incorporate those three phases by interacting with its clients. Interaction is done using message-sending-receiving mechanism between client (smart device) and the Pragmatic Web. To this end, we adopt FIPA ACL (Agent Communication Language)[12] and standardized rule format to expresss each side's policies and rules as its message contents. We also adopt speech act theory [9], [10] for message (part of performatives in FIPA ACL message). We also add Habermas' theory of communicative action [11] by adding a reaction of any speech acts in the form of "understand" and "not-understand". Details follow.

1) Improvement of FIPA ACL Message Structure: We use FIPA ACL (Agent Communication Language) message[13] as our base. FIPA ACL uses performatives from the speech act theory in Table I for the message that will be sent from smart device to the Pragmatic Web and vice versa.

Our improvement of FIPA ACL message structure is aimed towards clarity and more explicit communication. Originally, FIPA ACL message parameters consist of 13 parameters: *performative, sender, receiver, reply-to, content, language, encoding, ontology, protocol, conversation-id, reply-with, in-reply-to, reply-by*. We propose to include:

- phase: consist of current phase, possible contents are *search, negotiation*, and *fulfilment*
- phase-status: consist of *finish* or *unfinish*
- previous-phase
- next-phase
- message-status: if message is a reply, then we have to make sure that we understand the message that we are about to reply. The content should be *understand* or *not-understand*.

Speech act	Description	English verbs
Assertives	Can be verified as true or false	assert, claim, affirm, assure, inform, predict, report, suggest, insist, hypothesize, swear, admit, confess, blame, praise
Directives	Call upon listener to do something	direct, request, ask, urge, demand, command, forbid, suggest, insist, recommend, implore, beg
Commissives	Commit to a course of action	promise, voew, fledge, swear, consent, refuse, assure, guarantee, contract, bet
Expressives	Express a psychological position about a state of	apologize, thank, condole,

11 For example: SOAP-based web services, RMI-IIOP/CORBA, etc

12 http://www.fipa.org

13 http://www.fipa.org/specs/fipa00061/SC00061G.html

	affairs	congratulate, complain, protest, compliment, praise, welcome
Declaratives	Change the reality in accord with the proposition of the declaration	fire, pronounce, declare, appoint, confirm, endorse, renounce, denounce, name, call, repudiate

TABLE I

SUMMARY OF ENGLISH VERBS RELATED TO SPEECH ACTS

The definition, concept relation between phase, and relation between phase and performatives are saved in triplestore/ontologies. By using "phase" message structure, we can limit performatives that can be handled, for example, in phase "search", a speech act that can be used are **directive**s - **ask/request information** and **assertives - inform**. Also, whenever a phase has been finished, then both can go to the next phase.

2) Search: In **search** phase, usually smart device will request basic question such as product list, product availability, etc. Therefore, the interaction is usually structured and involves **Directives - request information** (from smart device to Pragmatic Web application) and **Assertives - inform** (from Pragmatic Web application to smart device).

3) Negotiation: The key in E-Commerce interaction is in negotiation. Both parties can use all of speech acts in this phase. Rule base and rule engine are central in this part. Both parties exchange message to negotiate toward commitment(s). Most message exchange will be about policies and rules. Therefore, we propose Rule Interchange Format / RIF[14] which is a recommendation from W3C for rule interchange between application. To ease the communication formalization, as in any negotiation mechanism in the real world, we propose three stages of negotiation:

1. **Identification**. In "identification" stage, both parties conduct a question-answering session to make sure that both deal with the right party. To this end, both parties have to provide a credential and each party can trace the credential so that both can be sure about each party.
2. **Offer and counter-offer**. In "offer and counter-offer" stage, both parties send policies and rules which show each other preferences in doing business.
3. **Agreement**. In "agreement' stage, both parties agree or disagree on policies and rules regarding the product.

Beside some additional **phase** above for message structure, to accomodate negotiation part, we also propose **sub-phase** and **subphase-status**. Therefore both parties can only do **offer - counter-offer** after both agree on both identity, and so on.

4) Fulfilment: In this phase, both parties usually can use commissives, expressives, and declaratives speech acts. In this part, if both parties agree on specific contract, both need to have the same contract document. In contract document, both write policies and rules as agreed upon in previous phase (negotiation). The document can be stored in a NoSQL document store database such as mongoDB[15], Apache CouchDB[16], etc.

V. CONCLUSION

In this paper, we have identified and discussed the Pragmatic Web software architecture and how it can be used to fit a scenario of home automation for the Internet of Things. In this scenario, interaction between the Pragmatic Web and smart device is the most important part. To this end, we propose some improvements for FIPA ACL message, namely **phase** and **subphase** based of three phases in E-Commerce. We also discuss speech acts for communication between the Pragmatic Web and smart device and accomodate validity claims from Habermas' communicative action theory by putting **message-status**. However, we also need to consider service discovery for future research.

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Sertifikat

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As paper presenter in our conference with the theme

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TECHNICAL PROGRAM
ICoICT 2014
May 28-30, 2014

Wednesday, May 28, 2014

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10.30-10.50	Coffee Break				
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KEYNOTE AND TUTORIALS

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	C-34	*Texture Feature Extraction Using Co-Occurrence Matrices of Sub-Band Image for Batik Image Classification*	Yuda Munarko
I-1	I-11	*Improving Intrusion Detection System Based on Snort Rules for Network Probe Attack Detection*	Nattawat Khamphakdee
	I-12	*An Implementation of Data Encryption for Internet of Things Using Blowfish Algorithm on FPGA*	Denny Darlis
	I-13	*Study of SIR for Designing Filters with Arbitrary Resonant Positions*	Mudrik Alaydrus
	I-14	*Identification of Process-based Fraud Patterns in Credit Application*	Solichul Huda

Session	#	Title	Registered Author
I-2	I-21	*PAPR Comparison of OWDM and OFDM System*	Yuyun Rohmah
	I-22	*Analysis of Reflectarray Unit Cell with Capacitive Effect*	Marlina Ramli
	I-23	*Investigation of Channel Bonding Based on TV White Space Spectrum Occupancy for Urban Areas in Malaysia*	Razimah Abdul Rahim
	I-24	*Performance Analysis of AoE-SAN Using Bonding Interface Over RAID*	Tody Wibowo
I-3	I-31	*Performance Evaluation of VoC Network Through DNS Server*	Rendy Munadi
	I-32	*Low Complexity of Computational Cost of RF Signal Processing Based Diversity Scheme for MIMO-OFDM Systems*	I Gede Puja Astawa
	I-33	*A Configurable and Low Complexity Hard-Decision Viterbi Decoder in VLSI Architecture*	Rachmad Vidya Wicaksana Putra
	I-34	*A Branch and Bound Approach to Permutation Codes*	Roberto Montemanni
I-4	I-41	*Inter-Carrier Interference Reduction in Broadband Wireless Access Technology Using Extended Kalman Filter*	Asri Diliyanzah
	I-42	*Analysis of Low Pass Filter Using Nonhomogeneous Transmission Lines*	Mudrik Alaydrus
	I-43	*Solar Panel and Battery Street Light Monitoring System Using GSM Wireless Communication*	Simon Siregar
	I-44	*Search Method Analysis of Occurrence Data Call Drop in CDMA 2000-1x EV-DO Rev.A Network*	Uke Kurniawan
S-1	S-11	*Information Security Readiness of Government Institutions in Indonesia*	Kautsarina Kautsarina
	S-12	*Security Vulnerabilities in Open Source Projects: An India Perspective*	Sreekutty SudhaRavi
	S-13	*The Relationship of Password Created and Habit Among Undergraduate Students*	Norizan Anwar
	S-14	*Anomaly Detection on Intrusion Detection System Using Clique Partitioning*	Nungky Nasta'iinullah
S-2	S-21	*Effectiveness Evaluation Model Design of Customer Relationship Management Using Balanced Scorecard: Case Study XYZ*	Amarilis Yanuarifiani
	S-22	*Understanding Government E-Procurement Effectiveness From Users' Perspectives: A Case of Social Media Discussion in Indonesia Local Government*	Nurdin Nurdin
	S-23	*Understanding E-Book Acceptance Through Technology Acceptance Model (TAM Model)*	Adillah Mustafa
S-3	S-31	*Significant Aspects in Relation to Agile Usage: Malaysian Perspective*	Ani Liza Asnawi
	S-32	*Towards Establishing Medical Records Officer Competency Framework in Healthcare Providers*	Aniza Jamaluddin
	S-33	*Usability Testing Research Framework: Case of Handicraft Web-Based System*	Wan Abdul Rahim Wan Mohd Isa

Thursday, May 29, 2014

	Ballroom A	Ballroom B	Ayodia A	AyodiaB	Ayodia C
08.00-09.00	Registration				
09.00-10.00	Keynote 2				
10.00-10.20	Coffee Break				
10.20-12.00	Tutorial 3 Chair: Fiky Yosef Suratman	I-5 Chair: Maman Abdurohman	S-4 Chair: Wan Abdul Rahim Wan Mohd Isa	A-4 Chair: Wikan Danar Sunindyo	C-4 Chair: The Houw Liong
12.00-13.00	Lunch				
13.00-14.40	Tutorial 4 Chair: Bayu Erfianto	I-6 Chair: Erwin Susanto	S-5 Chair: Rizal Isnanto	A-5 Chair: Roberto Montemanni	C-5 Chair: Deni Saipudin
14.40-15.00	Coffee Break				
15.00-16.40			S-6 Chair: Dedy Sushandoyo	A-6 Chair: Gerfried H. Cebrat	I-7 Chair: I Gede Puja Astawa
18.00-21.00	Gala dinner				

KEYNOTE AND TUTORIALS

Keynote 2	*Advancements of Automatic Identification Technology* Prof. Jin Mitsugi Keio University, Japan
Tutorial 3	*Biometric Technology: What, Why, and How* Prof. Goh Kah Ong Michael Multimedia University, Malaysia
Tutorial 4	*Agent Based Mobile Ubiquitous Computing* Prof. Dr. Suresh Sankaranarayanan, SMIEEE Institut Teknologi Brunei, Brunei Darussalam

LIST OF PAPERS

Session	#	Title	Registered Author
A-4	A-41	*On the Experiment of Multi Camera Tracking Using Kalman Filter and FOV Lines*	Bedy Purnama
	A-42	*Secure Web Based Home Automation Application Layer Based Security Using Embedded Programmable Logic Controller*	Gerfried H. Cebrat
	A-43	*Pragmatic Web as a Service Provider for the Internet of Things*	Bambang P urnomosidi
	A-44	*Design of a Dual-microcontroller Scheme to Overcome the Freeze Problem for a Smart Data Logger*	Oka Mahendra

Session	#	Title	Registered Author
A-5	A-51	*Environmental Design: A Discussion About Augmented Reality Signaling Systems in Urban Environment*	Beatriz Pacheco
	A-52	*Research and Application of Route Guidance Technology for the Visually Impaired Using Smart Stick in Intelligent Transportation Systems*	Min Ho Paek
	A-53	*Improving the Accuracy of Real-Time Traffic Data Gathered by the Floating Car Data Method*	Fajar Chandra
	A-54	*Automatic Musical Genre Classification of Audio Using Hidden Markov Model*	Ledya Novamizanti
A-6	A-61	*Wireless Sensor Network for Prototype of Fire Detection*	Raditya Nugroho
	A-62	*Mobile Enabled Bus Tracking and Ticketing System*	Sankaranarayanan Suresh
	A-63	*Analysis of E-Toll Card Usage At PondokRanji Tollgate*	Andry Panjaitan
	A-64	*Location Finder Using Augmented Reality for Railways Assistance*	Ary Mazharuddin Shiddiqi
C-4	C-41	*Long Term Predictions of Economic Crisis in Indonesia Using System Dynamic Model Optimized by Adaptive Genetic Algorithm*	Fajri Umbara
	C-42	*Handling Imbalanced Data in Customer Churn Prediction Using Combined Sampling and Weighted Random Forest*	Veronikha Effendy
	C-43	*Predicting and Clustering Customer to Improve Customer Loyalty and Company Profit*	Judi Alhilman
	C-44	*Time Series Prediction of Economic Indicators in Indonesia Using Differential Dynamic Optimized by Genetic Algorithm*	Siti Sa'adah
C-5	C-51	*Performance Efficiency in Plagiarism Indication Detection System Using Indexing Method with Data Structure 2-3 Tree*	Agung Wibowo
	C-52	*Comparison of Modified Kneser-Ney and Witten-Bell Smoothing Techniques in Statistical Language Model of Bahasa Indonesia*	Ismail Rusli
	C-53	*Experiments on the Indonesian Plagiarism Detection Using Latent Semantic Analysis*	Sidik Soleman
	C-54	*Extraction and Classification of Rhetorical Sentences of Experimental Technical Paper Based on Section Class*	Afrida Helen
I-5	I-51	*Concept Implementation of Sole Module for Software-based UL Subframe Mapping Method on a TDD WiMAX IEEE 802.16e-based Subscriber Station*	Arthur Silitonga
	I-52	*Design of an FPGA-Based OFDM-STBC Transceiver for WiMAX 802.16e Standard*	Sugondo Hadiyoso
	I-53	*A Pattern Reconfigurable Short-Circuited Circular Patch Antenna Design Based on Genetic Algorithm*	Dwi Nurmantris
	I-54	*Firefly Inspired Energy Aware Cluster Based Tree Formation in WSN*	K L V Sai Prakash Sakuru

Session	#	Title	Registered Author
I-6	I-61	*Performance Analysis of Scaled Switching Technique for Cooperative Diversity Systems*	Mandha Damodaran Selvaraj
	I-62	*Performance Evaluation Coarse Time Synchronization of OFDM System Under COST 207 Multipath Channel Model*	Suyoto Suyoto
	I-63	*Evaluation of X2-Handover Performance Based on RSRP Measurement with Friis Path Loss Using Network Simulator Version 3 (NS-3)*	Muhamad Assyadzili
	I-64	*Mechanism Performance Evaluation of Access User in Ofdma Femtocell*	Raphel Nadeak
I-7	I-71	*A HOS Based Spectrum Sensing for Cognitive Radio in Noise of Uncertain Power*	Agus Subekti
	I-72	*A Flexible Threshold Selection and Fault Detection Method for Health Monitoring of Offshore Wind Farms*	Deepshikha Agarwal
	I-73	*Information Technology (IT) Value Model Using Variance-Based Structural Equation Modeling: Towards IT Value Engineering*	Lukman Abdurrahman
	I-74	*Realizing the Quality of Service (QoS) in Software-Defined Networking (SDN) Based Cloud Infrastructure*	Kannan Govindarajan
S-4	S-41	*Main and Support Enabler of Vocational Higher Education Governance*	Heru Nugroho
	S-42	*University Dashboard an Implementation of Executive Dashboard to University*	Meyliana Meyliana
	S-43	*Online Training Effect on Employee Skills Development*	Titan Titan
	S-44	*ITRACT: A Theoretical Model Towards New E-Learning Readiness Framework*	Kusuma Ayu Laksitowening
S-5	S-51	*Engineering Rural Informatics Using Agile User Centered Design*	Wan Abdul Rahim Wan Mohd Isa
	S-52	*Knowledge Infrastructure for Agriculture in Bangladesh: A Need Assessment Study of Middle Mile ICT Solutions*	Faheem Hussain
	S-53	*Domestication of Technology on Women Migrant Domestic Workers*	Alila Pramiyanti
S-6	S-61	*Social Network Modeling Approach for Brand Awareness*	Andry Alamsyah
	S-62	*Probabilistic Partnership Index (PPI) in Social Network Analysis Using Kretschmer Approach*	Nisa Cahya
	S-63	*Social Simulation: Individual and Organizational Dynamic in Team Learning Collaboration for Performance Improvement*	Heriyono Lalu
	S-64	*Evaluation of Mobile Ordering Post-Implementation*	Alfa R Yohannis

Friday, May 30, 2014

	Ballroom A	Ballroom B
08.00-08.30	**Morning Coffee**	
08.30-10.30	Panel Chair: Dana S. Kusumo	
10.30-10.45	Closing	
10.45-11.00	Brunch	

Panel

Internet of Things in Indonesia

Internet of Things: Infrastructure and Application
Alfred Boediman, Ph.D
Vice President Samsung Research and Development Institute Indonesia (SRIN)

Creating the Internet of Your Things: Application and Computation
Risman Adnan
Developer and Platform Evangelism Lead-Microsoft Indonesia

The IoT and the Internet of Everything
Prio Utomo
Cisco's Subject Matter expert for Industry

Implementing IT Value using Enterprise Architecture and Strategis Alignment Maturity Model
Dr. Ing. Ir. Suhardi, MM
Associate professor, Institut Teknologi Bandung, Indonesia

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SURAT TUGAS

Nomor : L.05.1/419/KP/V/2014

Yang bertanda tangan di bawah ini	:	
Nama	:	Cuk Subiyantoro, S.Kom., M.Kom.
Nomor Pokok Pegawai	:	8 4 1 0 1 1
Jabatan	:	Ketua STMIK AKAKOM
Dengan ini memberikan tugas kepada	:	
Nama Pegawai	:	**Jabatan/Status**
Bambang Purnomosidi Dwi Putranto, S. Kom., MMSI.	:	Dosen STMIK AKAKOM
Kepentingan tugas	:	Pemakalah pada International Converence on Information and Communication Technology (ICoICT)
Pelaksanaan	:	4 Hari
Hari	:	Rabu - Jumat
Tanggal	:	28 – 30 Mei 2014
Pukul	:	Menyesuaikan
Tempat	:	Universitas Telkom Jl. Telekomunikasi No. 1 Terusan Buah Batu Bandung, Indonesia
Merupakan kegiatan prestise	:	

Keterangan : Maksimal 2 (dua) minggu setelah melaksanakan tugas, diwajibkan menyerahkan laporan hasil tugas dinas secara tertulis kepada Ka. Puslitbang dan PPM.

Demikian surat tugas ini untuk dapat dilaksanakan dan dipergunakan sebagaimana mestinya, atas perhatian Saudara, kami ucapkan terima kasih.

Yogyakarta, 5 Mei 2014

Ketua,

Cuk Subiyantoro, S.Kom., M.Kom.
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Program	:
Kegiatan	:
Sumber dana	:

SURAT PERINTAH TUGAS

1.	Pejabat berwenang yang memberi tugas		Cuk Subiyantoro, S.Kom., M.Kom.
2.	Nama pegawai yang diperintahkan		Bambang Purnomosidi Dwi Putranto, S. Kom., MMSI.
3.	a. Pangkat dan golongan	a.	Penata Muda Tk1/III-b
	b. Jabatan	b.	Dosen STMIK AKAKOM
4.	Maksud tujuan dinas		Pemakalah pada International Converence on Information and Communication Technology (ICoICT)
5.	Alat angkutan yang dipergunakan		
6.	a. Tempat berangkat	a.	STMIK AKAKOM Yogyakarta
	b. Tempat tujuan	b.	Universitas Telkom Jl. Telekomunikasi No. 1 Terusan Buah Batu Bandung, Indonesia
7.	a. Lamanya tugas dinas b. Tanggal berangkat mulai c. Tanggal harus kembali bekerja	a. b. c.	4 Hari 27 Mei 2014 2 Juni 2014
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II.a Tiba di : Universitas Telkom Jl. Telekomunikasi No. 1 Terusan Buah Batu Bandung, Indonesia Pada tanggal : 28 Mei 2014 Kepala : ( )	II.b Berangkat dari : Universitas Telkom Jl. Telekomunikasi No. 1 Terusan Buah Batu Bandung, Indonesia Pada tanggal : 28 Mei 2014 Kepala : ( )
III.a Tiba di : Universitas Telkom Jl. Telekomunikasi No. 1 Terusan Buah Batu Bandung, Indonesia Pada tanggal : 29 Mei 2014 Kepala : ( )	III.b Berangkat dari : Universitas Telkom Jl. Telekomunikasi No. 1 Terusan Buah Batu Bandung, Indonesia Pada tanggal : 30 Mei 2014 Kepala : ( )
IV. Tiba kembali di : STMIK AKAKOM (tempat kedudukan) Pada tanggal : 2 Juni 2014 Ketua STMIK AKAKOM Cuk Subiyantoro, S.Kom., M.Kom.	


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Paper title
Pragmatic Web as a Service Provider for the Internet of Things
Conference and track
2014 2nd International Conference on Information and Communication Technology (ICoICT) - Application
Abstract
In this paper, we present the Pragmatic Web architecture and how it can be used to improve...
Topics
Semantic web technologies for IoT; Application architecture of IoT; Intelligent shopping
Personal notes
Status
Published
Registration
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