

Workshop

Pemograman IoT Berbasis Arduino



Kafi Ramadhani Borut, S.Kom , M.Kom
Co-Founder i-ot.net

Thanks To

- ▶ Dekan Fakultas Ilmu Komputer
- ▶ Wakil Dekan 1 Fakultas Ilmu Komputer
- ▶ Wakil Dekan 1 Fakultas Ilmu Komputer
- ▶ Wakil Dekan 3 Fakultas Ilmu Komputer, Founder i-ot.net, Mentor sekaligus Panutan Saya
- ▶ Teman Teman Dosen Teknik Informatika Dan Sistem informasi
- ▶ Segenap dan Seluruh Panitia Penyelenggara Workshop
- ▶ Segenap dan Seluruh Peserta.

Biografi Penulis

- ▶ Nama: Kafi Ramadhani Borut, S.Kom, M.kom
- ▶ Pendidikan Terakhir : Magister Komputer, TF ITS Surabaya
- ▶ Bidang Keahlian : Network, Security, Audit, dan Forensic
- ▶ Email : admins@i-ot.net , ghaniborudxx@gmail.com
- ▶ No. Hp / Wa : **0895328400080**
- ▶ Pekerjaan saat ini:
Researcher, Co-Founder I-ot.net, Founder Pasarmu.com
- ▶ Hoby :
Ngotak Ngatik Server, Main Game, Ngotak Ngatik Server lagi
- ▶ Visi Misi Terpenting :
BERMANFAAT Bagi Semua

Simples Understanding of Network Security

- ▶ 5W1H
- ▶ What?
- ▶ Why ?
- ▶ Who?
- ▶ Where?
- ▶ When?
- ▶ How?
- ▶ Important Goal of do that?

What is (1) Network Security ?

- ▶ Network security is any activity design and implemented to protect the usability and integrity of your network and data.

What is (2)

core concept security of network

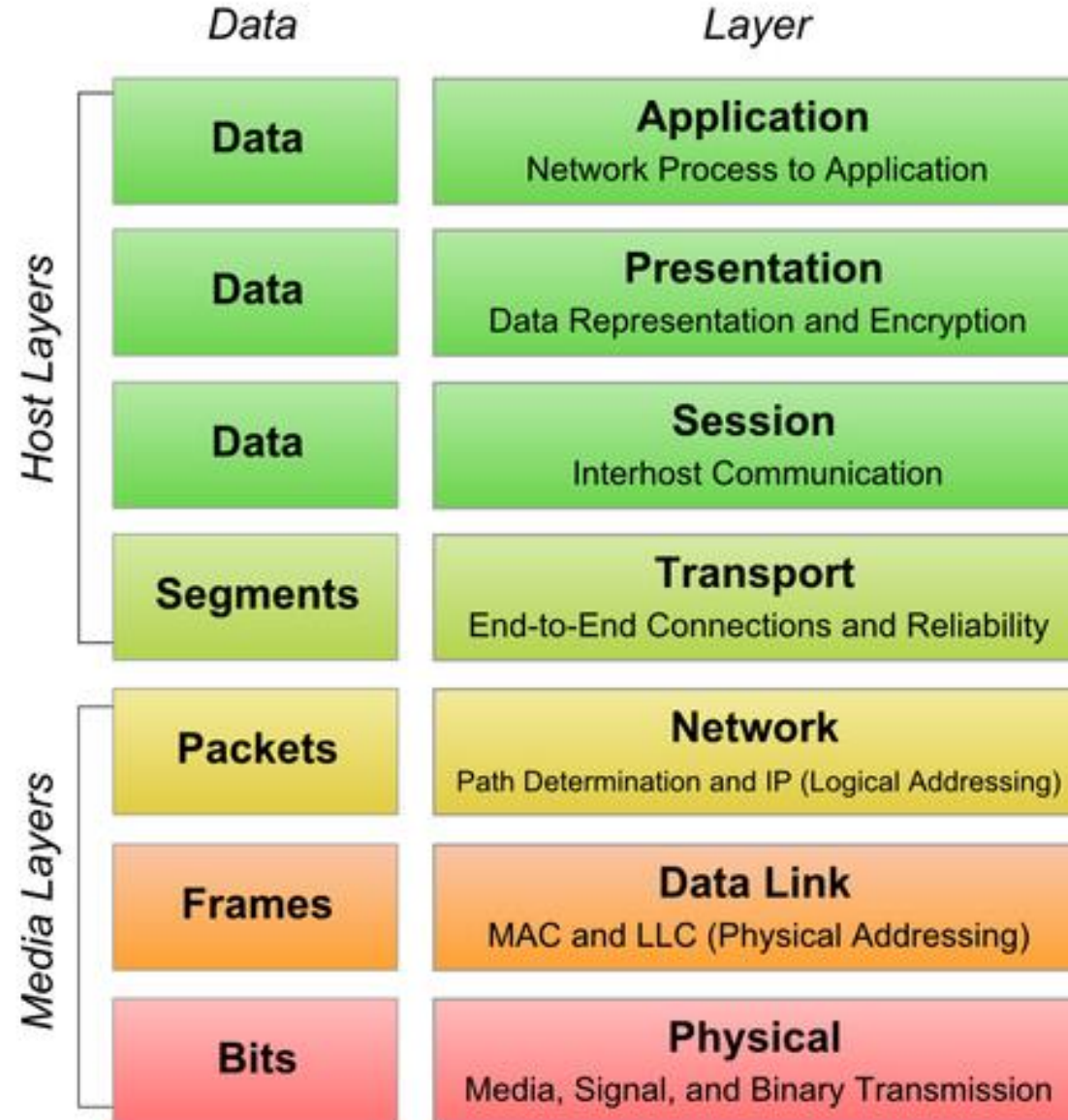
- ▶ CIA Concept and Rules:
- ▶ Confidentiality (kerahasiaan)
 - Kerahasiaan setara dengan privasi.
- ▶ Integrity (integritas),
 - Konsistensi, akurasi, dan kepercayaan data
- ▶ Availability (ketersediaan).
 - Selalu ada, Bisa dimanfaatkan, dijaga dan Selalu dapat dirasakan hadirnya

Why?

- ▶ Caring and Protect
- ▶ Save
- ▶ Enjoy
- ▶ Happy
- ▶ **TRUST**

Who is
(1) ??

OSI Model



Who is (2)? Example

- ▶ Network
- ▶ Server
- ▶ Application
- ▶ Database
- ▶ Data Personal
- ▶ User
- ▶ Group
- ▶ File

Where is (1)?

► Physical (Hardware)

- Router
- Switch
- Server
- Devices
- Phone
- Laptop
- ATM
- Etc, et All

► Network

- Routing
- Bridging
- IoT
- Grid
- Cloud
- P2P
- E-Banking

Where is (2) ?

▶ Application

- ▶ Mail Services
- ▶ Streams Services
- ▶ Cloud Services
- ▶ GSM Services
- ▶ Web Services
- ▶ IoT Services
- ▶ P2p Servies
Etc, et All

▶ Data & Access

- ▶ File
- ▶ Password
- ▶ Email
- ▶ Phone Number
- ▶ Address
- ▶ Hard File

When ?

- ▶ WHEN EVERYTIME
- ▶ WHEN ALL NEEDS HELP
- ▶ WHEN ELECTROINIC is USED
- ▶ WHEN BUILDING COMPANY, GROUP
- ▶ WHEN PEOPLE NEEDS EASY WAY
- ▶ DISASTER
- ▶ WHEN IS TO MUCH HUMAN ERROR

HOW TO (1)?

- ▶ 3A WAY Best Security Concept
- ▶ AUTHENTICATION
- ▶ AUTHORIZATION
- ▶ ACCESS LIST

HOW TO (2)?

- ▶ MUST BE LEARN, DO, AND THING LIKE THIEF, CAN SAVE
- ▶ UP TOO DATE / FAST LEARN/ UPDATES NEWS ISSUES
- ▶ TIDAK ADA SYSTEM YANG AMAN 100%

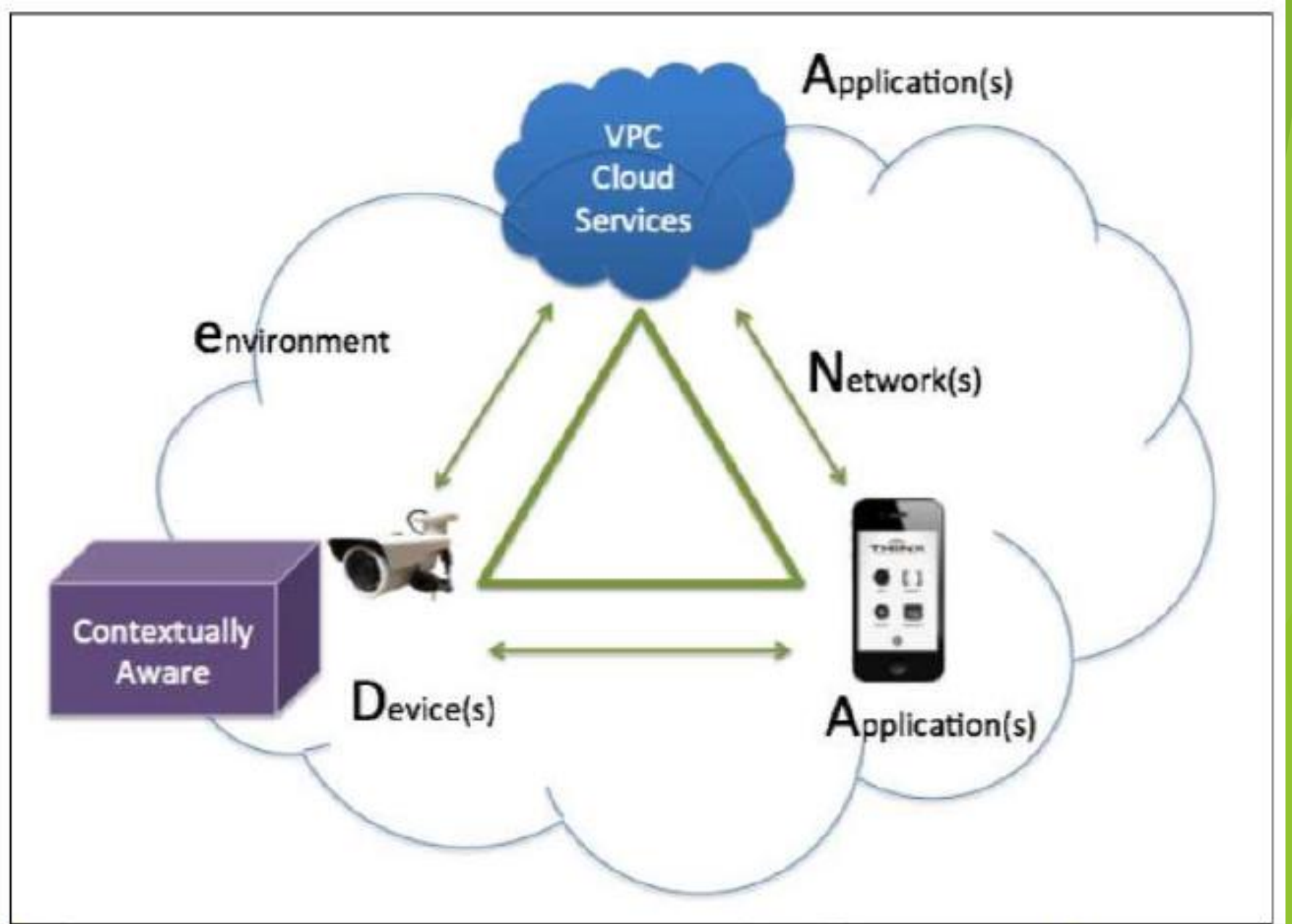
HOW TO (3)?

- ▶ Identification
- ▶ Understanding Problem
- ▶ Design The Solution
- ▶ Implementing Real Solution
- ▶ Monitoring

Understanding I-oT

- ▶ IOT (INTERNET OF THING) MEANS
- ▶ NEW ERA OF NETWORK AFTER CLOUD
- ▶ CONCEPT OF P2P
- ▶ E2E DEVICES COMMUNICATION
- ▶ REMOTE CONCEPT
- ▶ PUBLISH SUBSCRIBE RULES
- ▶ ANY CONNECTED BASED ON

Sistem IoT



MQTT (Message Queuing Telemetry Transport) Protocol

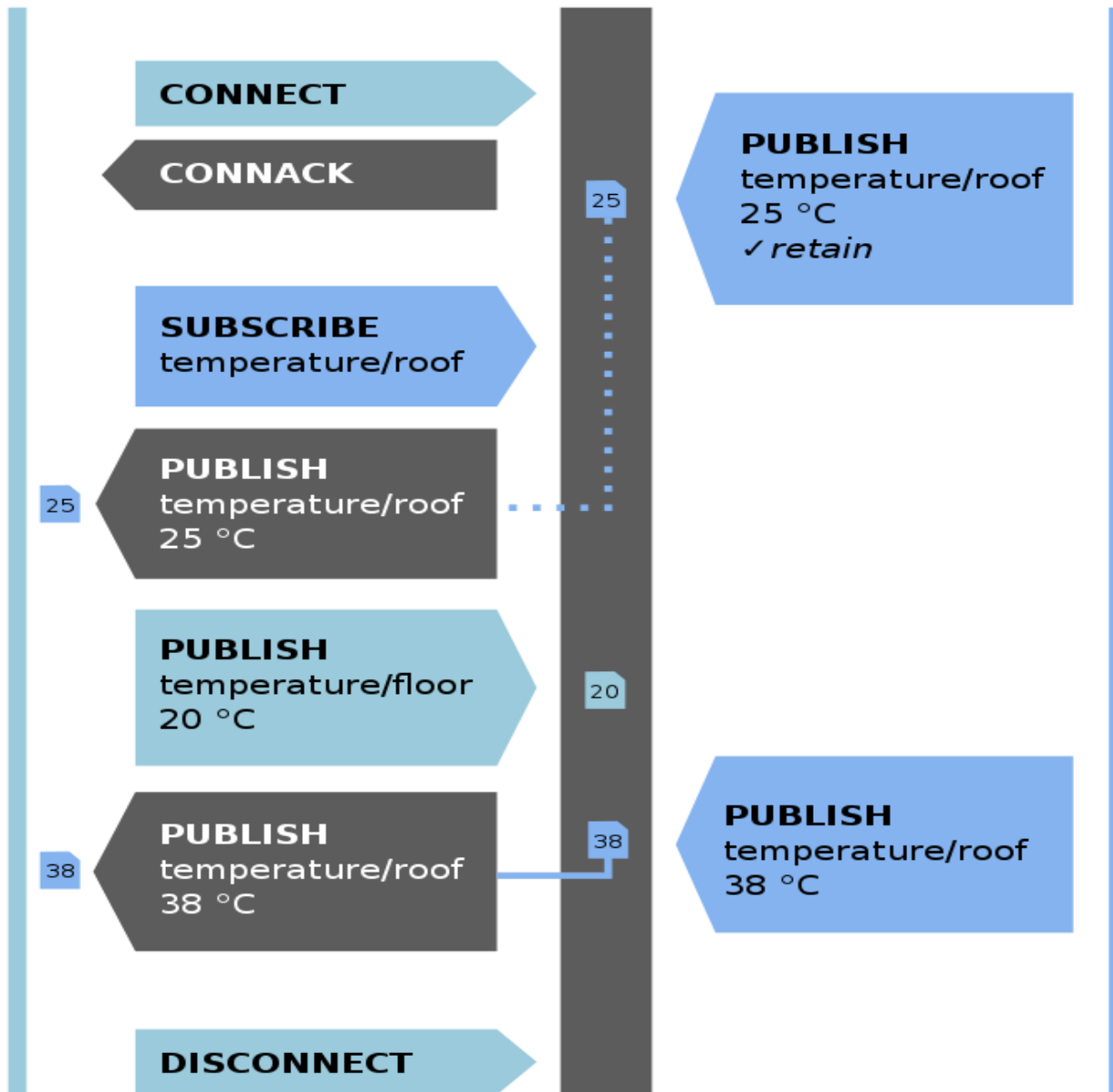
- ▶ The MQTT protocol defines two types of network entities: a message broker and a number of clients.
- ▶ An MQTT broker is a server that receives all messages from the clients and then routes the messages to the appropriate destination clients.[12]
- ▶ An MQTT client is any device (from a micro controller up to a full-fledged server) that runs an MQTT library and connects to an MQTT broker over a network.[13]

Client A

Broker

Client B

MQTT PROTOCOL



MQTT BROKER

- ▶ The broker acts as a post office, MQTT doesn't use the address of the intended recipient but uses the subject line called "Topic", and anyone who wants a copy of that message will subscribe to that topic. Multiple clients can receive the message from a single broker (one to many capability). Similarly, multiple publishers can publish topics to a single subscriber (many to one).
- ▶ The main advantages of MQTT broker are:
- ▶ Eliminates vulnerable and insecure client connections
- ▶ Can easily scale from a single device to thousands
- ▶ Manages and tracks all client connection states, including security credentials and certificates
- ▶ Reduced network strain without compromising the security (cellular or satellite network)

HOW TO SECURE MQTT SERVER AND DEVICES

- ▶ 3A WAY Best Security Concept
- ▶ AUTHENTICATION
- ▶ AUTHORIZATION
- ▶ ACCESS LIST

AUTHENTICATION MQTT

- ▶ Client id , Password
- ▶ Mysql Authentication
- ▶ Username , Password
- ▶ Tokens Authentication Using JWT
- ▶ Postgree Authentication
- ▶ MNESIA Authentication
- ▶ HTTP Basic Authentication
- ▶ TWO FACTOR AUTHENTICATION
- ▶ SSL (Socket Secure Layer)

AUTHORIZATION Of MQTT

- ▶ LDAP SERVICES
- ▶ KERBEROS SERVICES
- ▶ Single Sign On Services
- ▶ SAML
- ▶ GROUPS Terminal

ACCESS LIST ON MQTT

- ▶ RULE
- ▶ ROUTES DEVICES
- ▶ SCHEMA CONNECTING



Terimakasih...