

Industrial Wireless LAN System based on IEEE 802.11 standard

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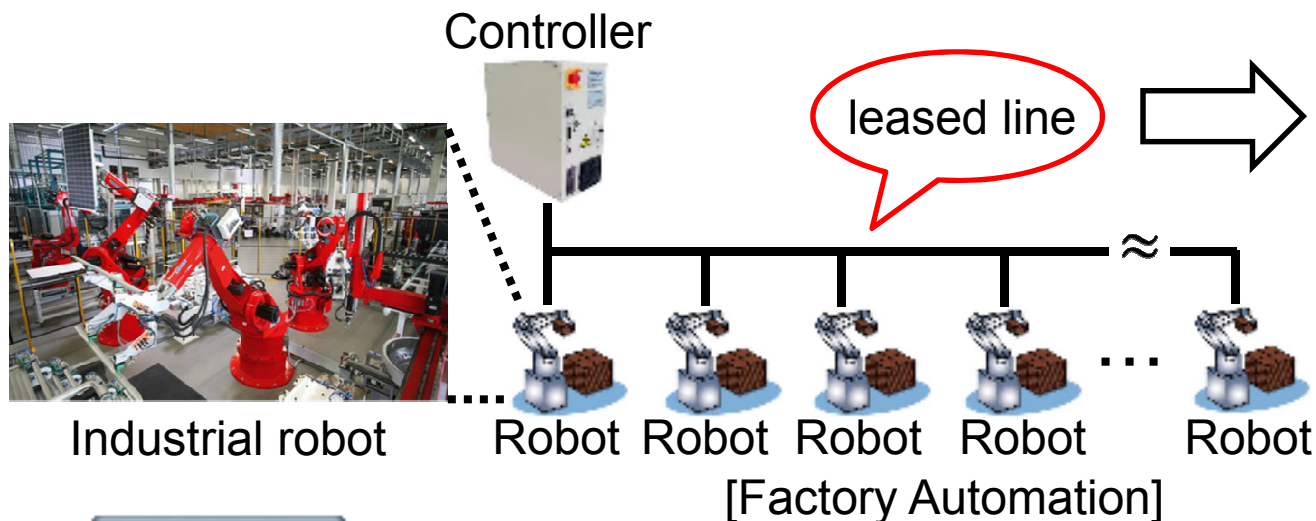
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- The industrial wireless synchronous communication system using wireless LAN (IEEE802.11ac)



【Standard】



【Advantages】

- cycle communication
- low latency (real time)
- high precision time synchronization
- high quality(no error)

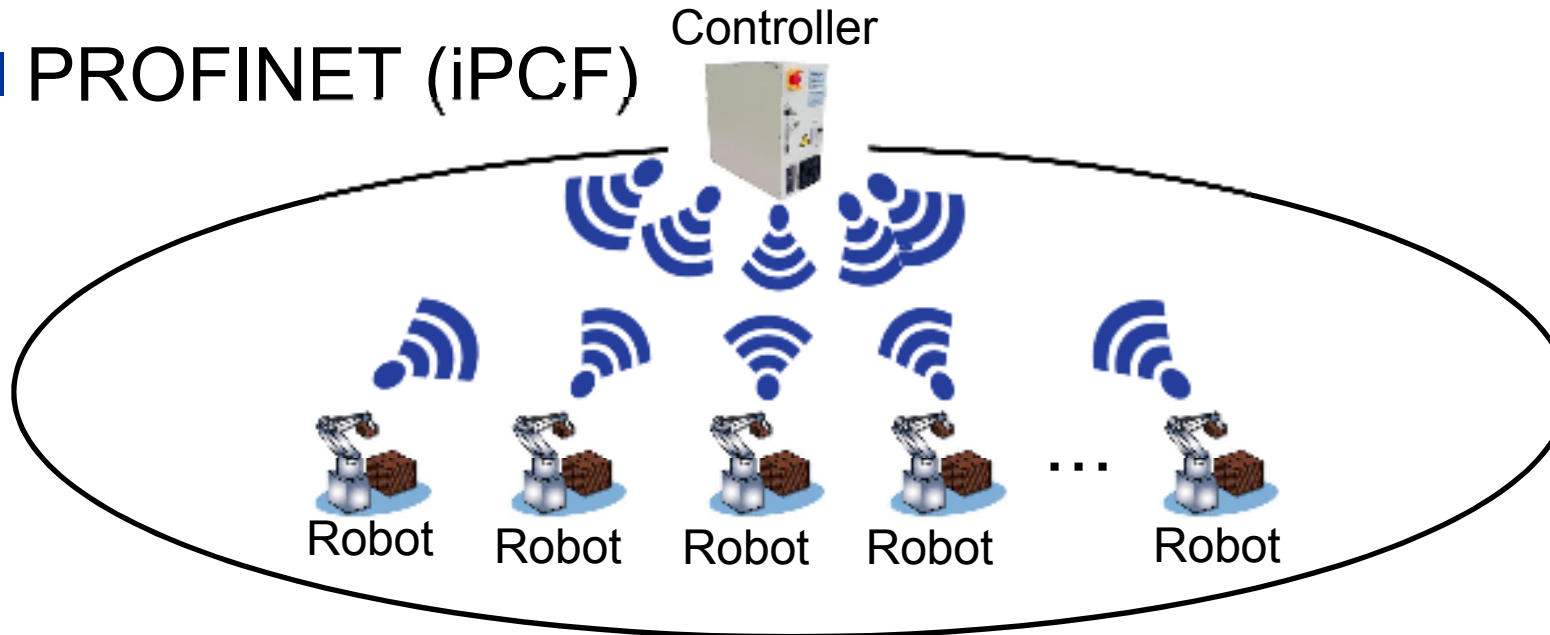
Problem

- High maintenance cost
- Limited robot installations due to wire characteristics

Solution

The development of industrial Wireless LAN system based on IEEE 802.11 standard

■ PROFINET (iPCF) Controller



One-to-one communication



Communication time per 1 robot is more than 1[ms]

using an existing WLAN chip

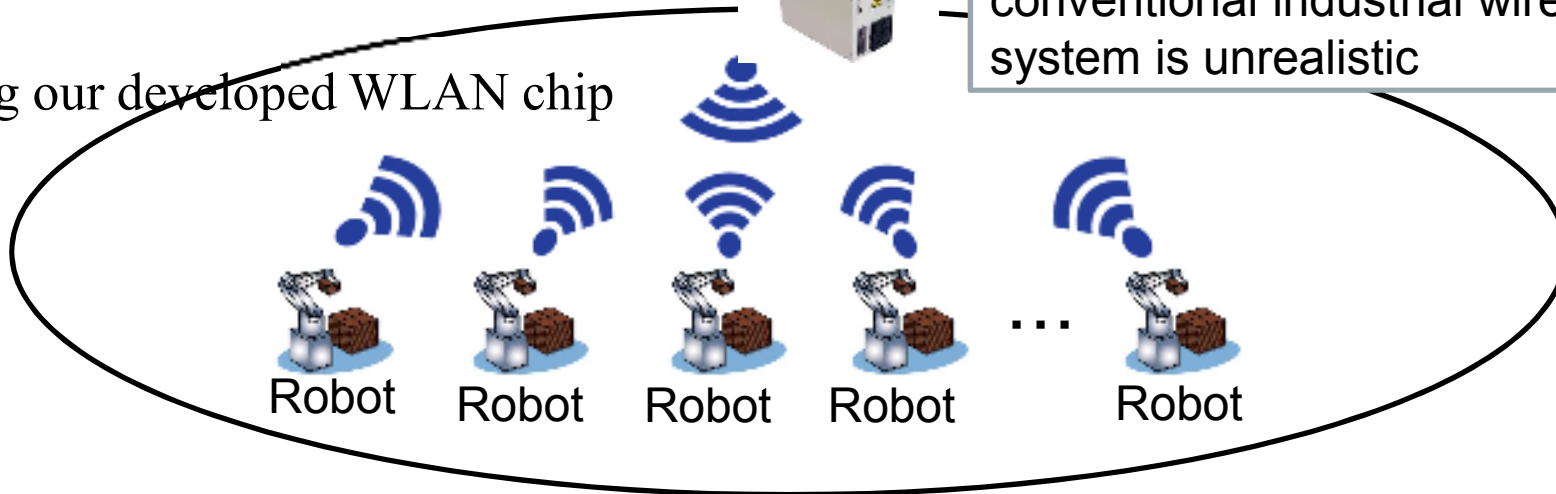
■ One-to-many communication

Controller



The implementation of conventional industrial wireless system is unrealistic

Using our developed WLAN chip



Time synchronization

Ultra-high speed cycle communication

Safety (response)

Implementation

Novel method
[ns] order

Novel transmission method
Per 1 robot < 100[μs]
System error probability=10⁻³/year

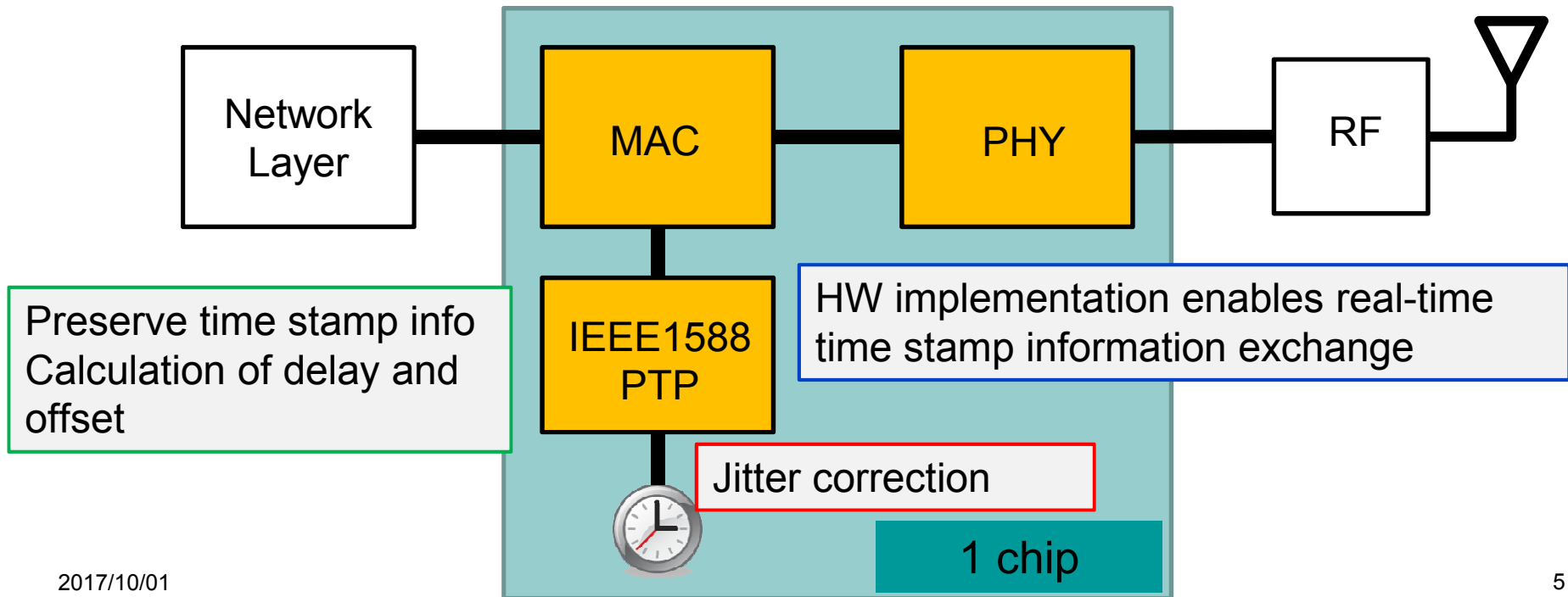
Novel authentication & encryption
Satisfy worldwide safety standard

**Patent Pending
2015-133533**

- Time-synchronization protocol
 - Improve from IEEE1588 PTP (v2)
- Implementation method
 - HW implementation of MAC layer
 - Novel jitter correction algorithm

Synchronization accuracy
Conventional : < 1μsec
Proposed : < 1nsec

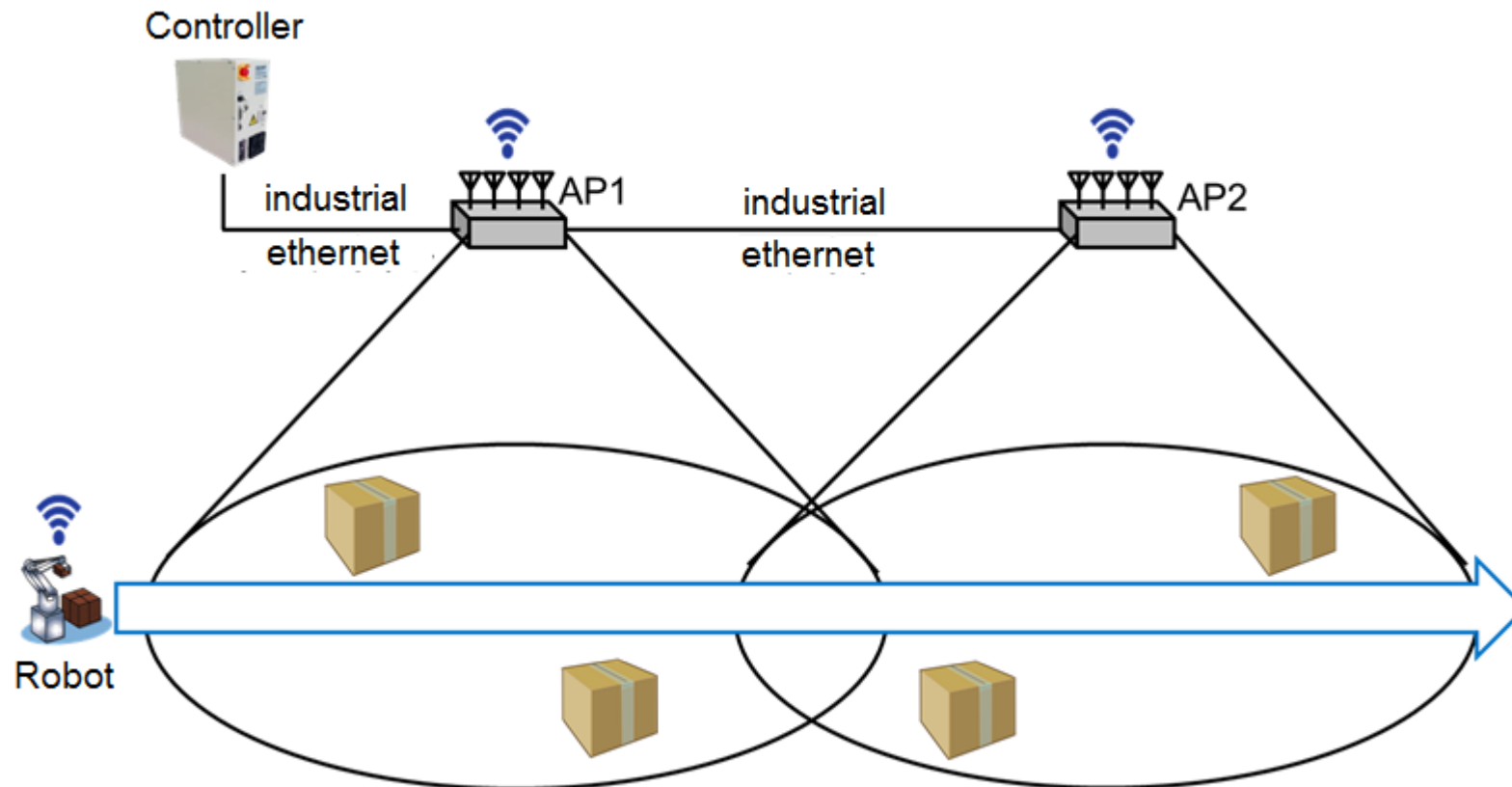
Patent in preparation



Kyutech DSP Lab. Application Example① (Transfer Robot)

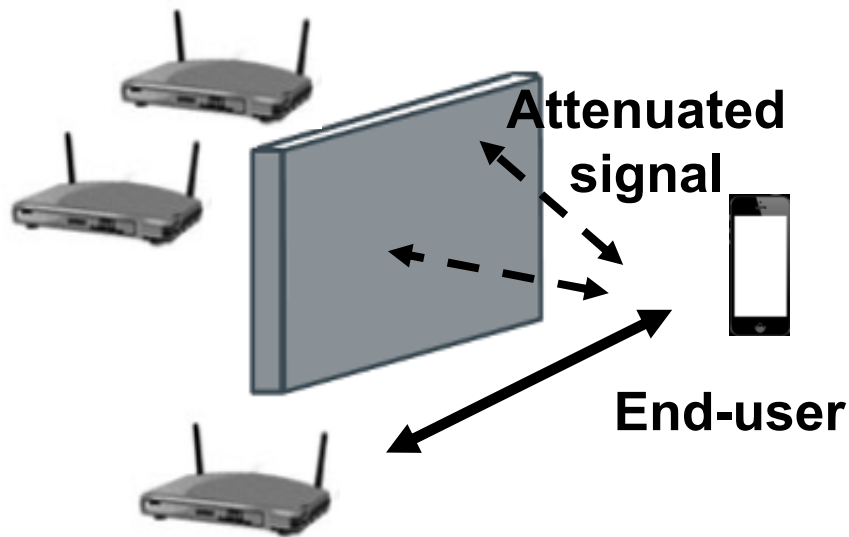
※ AP : Access Point

- Support mobile terminal
 - Fast roaming function enables seamless AP switching



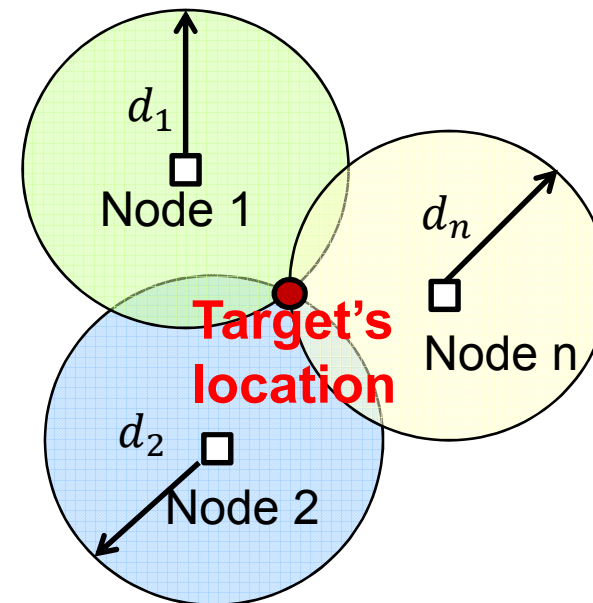
■ Conventional (RSSI)

- Susceptible to obstruction



■ Proposed

- Estimate position using ToA(Time-of-Arrival)



The accuracy of conventional method is in order of [m]

The accuracy of proposed method in **order of [cm]** : The radius of positioning range is about 50m

■ Joint R & D

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