Applying Common Criteria to a cloud type payment service

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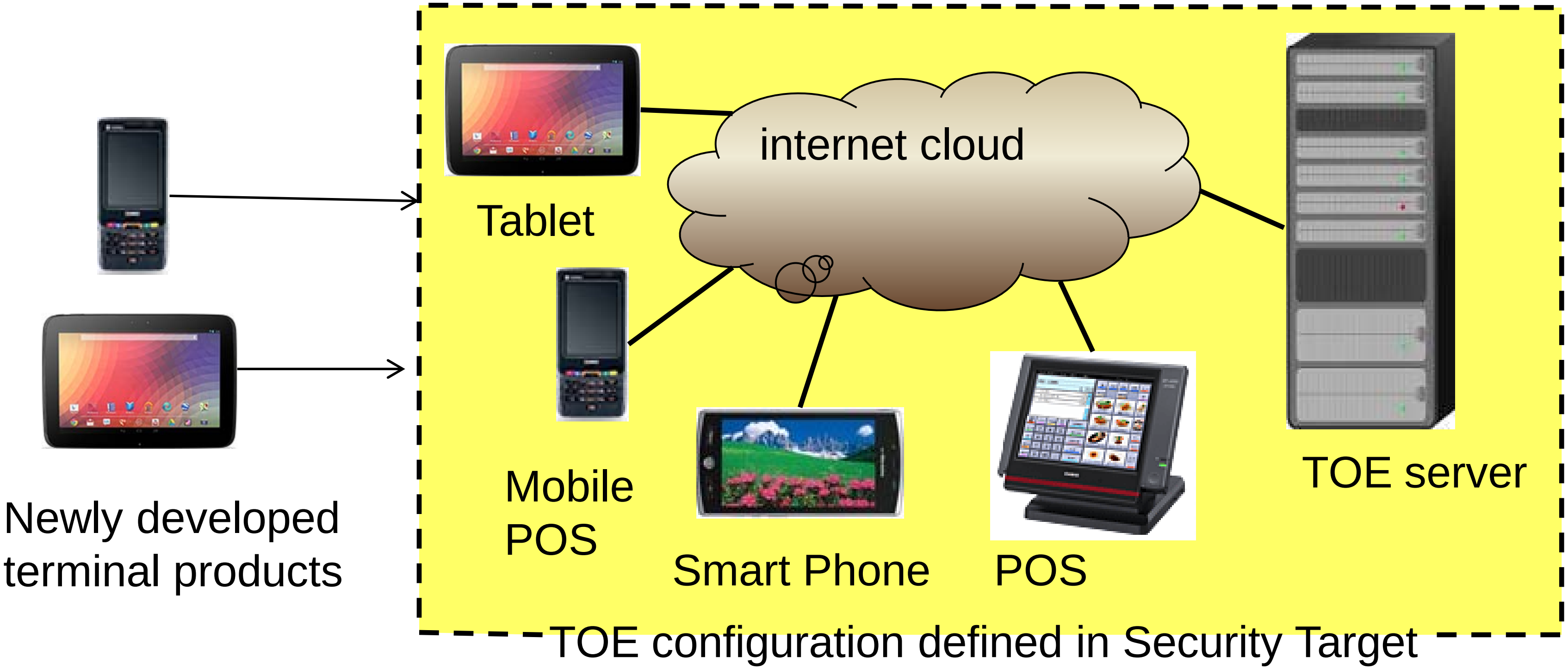
Evaluation of a cloud system


internet cloud
Tablet
Mobile POS
Smart Phone
POS
TOE server
Newly developed terminal products
TOE configuration defined in Security Target

- A cloud system we evaluated varies dynamically by terminals connected with.
- The configurable TOE is one reason to the difficulty in evaluating the cloud system.

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Thincacloud and its evaluation

Idea for whole cloud evaluation

Evaluation of terminals

Evaluation of a server

Evaluation of a whole cloud system

Remaining issue

Conclusion

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What is Thincacloud

- Thincacloud is a **cloud system based on NFC** solution.
- It is currently available and providing e-commerce payment service in Japan.
- No evaluation regarding whole cloud system evaluation including many kinds of terminals, so far.

What is Thincacloud

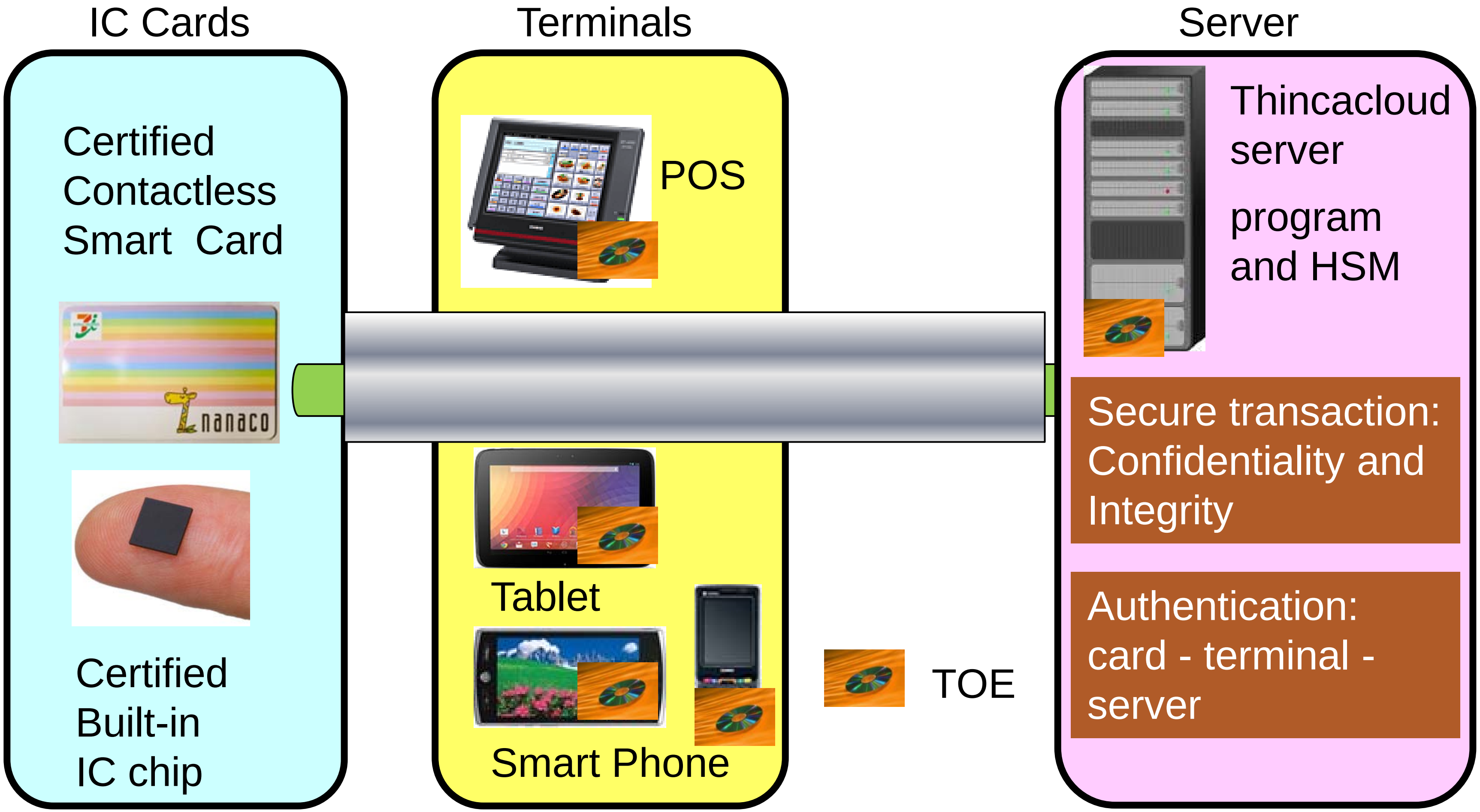
Real payment

Virtual payment

At restaurants
At shops
In a taxi
Delivery Services

By TV
By Smart Phones
In offices
By Tablets

Thincacloud architecture



IC Cards

Certified Contactless Smart Card

Certified Built-in IC chip

Terminals

POS

Tablet

Smart Phone

TOE

Server

Thincacloud server

program and HSM

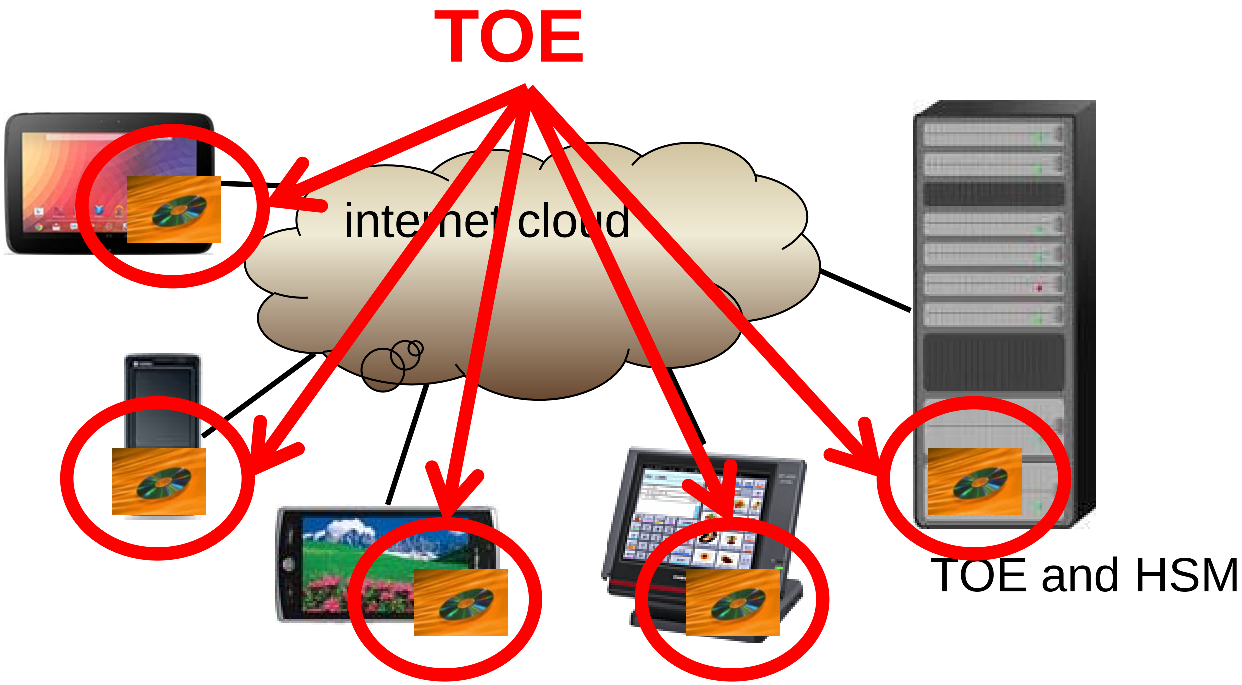
Secure transaction: Confidentiality and Integrity

Authentication: card - terminal - server

Merit of Thincacloud architecture

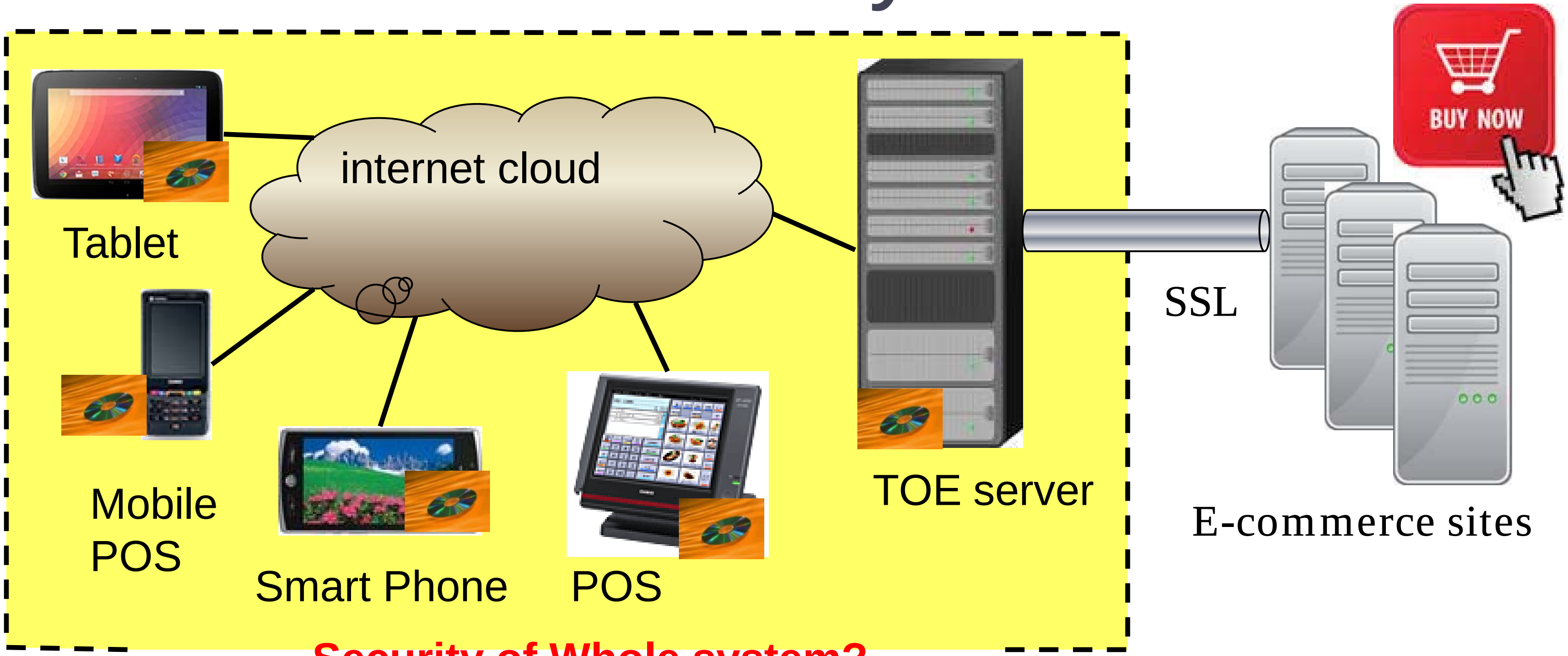
- Main security functionality is the secure session. The developer forces the secure session on the just High-EAL IC and the server.
- Terminals only support the secure session.
- The developer decides that TOE in terminals is a program, and configurable parts (OS and hardware) are IT environments.
- Therefore, assurance will be continued regardless of terminals until the program is updated.

Evaluated Thincacloud



- This TOE we have already evaluated is a small program in terminals and a program, and a HSM in a server.
- Merit : **Assurance will be continued regardless of terminals until the program is updated.**

How about a whole system ?



Security of Whole system?

- “Is my tablet secure to use Thincacloud payment?” some users may think.
- “Is my POS terminal secure?” some shop owners may think.
- “Is Thincacloud server secure?” e-commerce site owners may think.

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Evaluation of terminals

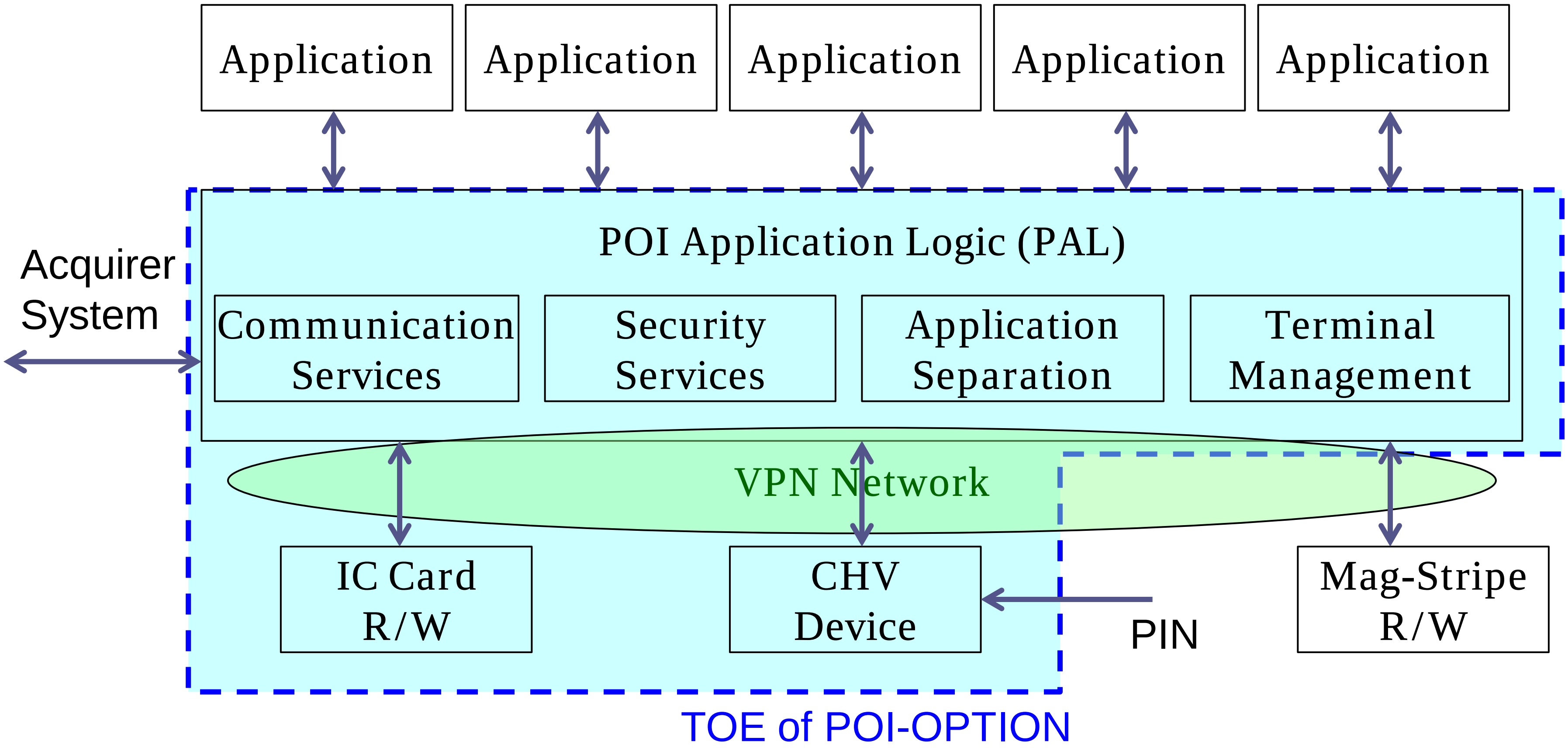
- How does the stakeholders obtain security assurance of the entire terminal, instead of a program?

- Is the Point of interaction protection profile (POI-PP) available for evaluation of the entire terminal?

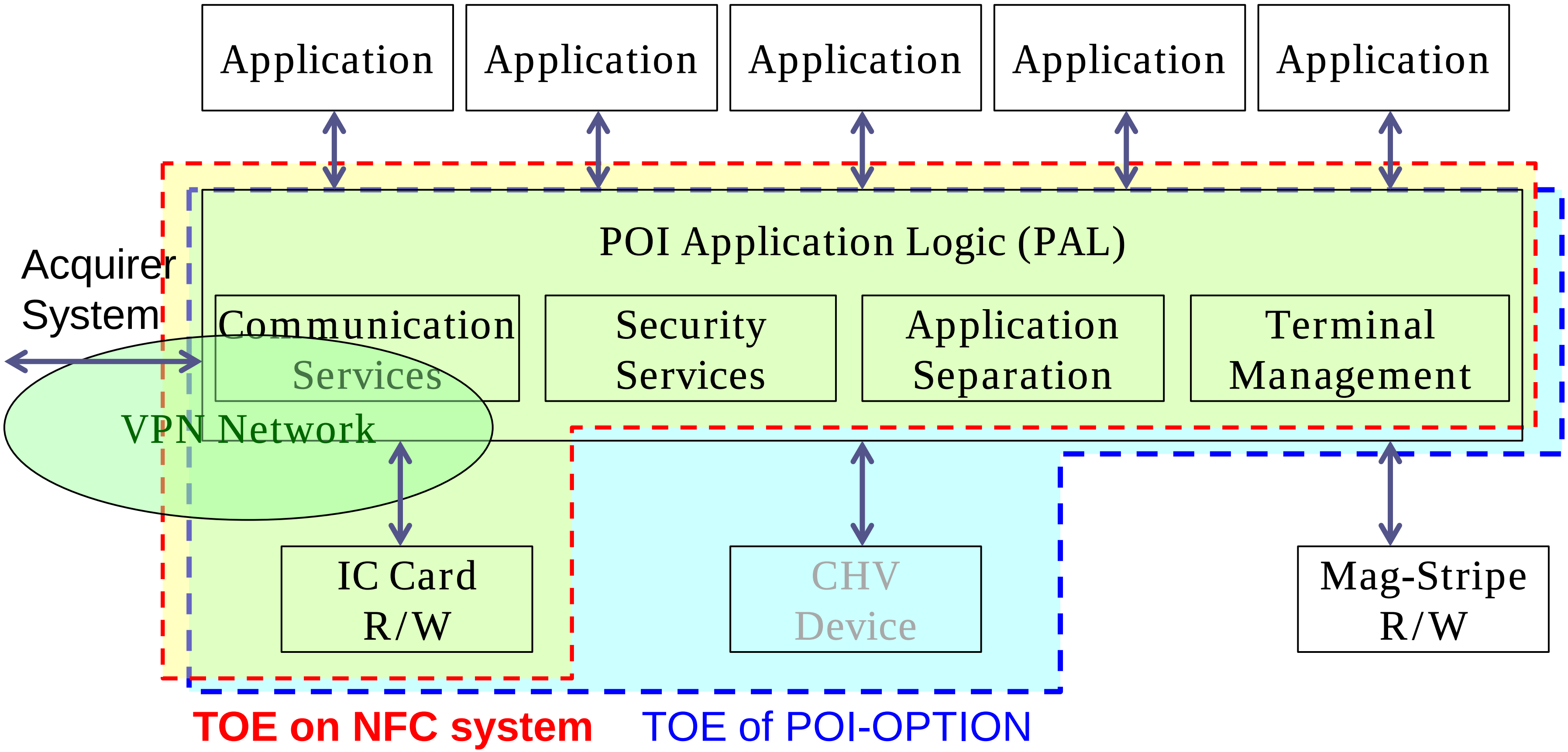
What is POI-PP

- **POI-PP** is a protection profile for the payment terminals, Version 2.0 certified by ANSSI on 2011.
- The target products are payment terminals with the smart card based transaction capability.
- POI-OPTION configuration: TOE provides protection for smart card based transaction, payment transaction data management and external communication facilities.

POI-OPTION configuration



NFC configuration

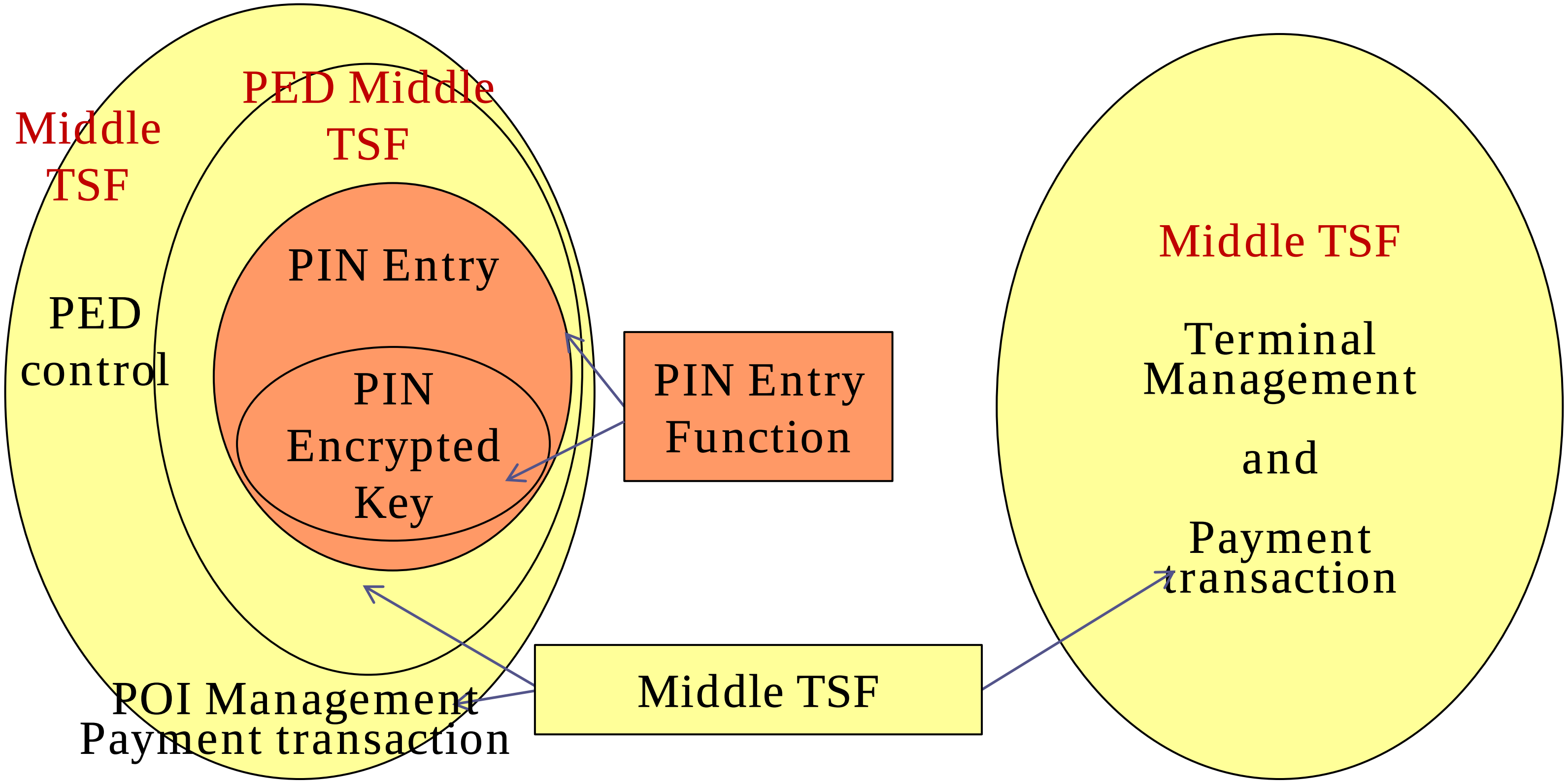


TOE on NFC system is similar to one of POI-OPTION, which indicates that POI-PP could be applied to cloud system based on NFC.

TSF structures

POI-OPTION

NFC terminal



TSF based on NFC could be covered with POI-OPTION without PIN entry.

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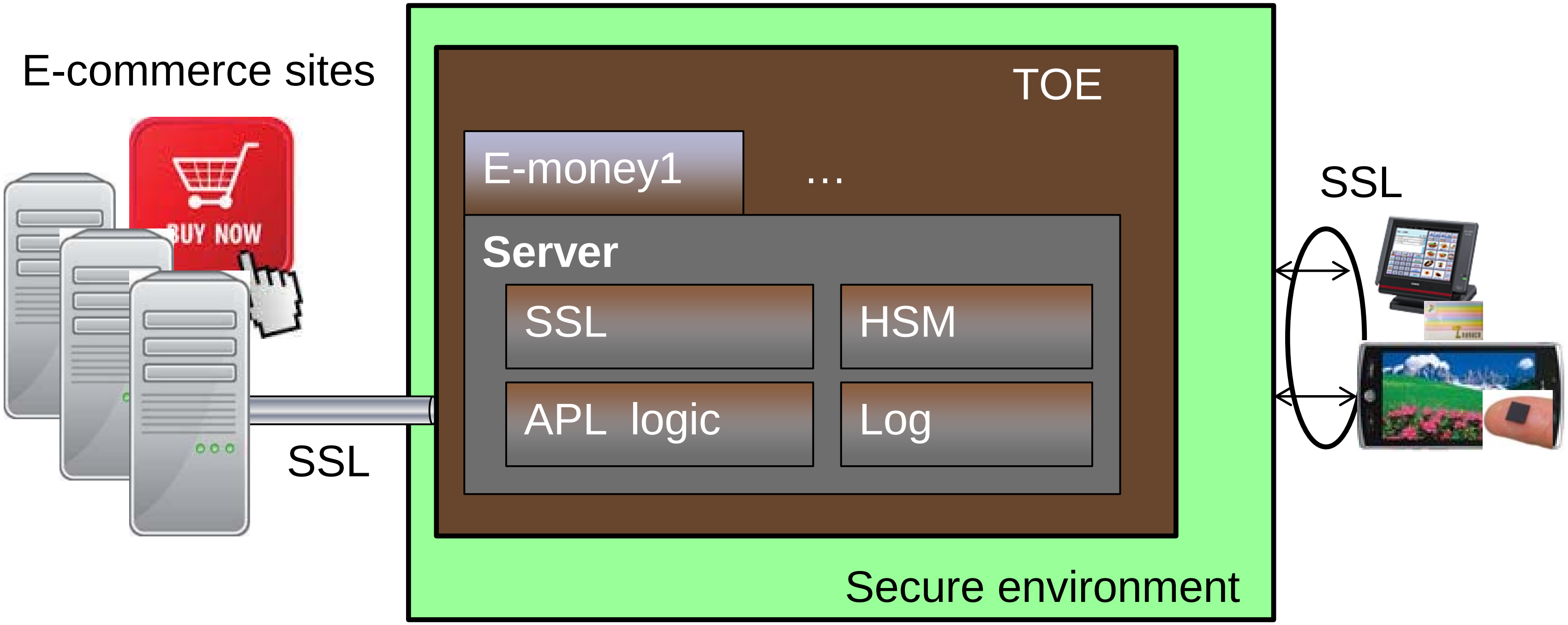
Evaluation of a server

- How the stakeholders obtain security assurance of total server instead of component only.



Evaluation of a server

- How the stakeholders obtain security assurance of **total server scheme** instead of component only.

- Physical scope of the server-side TOE is total server including databases, HSMs, SSL accelerators, Web servers and so on.

Assurance continuity can be applied to the total server scheme, even when components are upgraded.

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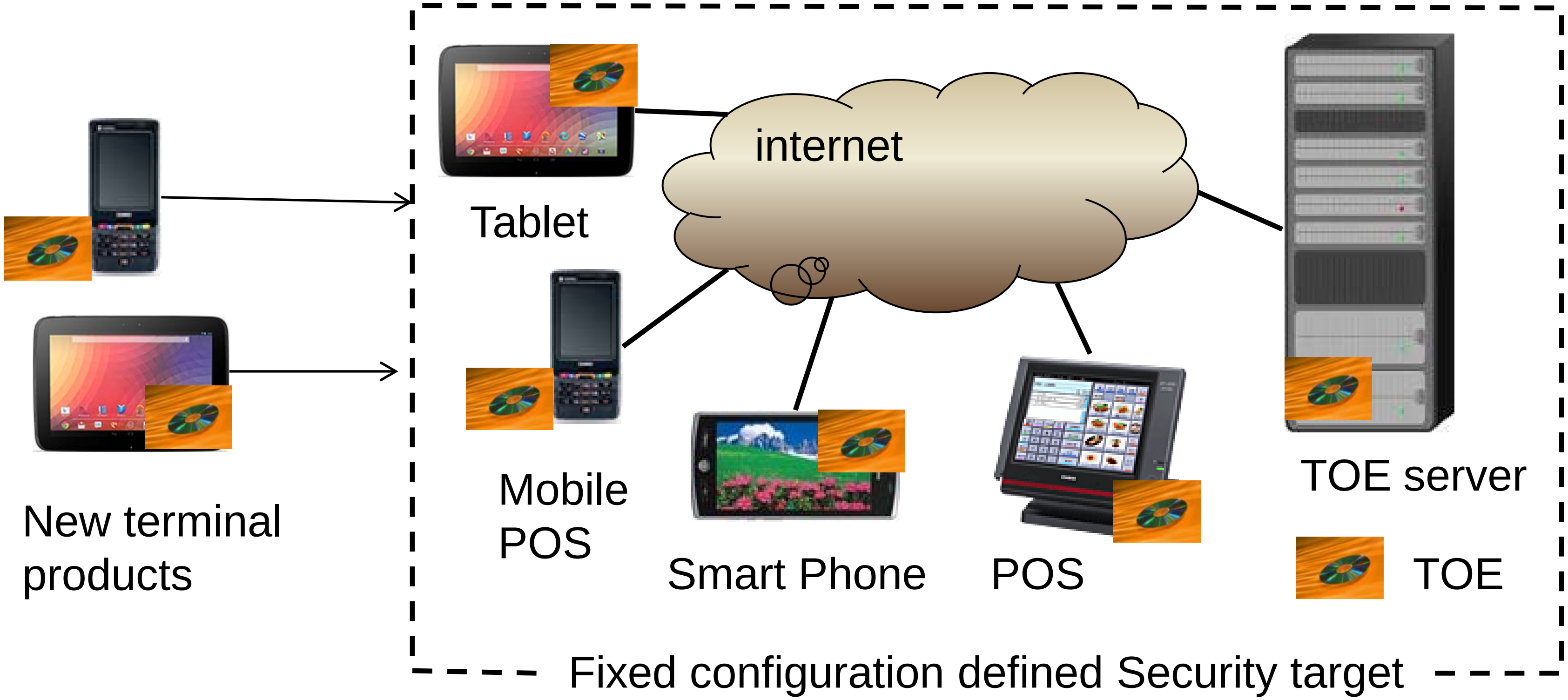
Evaluation of a whole system



- The client TOE runs well on the newly-developed terminals.
- **Rapid assurance continuity** is useful for whole system evaluation.

Evaluation of a whole system

- Security target describes the newly-developed terminal as a part of TOE.
- Evaluation of the newly-developed terminal is required.
  - From whole system point of view, evaluation of terminal means partial evaluation.

Then assurance continuity for the TOE is maintained and available for evaluation.

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Remaining issue

- The e-commerce site is out of the scope of TOE.
- It is regarded as a user for the TOE.
- However, the card holder may require it is secure.

We need to consider how we assure the e-commerce site is secure enough.

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Conclusion

- Idea of assurance for the whole cloud system including terminals.
  - ▫ Terminals: terminals are evaluated and applied for assurance continuity.

    Developing subset of **POI-PP TOE** might be applicable.
  - ▫ Server: **Total server scheme** as TOE is suitable for evaluation, NOT component base.
  - ▫ Whole system: **Rapid assurance continuity** could be useful depends on component's life cycle.

Thank you

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Evaluation of software / hardware IT Products by ISO/IEC15408
Testing of cryptographic module and algorithm implementation
by FIPS 140-2 and JIS X 19790 (ISO/IEC 19790)