Intrusion detection and privacy

- Security mechanisms are used to protect privacy;
- Security mechanisms use and/or collect personal private data about users and data they use;
- The data may be used to compromise privacy;

Examples:
- Audit, intrusion detection systems;
- Biometric

Conflict: security mechanisms and privacy

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Audit and privacy

- During auditing events in a computer system a lot of sensitive information is recorded;
- When records are used for intrusion detection privacy is under potential threat;
- As an example, consider a situation, when IDS has produced a false alarm, then a user, whose name is appeared in the corresponding record may be wrongly accused of the misuse;

Accountability and privacy

- The conflict is inevitable:
  - On the one hand, when we are doing intrusion detection, there must be a way to connect events to a specific user (which could be held accountable);
  - On the other hand, if we want to protect privacy of users such connections should be hidden.
Anonymity and Pseudonymity

- Full anonymization of the audit records is not suitable because
  - there would be no way to recover real identities;
  - Intrusion detection requires often detection of a sequence of actions of the same user;
- Pseudonymity is a solution here. It allows
  - to protect privacy by using pseudonyms instead of true identities;
  - In case of suspicious behaviour it allows re-identify a user (find a true identity);

Pseudonymization techniques

- Reference pseudonyms:
  - Database matching true identities and pseudonyms
- Cryptographic pseudonyms:
  - may use Separation of duties by:
    - Splitting the secret key $k$ into two parts, e.g. $k = k_1 + k_2$;
    - $k_1$ and $k_2$ are hold by two different people, e.g SSO and privacy protection officer;
    - One part is not enough to restore true identity;

The issue of unauthorized re-identification

- The procedure of re-identification should be well specified in a security policy: who and under which circumstances can do it;
- There is problem of unwanted and unauthorized re-identification:
  - A person who knows well a system and its users, may re-identify a person without an authorization, just using public information from audit records;
  - A real issue, especially for small systems/networks;
Re-identification

Re-identification can be based on the information about an event:
• Action and data/time;
• Action, access right, data/time;
• Host identifier;
• Etc
  May be dealt with by creating the fake traffic, simulating normal behaviour of the users;

Legal and ethical issues

• Monitoring users behaviour may not be appropriate or even illegal, unless they are notified
  • They may be monitored
  • Information may be used to support prosecution or dismissal