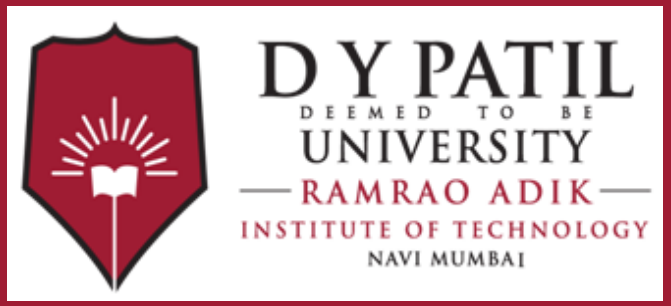

Subject Name: Information System

Unit No:02 Unit Name: Access Control Models

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Temporal and Spatio-Temporal Models

Temporal and Spatio-Temporal Access Control Models

- **Temporal Access Control Models** and **Spatio-Temporal Access Control Models**, which are advanced models used in **access control systems** that take into account **time** and **location** factors to make more dynamic and flexible access control decisions.
- These models can be used to enhance the security and efficiency of access control policies in various systems, including corporate environments, security systems, and other resource management systems.

Temporal Access Control Model

- A **Temporal Access Control Model** manages access rights based on **time-related factors**. In this model, access permissions are determined not only by the identity of the user or their role but also by **when** the user tries to access a resource. Temporal access control allows for access decisions based on conditions like:
- **Time of day**: Only allowing access during working hours (e.g., 9 AM to 5 PM).
- **Date-based restrictions**: Restricting access to certain days or certain time periods, such as weekends, holidays, or specific time slots.
- **Time duration**: Specifying how long a user can access a resource.

How Temporal Access Control Works:

•**Time Windows**: Permissions can be granted or denied depending on whether the access request falls within a specific time window (e.g., only accessible during office hours).

•**Time-based Policies**: Time-based access policies allow administrators to define rules such as "Only allow access to sensitive data from 8 AM to 6 PM on weekdays."

Example of Temporal Access Control:

- Imagine a **Corporate Office** that has a **confidential database** containing sensitive employee information. The company wants to ensure that only **HR personnel** can access this database during **office hours** (9 AM to 5 PM) on weekdays.
- **Policy**: Only users with **HR roles** can access the database between **9 AM and 5 PM** on weekdays.
- **Example**:
  - **Alice**, an HR manager, tries to access the database at 10 AM on a **Monday**: **Access Granted** (since it's within the allowed time window).
  - **Bob**, an HR employee, tries to access the database at **6 PM** on a **Monday**: **Access Denied** (since it's after office hours).
  - **Charlie**, a non-HR employee, tries to access the database at 10 AM on a **Monday**: **Access Denied** (since Charlie doesn't have HR clearance).

Applications of Temporal Access Control:

•**Workplace Access**: Restrict access to resources such as company databases or files only during specific working hours.

•**Secure Systems**: Allow access to security-sensitive data or systems only during authorized time periods (e.g., during a shift).

•**System Maintenance**: Limit access to a system during scheduled maintenance windows, ensuring no unauthorized access during updates.

Spatio-Temporal Access Control Model

- A **Spatio-Temporal Access Control Model** adds a **location-based** dimension to the Temporal model. It combines both **time** and **space** (location) factors to enforce access policies. This means that access to resources is not only dependent on **when** access is requested (as in Temporal models) but also on **where** the user is located at the time of the request.
- In a spatio-temporal model, access permissions are granted based on:
- **Time of access** (similar to Temporal Access Control).
- **Geographical location** (e.g., based on IP addresses, GPS coordinates, or network locations).

How Spatio-Temporal Access Control Works:

- **Time and Location Conditions**: The system evaluates both the **time** and the **location** of the user making the request. If both conditions match the allowed criteria, access is granted.
- **Geofencing**: Geofencing is a technique used in spatio-temporal models, where access to a resource is allowed only if the user is within a specific **geographical area**.

Example of Spatio-Temporal Access Control:

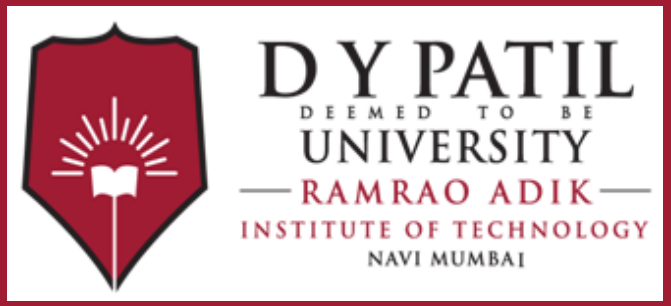
- Imagine a **corporate network** where **employee access** to sensitive resources is **restricted** based on both **time** and **location**.
- **Policy**: Only employees with a **Manager** role can access the **secure financial records** during **office hours** (9 AM to 5 PM) but only if they are **within the company's campus**.
- **Example**:
  - **Alice**, a **Manager**, tries to access the records at **10 AM** while on the **company campus**: **Access Granted** (both time and location match the policy).
  - **Bob**, a **Manager**, tries to access the records at **7 PM** while on the **company campus**: **Access Denied** (time is outside the allowed range).
  - **Charlie**, a **Manager**, tries to access the records at **10 AM**, but he is **outside the company campus** (e.g., in a different city): **Access Denied** (location is outside the allowed area).

Applications of Spatio-Temporal Access Control:

•**Physical Security**: In facilities where access to physical resources (e.g., rooms, labs) is based on both the **time** (e.g., during working hours) and the **location** (e.g., only within the building).

•**Mobile Device Security**: For apps or services that require users to be at a specific **geographical location** (e.g., access to a secure service only when a user is on company premises).

•**Government and Military**: Systems that require both time and location-based access to highly sensitive resources or data, like military bases or government intelligence systems.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Thank You