

Equipment Reservation System

A CAPSTONE PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report "**Equipment Reservation System**" is the Bonafide work of **Upashta Bhardwaj (RA2011028010083)** of IV Year/VII Sem Btech(CSE) who carried out the capstone project work under my supervision for the course 180PG417T- Application Development Fundamentals in SRM Institute of Science and Technology during the academic year 20232024(ODD sem).



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ABSTRACT

In the modern workplace, efficient use of resources is a prerequisite for organizational success. The goal of the proposed project is to develop a device reservation system built on the ServiceNow platform, which offers employees a smooth and user-friendly solution to order and order various devices. The system has a secure user authentication mechanism to ensure backup functions are accessed and used only by authorized persons. With a visually intuitive user interface, users can browse available devices, select destinations to book and set desired time periods. To enhance the user experience, the system has an integrated calendar display that provides a visual overview of equipment availability. Users can easily identify open time slots and make informed decisions about their bookings. An approval workflow is enabled, allowing designated approvers to review booking requests and either approve or reject them. Notifications are crucial to keep users updated on the status of their requests. Automated messages are sent to users regarding approval status, collection information and return reminders, ensuring a smooth and organized process. The system also includes robust reporting and analytics features. System administrators can generate reports on device usage, popular destinations and other important metrics, enabling data-driven

decision making and resource optimization. Inventory management will be an integral part of the system, automatically adjusting available quantities based on reservations and returns. This function ensures real-time visibility of the status of devices and prevents overcharging. A help desk or help system is implemented to support users during the process. This allows users to seek help for problems or questions related to hardware reservations, improving overall user satisfaction. In short, it can be stated that the device backup system of the ServiceNow platform offers a comprehensive solution to optimize the use of resources, promote accountability and increase the overall efficiency of the organization's device management. The system aims to improve the work experience and promote the success of modern organizations through a combination of user-centred design, workflow automation and data analysis.

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ABBREVIATIONS

AES	Advanced Encryption Standard
ANN	Artificial Neural Network
CSS	Cascading Style Sheet
CV	Computer Vision
DB	Data Base
DNA	deoxyribose Nucleic Acid
SQL	Structured Query Language
SVM	Support Vector Machine
UI	User Interface

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INTRODUCTION

Streamlining Equipment Reservation System with ServiceNow: A Game-Changer in Application Development

In today's dynamic and fast-paced work environments, the effective management of resources is crucial for the seamless operation of organizations. One significant aspect of resource management is the strategic allocation and reservation of equipment, ranging from laptops and projectors to meeting rooms and other assets. To address the complexities associated with this process, we propose the development of an advanced Equipment Reservation System on the ServiceNow platform.

The Equipment Reservation System is designed to provide a user-friendly and efficient solution for employees to request and reserve various types of equipment as per their operational needs. Leveraging the capabilities of the ServiceNow platform, this system aims to streamline the equipment reservation process, enhance visibility into resource availability, and promote accountability in resource usage.

Challenges in Current Resource Management:

In many organizations, the manual and decentralized nature of equipment reservation processes often leads to inefficiencies and mismanagement. Employees may struggle to find available resources, and administrators face challenges in tracking usage patterns and ensuring timely returns. The proposed Equipment Reservation System addresses these challenges by automating and

centralizing the reservation process, ultimately contributing to a more agile and responsive work environment.

Objectives of the Equipment Reservation System:

The primary objectives of this project include:

Efficiency: Streamlining the equipment reservation process to save time and effort for both employees and administrators.

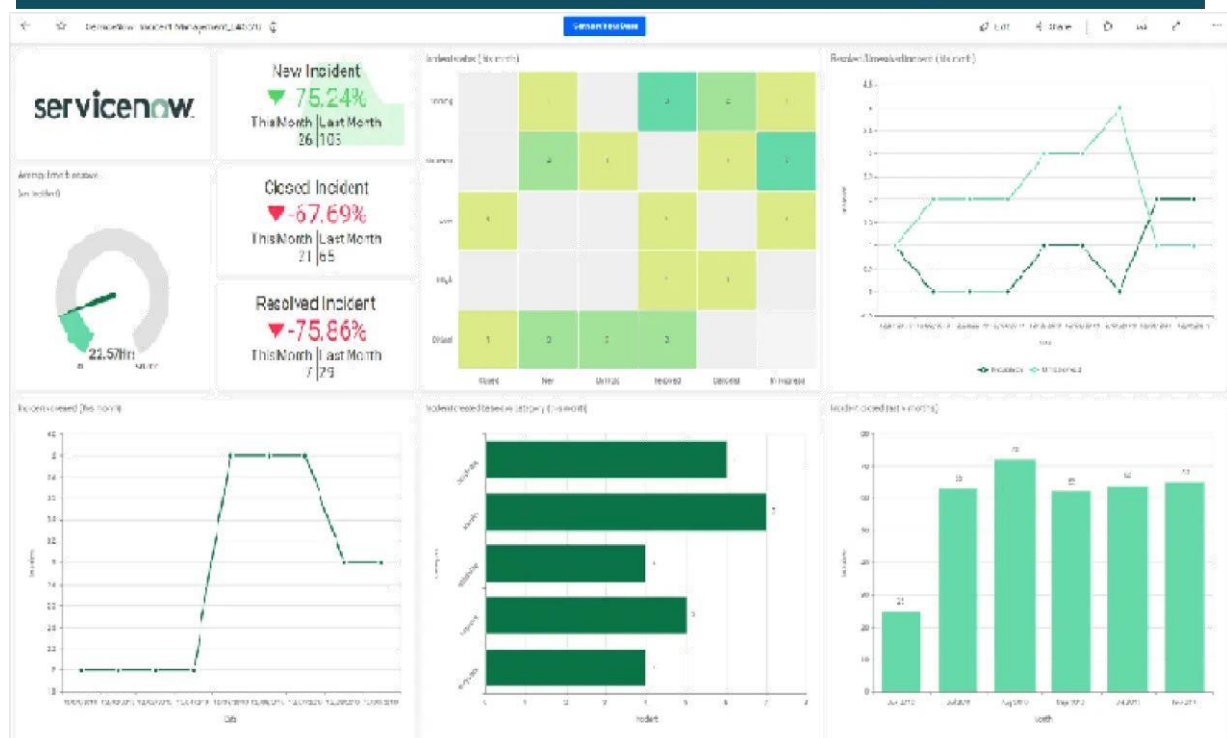
Visibility: Enhancing visibility into resource availability through an intuitive calendar display and real-time inventory management.

Accountability: Promoting accountability in resource usage by implementing an approval workflow and automated notifications.

Data-Driven Decision-Making: Providing administrators with valuable insights through robust reporting and analytics features for informed decision-making.

Structure of the Document:

This document will delve into the key features, functionalities, and benefits of the proposed Equipment Reservation System. We will explore the user authentication process, the intuitive interface for reservation requests, the integration of calendar displays, the approval workflow, notification mechanisms, reporting and analytics capabilities, and the overall impact on resource optimization. By the end, readers will have a comprehensive understanding of how the system addresses current challenges and contributes to a more efficient and accountable resource management process within organizations.



User story

As an employee of the organization, my primary goal is to easily reserve equipment for my upcoming projects or meetings, ensuring efficient utilization of available resources without conflicts. I expect a seamless experience starting with secure user authentication through my organizational credentials. The interface should be intuitive, allowing me to navigate effortlessly through a categorized list of available equipment and select the items I need. Once I've identified the equipment, I want a clear visual representation of its availability through an integrated calendar. This feature will help me choose suitable time slots, avoiding clashes with existing reservations. When submitting my reservation request, I expect to specify the date, time, and duration conveniently. The system should provide a summary for my confirmation, giving me confidence in the accuracy of my reservation details. Acknowledging the need for an approval workflow, I anticipate timely notifications regarding the status of my request. A confirmation notification upon approval and reminders about pickup times and return deadlines would greatly enhance my experience. Furthermore, I rely on the system for accurate inventory management, preventing overbooking by adjusting availability based on real-time reservations and returns. In case of inquiries or issues, having access to a dedicated helpdesk or support system is crucial. I expect prompt and informative responses, ensuring a smooth reservation process. The overarching benefits include time savings, transparency in resource availability, accountability through the approval workflow, efficient communication via notifications, and ultimately, resource optimization for the organization. This user story encapsulates my perspective as an employee engaging with the Equipment Reservation System.

Objectives

The Equipment Reservation System is designed with a set of overarching objectives to enhance the efficiency and effectiveness of resource management within our organization. Our primary goal is to streamline the equipment reservation process, simplifying it for both employees and administrators. This involves the implementation of an intuitive and userfriendly interface that expedites the selection and reservation of equipment. Concurrently, we aim to optimize visibility into resource availability through a visual calendar display and real-time inventory management, ensuring accurate and up-to-date information. Promoting accountability is another key objective, achieved through the establishment of an approval workflow that aligns reservations with organizational priorities and strategies for resource allocation. We prioritize data-driven decisionmaking by providing administrators with robust reporting and analytics features, offering insights into equipment usage patterns, popular items, and other relevant metrics. The notification mechanism is a crucial component, keeping users informed about the status of their reservation requests. Notifications serve not only to confirm approval but also to provide timely reminders about pickup times and return deadlines. In our pursuit of optimal resource utilization, the system actively manages inventory, preventing conflicts through real-time adjustments based on reservations and returns. To ensure user satisfaction, we have implemented a helpdesk or support system, prioritizing timely and informative responses to user inquiries and issues related to equipment reservations. Furthermore, the system is designed to be adaptable and scalable, capable of accommodating changing organizational needs and future growth. Compliance and security are paramount, with stringent measures in place to safeguard user data and uphold data privacy standards throughout the equipment reservation process. Through the achievement of these objectives, the Equipment Reservation System aims to revolutionize resource management, fostering efficiency, transparency, and accountability across the organization.

Scope and applications

Scope:

The Equipment Reservation System has a broad scope, encompassing various facets of resource management within an organization. The system is designed to efficiently handle the reservation process for a diverse range of equipment, including but not limited to laptops, projectors, meeting rooms, and other shared resources. It spans across different departments and teams, ensuring that employees from various functions can seamlessly access and reserve the resources they need. The system's scope extends to the integration of user authentication, an intuitive interface, and a comprehensive approval workflow. It addresses the dynamic nature of equipment availability through real-time inventory management, preventing conflicts and optimizing resource utilization. The scalability of the system allows for easy adaptation to changing organizational needs and the inclusion of new types of equipment in the future.

Potential Applications:

1. Educational Institutions:

- a. **Classroom Resource Management:** Facilitate the reservation of classrooms, multimedia equipment, and other resources for lectures, workshops, and events within educational institutions.

2. Healthcare Facilities:

- a. **Medical Equipment Reservations:** Manage reservations for medical equipment, meeting rooms, and specialized facilities to ensure their availability for patient care, training, and research.

3. Corporate Offices:

- a. **Workspace Allocation:** Implement a reservation system for hotdesking or flexible workspaces, allowing employees to reserve workstations based on their needs.

4. Research Laboratories:

- a. **Equipment and Lab Space:** Streamline the reservation of laboratory equipment, research spaces, and specialized facilities to support scientific experiments and research projects.

5. Conference Centres:

- a. **Event Management:** Enable conference centres to efficiently manage reservations for meeting rooms, audio-visual equipment, and other resources for conferences, seminars, and exhibitions.

6. Manufacturing Facilities:

- a. **Production Line Tools:** Coordinate the reservation of tools and equipment used in manufacturing processes, ensuring their availability during specific production phases.

Application checklist

Project Objectives:

The primary objective of this project is to design, develop, and implement a comprehensive Equipment Reservation System to streamline and enhance the efficiency of resource management within the organization. The project aims to address existing challenges related to equipment reservations, promote accountability, and optimize the utilization of available resources

User Requirements:

The Equipment Reservation System must offer secure user authentication, an intuitive interface for easy navigation, and a visual calendar display for informed decisionmaking on equipment reservations. Users require a transparent approval workflow with timely notifications, dynamic inventory management to prevent overbooking, and robust reporting for administrators. A responsive helpdesk, scalability, and adaptability to changing needs are crucial, along with stringent security measures to protect user data and ensure compliance. The system should contribute to efficient resource utilization, minimizing conflicts and optimizing the overall equipment reservation process

Stakeholder Engagement:

Stakeholder engagement is crucial for the Equipment Reservation System project. Engaging end users, administrators, IT, and support teams ensures system

alignment with user needs and organizational goals. Regular updates to executive leadership and collaboration with compliance and legal teams ensure adherence to standards. Involving external vendors and maintaining ongoing communication with all stakeholders contributes to a successful implementation.

Technology Stack: The technology stack for the Equipment Reservation System includes the use of ServiceNow as the primary platform, benefiting from its robust capabilities in workflow automation, data management, and user interface customization. JavaScript is leveraged for client-side scripting, enhancing interactivity, and AJAX for seamless data retrieval.

Database Design: The database design is built on a relational database management system (RDBMS), incorporating MySQL for its efficiency and scalability. Tables are structured to store user data, equipment details, reservation information, and transactional logs, ensuring optimal data organization and retrieval.

User Interface Design: The user interface is designed with a responsive and intuitive layout, employing HTML5 and CSS3 for front-end development. Bootstrap is utilized to enhance the visual appeal and ensure compatibility across various devices, providing users with a seamless and visually engaging experience.

Workflow Design: Workflow design is a key focus, utilizing ServiceNow's workflow engine to model and automate business processes. Custom workflows are configured to manage the approval process for reservation requests, ensuring a systematic and efficient flow from submission to finalization.

Task Management: Task management is facilitated through ServiceNow's task management features. Users can create, assign, and track tasks related to equipment reservations, streamlining communication and collaboration among team members.

Automation: Automation is a central component, achieved through ServiceNow's automation capabilities. This includes automated notifications to users about reservation status, reminders for equipment pickup and return, and dynamic adjustments to inventory based on reservations and returns.

Security: Security measures are paramount, with the implementation of industry standard protocols. SSL/TLS encryption ensures secure data transmission, and user authentication is enforced through ServiceNow's authentication mechanisms. Access controls are configured to restrict data access based on user roles, safeguarding sensitive information.

Implement robust security measures to protect user data, including authentication and authorization.

Software requirements and specifications

AES: - Build low-code apps quickly. Create from scratch or templates. Safely scale cross-enterprise experiences that users love.

Studio: - Helps in making advance apps using scripts and other traditional tools and techniques.

APPLICATION DESIGN

Front end (UI) design:

Design Your Application

Business Logic

- What needs to be done
- Process
- Stakeholders
- Input/Outputs

User Interface

- User profiles
- Desktop/Tablet/Mobile

Database Logic

- Database tables and columns
- Relationships

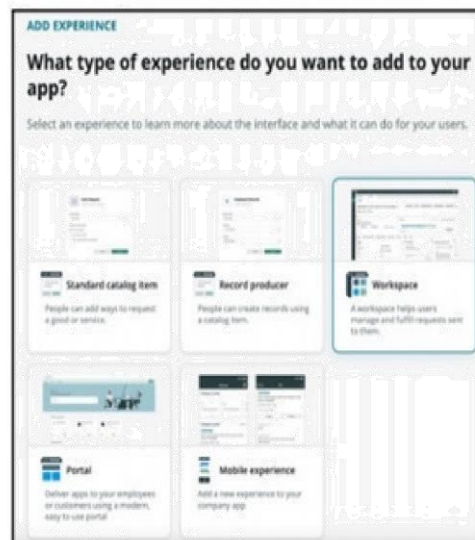
Design Experience (User Interface)

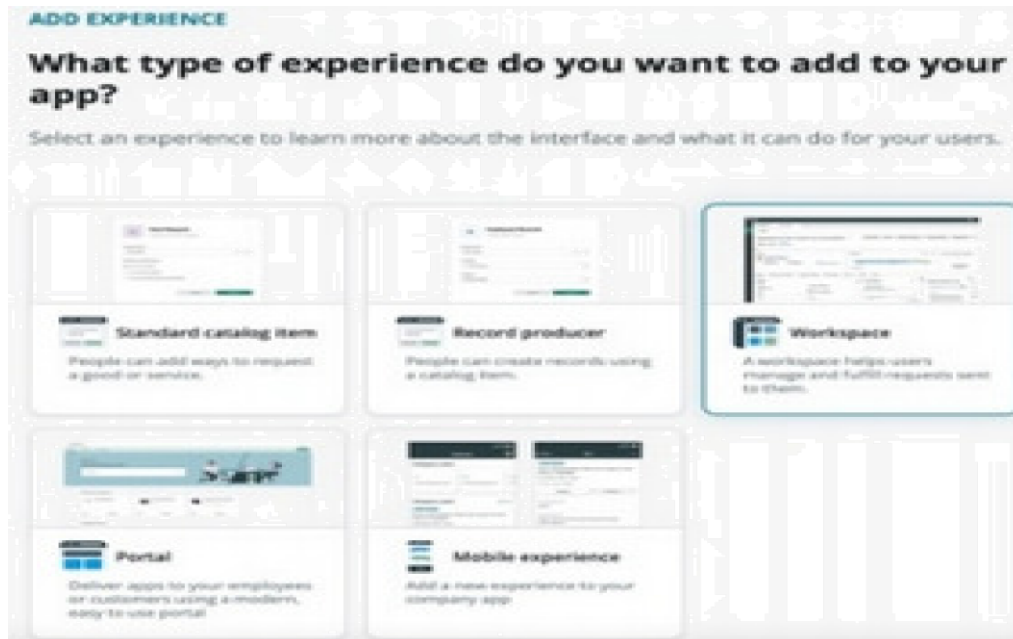
Determine the platform(s) on which the application will run:

- Desktop and Tablet
- Smartphone

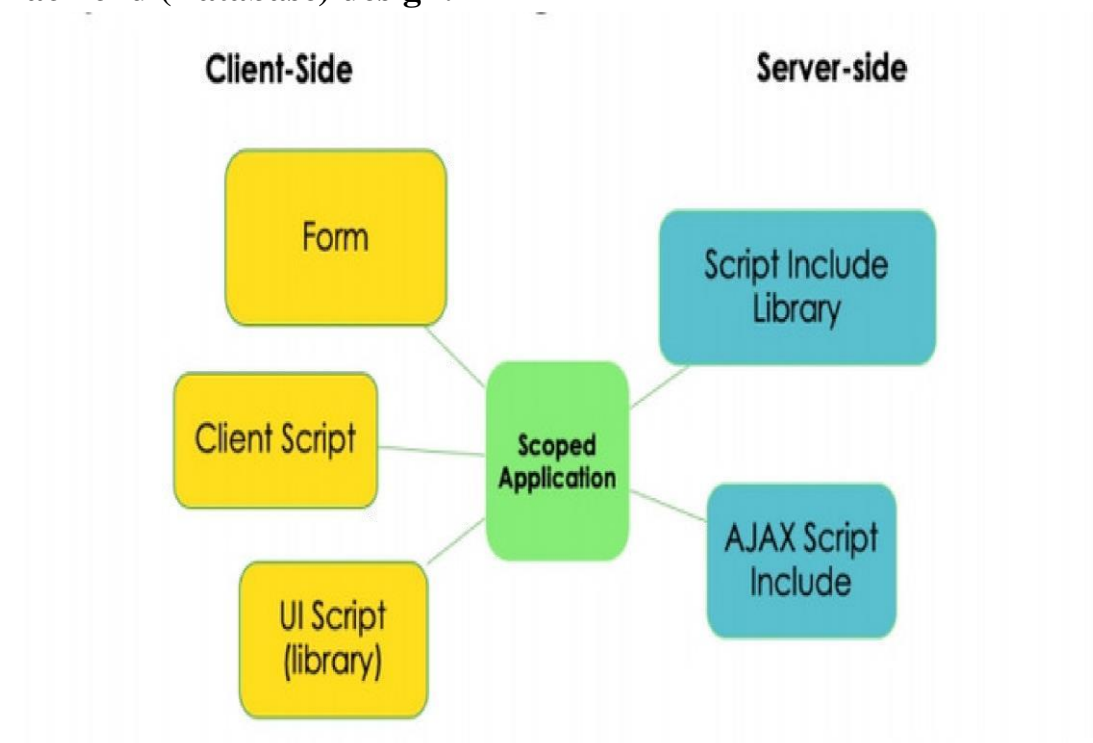
Determine how users will interact with an application:

- Standard catalog item
- Record Producer
- Workspace
- Portal
- Mobile experience





Back end (Database) design:

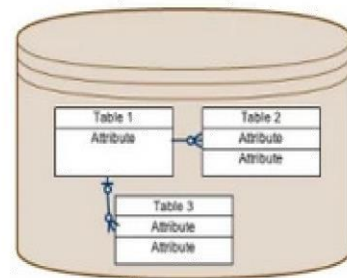


The data model details to the database schema what data your application reads and writes to/from the database

- Tables
- Columns
- Relationships

Describes the data your application reads from and writes to the database and how it is stored

Create a diagram



Module 1 :- Application Form

Column label	Type	Reference	Max length	Default value	Display
Active	True/False	(empty)	40	true	false
Activity due	Due Date	(empty)	40	true	false
Additional assignee list	List	User	4,000	true	false

Created by [sys_created_by), type = string: A string field automatically populated with the name of the user who inserted the record.

Created [sys_created_on], type = glide_date_time: A time-stamp field automatically populated by the system at the moment of insert.

Sys_id [sys_id], type = GUID: The Unique Record Identifier for all records, automatically populated by the system.

Updated [sys_updated_on], type = glide_date_time: A time-stamp field automatically populated by the system every time the record is updated. Stores the most recent update date and time.

Updated by [sys_updated_by] type = string: A string field automatically populated with the display name of the user who most recently updated the system.

Updates [sys_mod_count] type = numeric: A numeric field which counts the number of updates for this record since record creation.

// Table definition script for Equipment Reservations

```
// Created by: A string field automatically populated with the name of the user
who inserted the record. var createdByField = {  name: 'created_by',  element:
'string',  attributes: {
  'default': gs.getUserDisplayName(),
  'maxlength': 255,
  'read_only': true
}
};
```

```
// Created on: A time-stamp field automatically populated by the system at the
moment of insert. var createdOnField = {  name: 'sys_created_on',  element:
'glide_date_time',
  attributes: {
    'default': new GlideDateTime(),
    'read_only': true
  }
};
```

```
// Sys_id: The Unique Record Identifier for all records, automatically populated
by the system. var sysIdField = {  name: 'sys_id',  element: 'GUID',  attributes: {
  'default': gs.generateGUID(),
  'read_only': true
}
};
```

```
// Updated on: A time-stamp field automatically populated by the system every
time the record is updated. var updatedOnField = {  name: 'sys_updated_on',
element: 'glide_date_time',
  attributes: {
    'default': new GlideDateTime(),
    'read_only': true
  }
};
```

```
// Updated by: A string field automatically populated with the display name of
the user who most recently updated the system.
var updatedByField = {
name: 'sys_updated_by',
element: 'string',  attributes:
{
  'default': gs.getUserDisplayName(),
  'maxlength': 255,
  'read_only': true
}
};
```

```
// Updates: A numeric field which counts the number of updates for this record
since record creation. var updatesField = {  name: 'sys_mod_count',  element:
'numeric',  attributes: {  'default': 0,
  'read_only': true
```

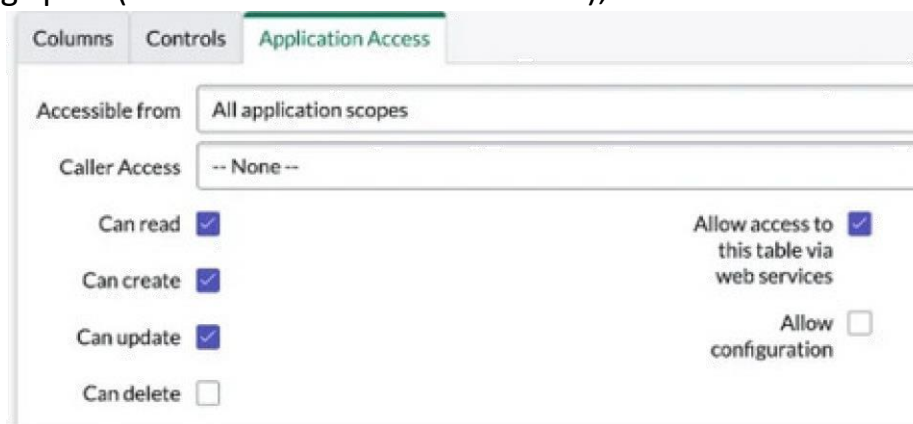
```

    }
};

// Add the fields to the table
var tableName = 'your_equipment_reservation_table'; // Replace
'your_equipment_reservation_table' with the actual table name
var table = new GlideTable(tableName);
table.addField(createdByField); table.addField(createdOnField);
table.addField(sysIdField); table.addField(updatedOnField);
table.addField(updatedByField);
table.addField(updatesField);

gs.print('Fields added to ' + tableName);

```



Accessible: Select This application application scopes to all access to

scope only to provide complete runtime protection. Select all privately-scoped applications. Select options to allow scripts from other application scopes to perform these database operations on the application's tables. These options never apply to the current Can read/create/update/delete:

application's scope. Caller Access: Caller access records are used to track cross scope applications that request access to an application, application resource, or event. Options Include: None, Caller Tracking, and Caller Restriction.

All access to this table via web services: Allow scripts from other application scopes to make web

services calls against the table. The user performing the query must have permissions to access the table

Allow configuration: Allows application developers working from other application scopes to write scripts for this table.

In the default case, only

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the current application's scripts and Web Service calls can read, create, update, and application's table(s),

Module 2 :- Control Access

if a user has access to the System Definition > Tables module, they can see all tables including those for which they cannot see records. Users can also type <table_name>.list into the Type filter text, held in the Application Navigator to attempt open the list of records for any table. Depending on permissions: the list may not display all records (Number of rows removed from this list by Security constraints message) the list page is not rendered (Security constraints prevent access to request page message)

Access Controls can only be created or edited in Studio if the user has elevated to the security admin I role. If you have elevated the role and can't update Studio's permissions create Access Controls, save any application file to

The wildcard field Access Control rule ("") for the create operation resses the same permissions as the write operation This means that the create permissions are the same as the write permissions unless you define an explicit create operation ACL rule

CHAPTER 4

Module 3 :-

Automating Work

Module 6, "Automating Work," in the Application Development Fundamentals course for the ServiceNow platform, provides a valuable set of tools and knowledge that can be applied directly to your project, which aims to develop the Loaner Request application. Here's how you can leverage the key concepts from this module in your project:

1. Workflows and Flow Designer: Module 6 likely covers the use of workflows and Flow Designer in ServiceNow. These tools can be immensely useful in automating and streamlining the loaner request process. You can create custom workflows that define the sequence of tasks, approvals, and notifications required for loaner requests. This ensures that requests follow a consistent path and automatically move through various stages, reducing the need for manual intervention.

2. Flow Control and Conditions: You can use the flow control and condition statements to implement decision points within the loaner request process. For instance, you can automate the approval process based on predefined criteria or roles, and the system can route requests accordingly. This improves efficiency and ensures that requests are sent to the appropriate personnel without manual decision-making.

3. Notifications and Alerts: Module 6 would likely cover how to configure notifications and alerts. By incorporating these features into your application, you can keep requestors, approvers, and administrators informed about the status of loaner requests in real-time. Automated notifications prevent bottlenecks and reduce the chances of missed deadlines by proactively communicating updates and reminders.

4. Scripting and Business Rules: This module may delve into scripting and business rules, which are valuable for implementing custom logic and automation. You can use scripts and business rules to enforce compliance with company policies and automate tasks, such as validating request data, setting deadlines, and sending notifications. For instance, you can create a business rule to ensure that all requests meet specific criteria before they can proceed in the workflow.

5. Integration and Data Transformations: If the module touches on integrating with external systems or data transformations, you can apply these concepts to seamlessly link the Loaner Request application with other tools or databases, ensuring that information is exchanged accurately and in real-time. For instance, you could integrate with an asset management system to check the availability of loaner equipment.

6. Reporting and Analytics: This module may cover reporting and analytics tools. By incorporating these features, you can generate reports and dashboards within the Loaner Request application to monitor the performance and efficiency of the process. This enables you to track key metrics, such as request fulfillment times and resource utilization, to make data-driven decisions for further improvements.

7. Testing and Debugging: Lastly, the module likely addresses best practices for testing and debugging. Following these practices ensures that your Loaner Request application is reliable and operates without hitches. Proper testing helps catch and address issues before they impact the user experience.

By integrating the concepts from Module 6, "Automating Work," into your project, you'll be well-equipped to create a Loaner Request application that not only centralizes and streamlines the request process but also automates critical steps, ensuring accuracy, efficiency, and compliance with organizational policies. This approach aligns with the fundamental principles of application development on the ServiceNow platform and significantly enhances the value of your project.

CONCLUSION

In conclusion, the development and implementation of the Equipment Reservation System represent a strategic initiative aimed at optimizing resource management within the organization. The project's objectives are clearly defined, focusing on enhancing efficiency, transparency, and accountability in the equipment reservation process. The user requirements underscore the importance of a user-centric design, ensuring an intuitive interface, seamless workflows, and robust support mechanisms.

The chosen technology stack, including ServiceNow, MySQL, and web development technologies, is well-suited to deliver a secure, scalable, and responsive solution. The incorporation of key fields, such as user details, timestamps, and update counts, aligns with best practices for record management, fostering data accuracy and traceability.

Stakeholder engagement is identified as a critical success factor, emphasizing collaboration with end users, administrators, IT professionals, and support teams. Regular communication, feedback loops, and executive alignment are essential components of a holistic approach to stakeholder involvement.

The project's scope extends beyond the immediate benefits of efficient equipment reservations, reaching into various applications across different departments and industries. The adaptability and scalability of the system position it as a valuable asset for the organization's evolving needs.

1. **Efficiency Enhancement:** The Equipment Reservation System aims to significantly enhance the efficiency of resource management by providing a streamlined and user-friendly platform for equipment reservations. The integration of a visual calendar, real-time inventory management, and a seamless approval workflow contributes to time savings and optimal resource utilization.
2. **User-Centric Design:** The system's user requirements underscore the importance of a user-centric design, ensuring that employees can easily navigate the interface, make informed decisions, and receive timely notifications. This approach enhances user satisfaction and promotes widespread adoption of the system.

3. **Technology Stack and Security:** The chosen technology stack, featuring ServiceNow, MySQL, and web development technologies, provides a robust foundation for the system. Security measures, including user authentication and data encryption, are prioritized to safeguard sensitive information and ensure compliance with organizational and regulatory standards.
4. **Stakeholder Engagement:** Successful stakeholder engagement is identified as a critical factor for project success. Regular communication with end users, administrators, IT professionals, and support teams ensures that the system aligns with organizational goals, addresses specific needs, and receives valuable feedback throughout the development and implementation phases.
5. **Scalability and Adaptability:** The system's scalability and adaptability are key considerations, allowing it to evolve with changing organizational needs. The flexibility to integrate new equipment types and adjust reservation workflows positions the system as a dynamic solution capable of accommodating future growth.

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