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Cybersecurity Maturity Assessment Integrating Identity and Access Management into Zero Trust Model

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ABSTRACT

In an era marked by escalating cyber threats and increasingly sophisticated attack vectors, traditional perimeter-based security models are proving inadequate. The Zero Trust Model (ZTM) has emerged as a robust security paradigm, asserting that trust should never be implicit, even within the network perimeter. Instead, every access request should be rigorously authenticated, authorized, and encrypted. This thesis presents a comprehensive framework for integrating Identity and Access Management (IAM) into the Zero Trust Model to enhance cybersecurity maturity. The framework aims to address the critical challenges of modern cybersecurity by providing a systematic approach to identity verification and access control.

The research begins with a thorough literature review on the principles of Zero Trust Architecture (ZTA) and the foundational elements of IAM. It then explores the development of a cybersecurity maturity model that incorporates these principles, providing organizations with a roadmap to assess and enhance their security posture. Key components of the proposed model include continuous authentication, least privilege access, and the use of advanced analytics for threat detection and response

Keywords: Cybersecurity, Maturity Assessment, Identity and Access Management (IAM), Zero Trust Model

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Introduction

1.1 Background

- Explain the current state of cybersecurity and the need for robust maturity assessment.

1.2 Motivation

- Describe the reasons for integrating IAM into the Zero Trust Model.

1.3 Objectives

- Outline the main goals of the research.

Literature Review

2.1 Cybersecurity Maturity Models

- Discuss various maturity models such as CMMI, NIST CSF, etc.

2.2 Identity and Access Management (IAM)
- Define IAM, its components, and its importance in cybersecurity.

2.3 Zero Trust Model
- Explain the Zero Trust principles and architecture.

2.4 Existing Integrations
- Review past attempts and research on integrating IAM with Zero Trust.

Methodology

3.1 Research Design
- Describe the overall research approach and design.

3.2 Tools and Technologies
- List and describe the tools and technologies used in the study (e.g., IAM solutions, Zero Trust frameworks).

3.3 Data Collection
- Explain how data was collected for the study (e.g., case studies, surveys, experiments).

3.4 Data Analysis
- Describe the methods used for data analysis.

Cybersecurity Maturity Models

4.1 Overview of Models
- Provide an overview of selected cybersecurity maturity models.

4.2 Metrics and Criteria
- Discuss the metrics and criteria used in these models.

4.3 Comparison of Models
- Compare the selected models and their applicability to IAM and Zero Trust.

Identity and Access Management (IAM)

5.1 Components of IAM
- Detail the components of IAM (e.g., authentication, authorization, user management).

5.2 Role in Cybersecurity
- Explain the role of IAM in enhancing cybersecurity.

5.3 Trends and Challenges
- Discuss current trends and challenges in IAM.

Zero Trust Model

6.1 Principles of Zero Trust
- Explain the core principles of the Zero Trust Model (e.g., least privilege, continuous verification).

6.2 Zero Trust Architecture
- Describe the architecture of a Zero Trust network.

6.3 Benefits and Challenges
- Discuss the benefits and challenges of implementing the Zero Trust Model.

Integrating IAM into Zero Trust Model

7.1 Proposed Framework
- Present the framework for integrating IAM into Zero Trust.

7.2 Integration Steps
- Detail the steps involved in the integration process.

7.3 Benefits of Integration
- Explain the benefits of this integration for cybersecurity.

7.4 Potential Challenges and Solutions
- Discuss potential challenges and proposed solutions.

Case Studies/Experiments

8.1 Description of Case Studies
- Provide a detailed description of the case studies or experiments conducted.

8.2 Application of Framework
- Explain how the proposed framework was applied in the case studies.

8.3 Results and Analysis
- Present the results and analysis of the case studies.

Cybersecurity Maturity Assessment

9.1 Assessment Process
- Describe the process used for assessing cybersecurity maturity.

9.2 Metrics and Tools
- List the metrics and tools used in the assessment.

9.3 Analysis of Results
- Analyze the results of the maturity assessment.

Discussion

10.1 Interpretation of Findings
- Interpret the findings of the research.

10.2 Comparison with Existing Studies
- Compare the findings with existing research.

10.3 Implications for Theory and Practice
- Discuss the implications for theory and practice.

10.4 Limitations of the Study
- Outline the limitations of the study.

Conclusion

11.1 Summary of Research
- Summarize the research conducted.

11.2 Key Contributions and Findings
- Highlight the key contributions and findings.

11.3 Future Research Directions
- Suggest directions for future research.

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