

Bachelor Thesis

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# From Security by Obscurity to Imminent Exposure:

Security Risks for IoT Devices in the IPv6  
Transition

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**University of  
Zurich<sup>UZH</sup>**



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## **Abstract**



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# 1. Introduction

*This thesis explores how global IPv6 addressing increases the attack surface of the Internet of Things (IoT) environment. The study combines not only a comprehensive literature review but also an empirical assessment of default system configurations through controlled laboratory demonstrations, highlighting how the adoption of new network standards can potentially affect the security of millions of end devices.*

## 1.1 Motivation: The IPv4 to IPv6 Transition

## 1.2 Problem Statement: Loss of NAT and IoT Exposure

## 1.3 Research Objectives & Questions

## 1.4 Contributions

## 1.5 Thesis Structure



## **2. Background and Related Work**

2.1 IPv6 Architecture vs. IPv4

2.2 The IoT Security Landscape

2.3 Network Perimeter Security

2.4 Related Work



## **3. Methodology**

3.1 Research Design

3.2 Experimental Setup

3.3 Ethical Considerations



## **4. Configuration and Risk Analysis**

4.1 Default Router Configurations

4.2 IPv6 Attack Vectors



## **5. Experimental Demonstration**

5.1 Scenario: Global Accessibility of an IoT Device

5.2 Scanning and Enumeration Results

5.3 Vulnerability Exploitation



## **6. Mitigation Strategies**

6.1 Recommendations for Network Administrators

6.2 Recommendations for Manufacturers

6.3 End-User Best Practices



## **7. Discussion and Limitations**

7.1 Interpretation of Results

7.2 Limitations

7.3 Threats to Validity



## **8. Conclusion and Future Work**



## **A. First Appendix**



## **B. Second Appendix**

