



Location proofs for secure smart spaces

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Motivation

- Location-aware applications deliver value based on a reported location
- They grant benefits to users, who feel tempted to lie about their location
- Proof of location mechanisms address this issue

Motivation

- SureThing provides location proofs, using witnesses that testify to the presence of a user
- In smart environments, smart devices work together to deliver context-aware services
- Proof of location mechanisms do not cover use cases in smart environments

Objectives

- Adapt SureThing to provide location proofs in smart environments
- Resort to a smart space orchestrator to discover, configure, and control smart devices
- Prototype our solution in a hospital scenario, to improve the overall quality of the cleaning process

Related Work

- The Internet of Things paradigm
 - Heterogeneous devices that share context information in real-time
- Indoor localization overview
 - State-of-the-art techniques and technologies, and disruptive systems
- Proof of location systems (Crepuscolo, APPLAUS, and SureThing)
 - How they manage to build proofs with strong security properties
- Smart space orchestration (DS2OS)
 - Challenges and solutions

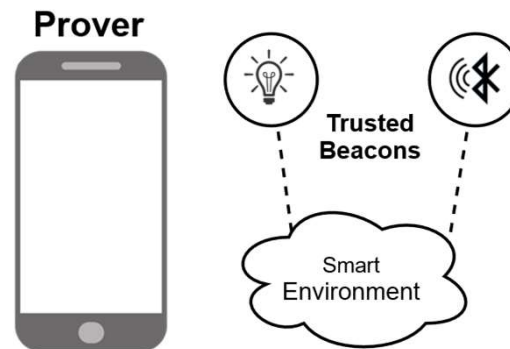
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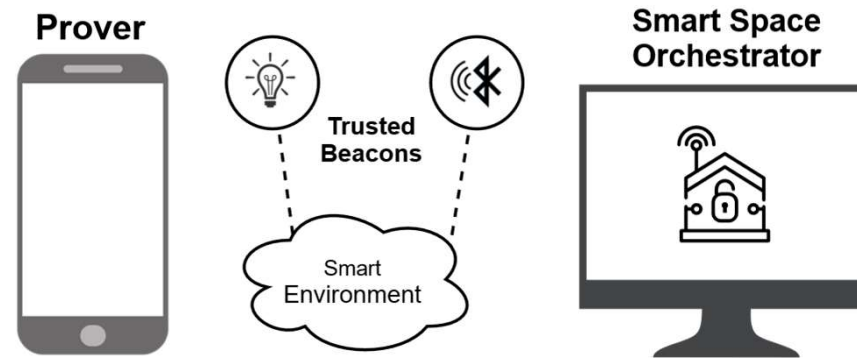
Solution Architecture



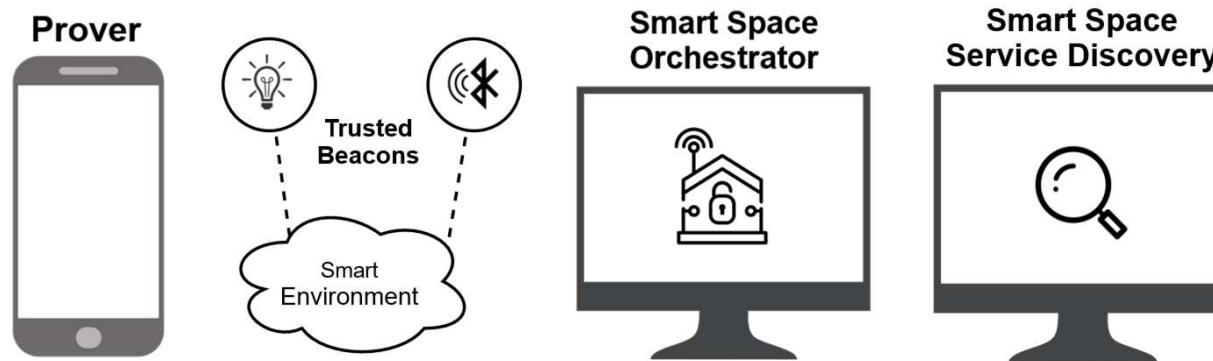
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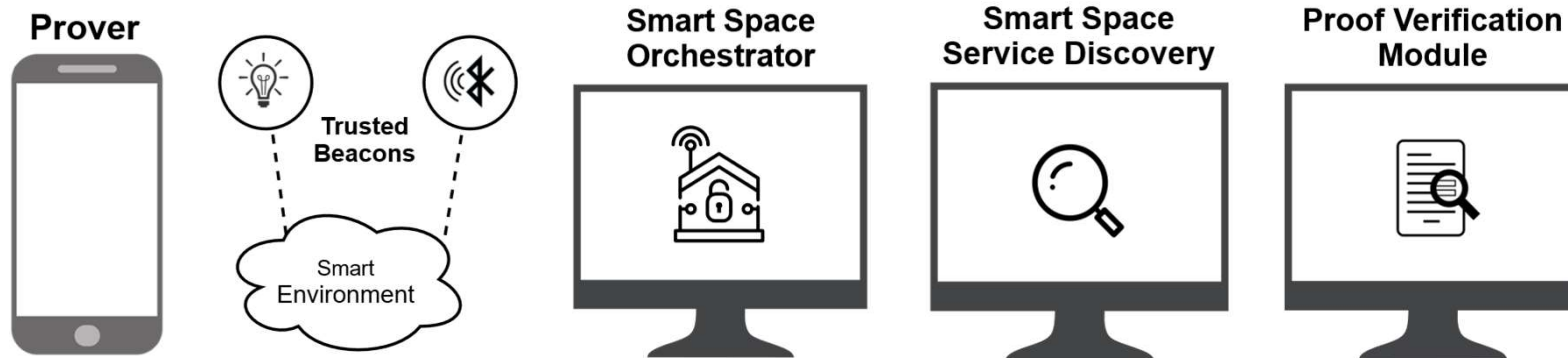
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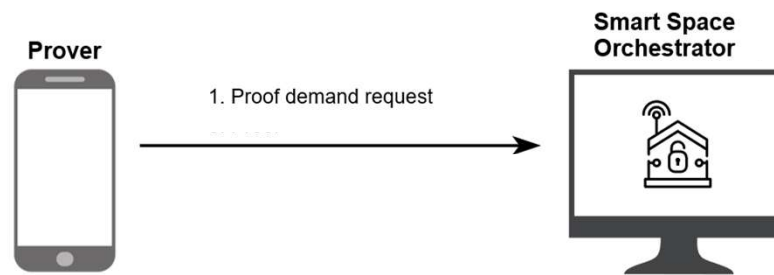
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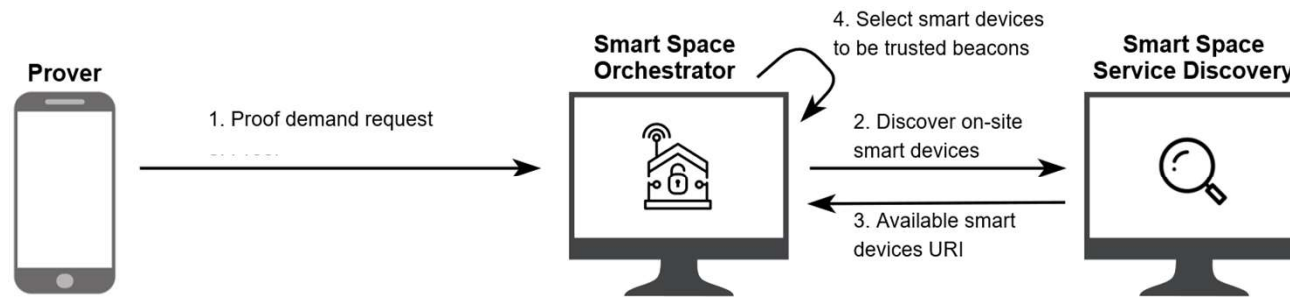
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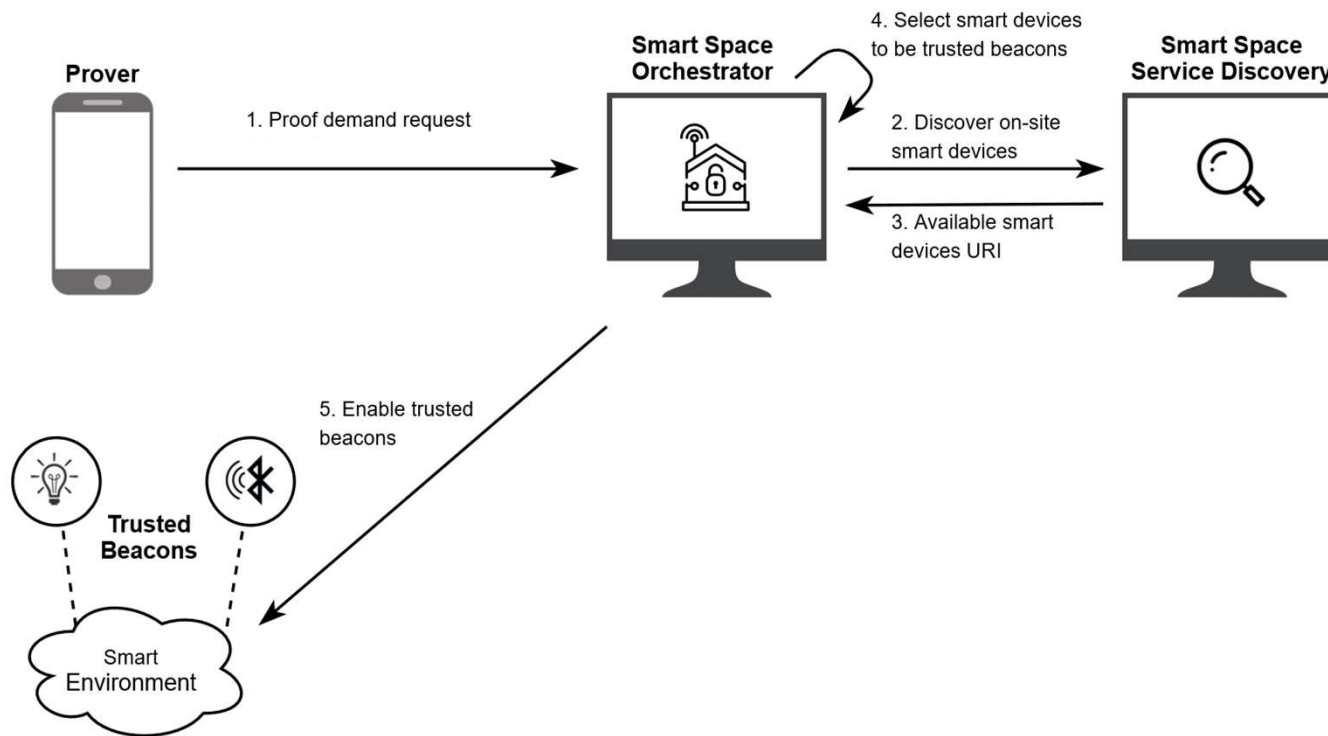
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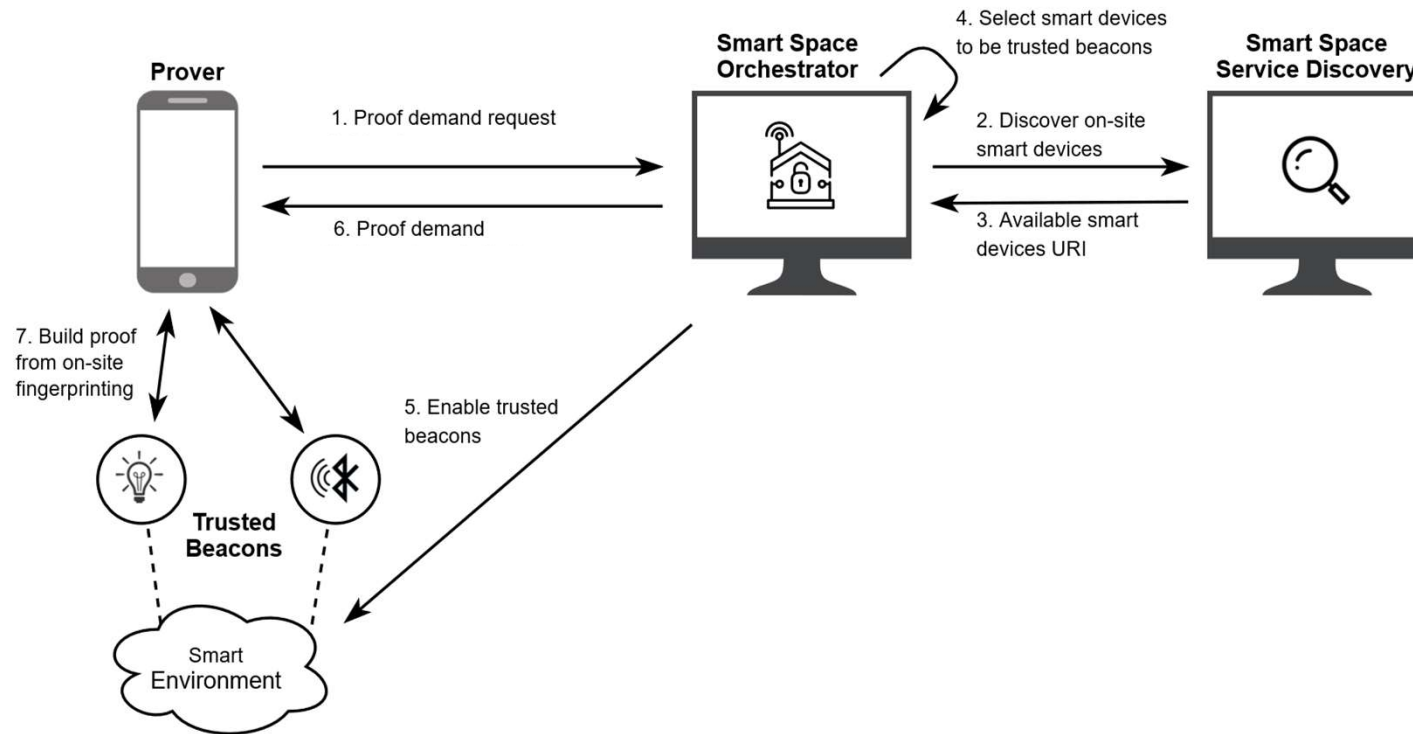
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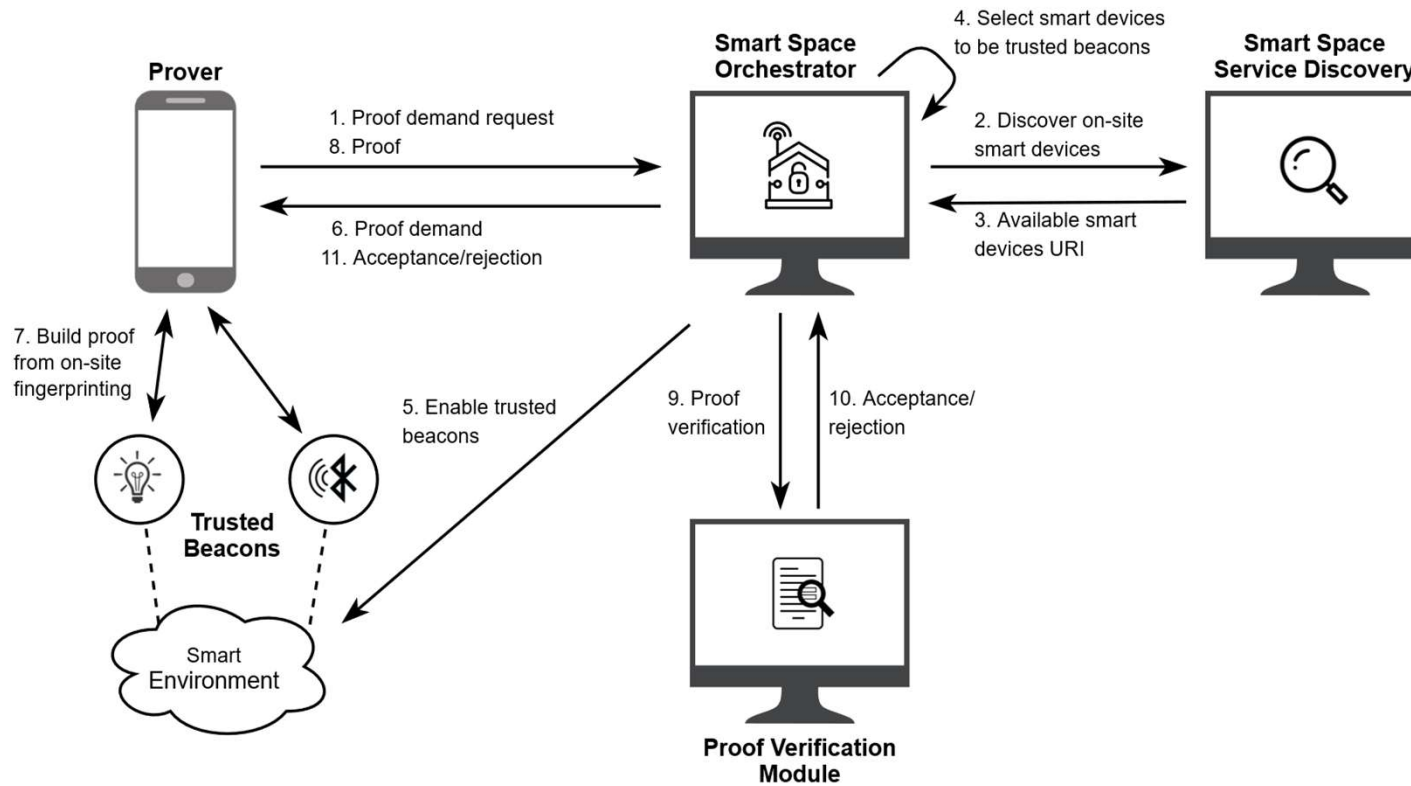
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- Availability
 - Avoid extra hardware on the user end
- Deployment cost
 - Take advantage of existing smart infrastructures
- Energy efficiency
 - Balance between energy consumption and fingerprint accuracy

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Conclusion

- Proof of location systems are a less costly solution to certify a user to a geographical location
- Smart environments deliver valuable context-aware services to the user, with booming app economies for smart spaces
- Our approach:
 - Improve SureThing
 - Leverage instrumented smart devices as trusted beacons
 - Use a smart space management framework to discover, configure and control them



Thank you!