

**AUTHENTICATION AND DEVICE DISCOVERY
AS A SERVICE FOR DEVELOPING LIQUID
SOFTWARE APPLICATIONS**

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Degree of Master of Science in Computer Science

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Thesis submitted in partial fulfillment of the requirements for the Degree of MSc in
Computer Science specializing in Software Architecture

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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgment to any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgment is made in the text.

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The above candidate has carried out research for the Masters thesis under my supervision.

Name of the Supervisor: Dr. Indika Perera

Signature of the Supervisor

Date

ABSTRACT

In this era where an average person consumes at least two computing devices, the applications that are developed for these devices should have the transformability among them. It not only ensures the users are not interrupted when switching between devices but also allows them to use the power of computing whenever, wherever. These kinds of applications with maximum transformability among computing devices are known by the term “Liquid Software”. Even though this concept of Liquid Software can be identified as a subsection of ubiquitous computing, it can prevail alone, whereas it is not the case for ubiquitous computing which cannot exist without liquid software. There are many architectural concerns that need to be addressed when developing liquid software applications. Application security and device discovery are two of the main architectural concerns of liquid software. Ensuring security while also maintaining liquidity in applications is a challenging task. In the application level granularity, device discovery when combined with proper authentication could provide a secure liquid experience to the users. But developing solutions while also addressing these concerns would require considerable amount of design and development effort. This research introduces a service model that could provide out-of-the-box authentication and device discovery features to assist development of liquid software applications. The authentication mechanism presented through this service model is mainly based on an authentication server and is also capable of providing service level security. The device discovery mechanism of the proposed service model is based on QR codes which could be controlled at the application level in order to be integrated with the authentication mechanism while hiding the complexity of device registration. The proposed Authentication and Device Discovery as a Service model could be either consumed by web applications to adhere to liquid concepts or extended by development teams in order to plug in their own services.

Keywords: liquid software, ubiquitous computing, device discovery, multiple device ownership

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