Fuchsia OS - A Threat to Android

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Abstract-Fuchsia is a fairly new Operating System whose development was started back in 2016.

Android supports various types of devices which is having different types of screen size, Architecture, etc. But problem is that whenever google releases new updates due to a large variety of devices lots of devices doesn't receive updates that are the main issue with android.

This review is about fuchsia and its current Status and how is it different from the Android operating system.

***Keywords*:** Internet Of Things(IOT), Operating System (OS), Microkernel, Little Kernel, Software Development Kit (SDK), GitHub

I INTRODUCTION

Fuchsia is an open source Hybrid Real-time Operating System which is under development.

Prior to Fuchsia we already had android OS which is used in almost all kinds of devices. Android development was started in 2003 by android inc later on google purchased them in 2005. Android's first beta version was released in 2007 by Google and OHA, and then it was officially accepted by the most of the companies which were in Open Handset Alliance [1]. But android wasn't dedicatedly developed for IOT, so Google came up with an idea to develop an Operating system for Internet of Things devices.

In 2016 Google was uploading some of the documentation[2] on the GitHub and at that time and no-one was aware of this new operating system after some time google further uploaded some of the other documents and made it clear that it is a new OS and its main focus is on IOT devices. Fuchsia runs on modern 64-bit Intel and ARM processors[1].

Purpose of development (Fuchsia)

Fuchsia is an Open source Operating System Optimised and developed in a way that it supports both personal computers as well as low power running devices, particularly IOT devices.

Initially, Android was developed for cameras and then it is extended to other electronic devices, developing apps for these devices are still a complex task because of compatibility issues of native devices.

Android operating system supports various types of devices such as android wear devices, auto cars, tablets, smart phones, etc. so to develop an android app for all these devices is a very tedious task.

The Major problem with android is, not all the devices receive updates on time.

Fuchsia is developed to overcome these problems, with fuchsia we can develop apps for all these devices and they can be implemented flawlessly.

A. Architecture of Fuchsia

Fuchsia uses Microkernel which is an evolution of little kernel (LK) named as Zircon. Zircon is a much segmented model and designed for smaller electronic devices, this is what makes Zircon different from Android's Linux kernel [3]. The biggest problem with Android Operating System its fragmentation, there are nearly 840 million versions of android are available which makes it complex for developers to decide the targeted versions.

B. Languages supported in Fuchsia for software development

It supports almost all modern and trending languages like Swift, C++, Go, Rust, python, which might attract lots of developers on the environment.

C. Technologies Recommended by Fuchsia for Software Development

Flutter is Google's mobile UI framework for crafting high-quality native experiences on iOS and Android in record time[4].

It has lots of amazing features such as:

- **Fast Development:** Due to hot reload we can develop apps faster[4].
- **Expressive UI:** Flutter has built-in Material Design Widgets, rich API, Smooth natural scrolling and platform awareness[4].
- **Native Performance:** Flutter's widgets incorporate all critical platform differences such as scrolling, navigation, icons and fonts to provide full native performance on both iOS and Android[4].

DART [5](recommended programming language for developing application based on fuchsia): an open-source project that aims to enable developers to build more complex, highly performant apps for the modern web.

Using the Dart language, you can quickly write prototypes that evolve rapidly, and you also have access to advanced tools, reliable libraries, and good software engineering techniques. Meanwhile, dart is also receiving a little criticism for being a modern language that doesn't handle **Null references.**

II CURRENT STATUS OF FUCHSIA OS

Fuchsia is still under development and may take few more years for being operational. Fuchsia is not google's 20% project. Armadillo was the first renderer engine of fuchsia but now it has been replaced by Escher which is Vulkan based rendering engine. Escher provides faster graphics rendering.

Google has released Fuchsia SDK and anyone can download and execute it.

Currently, Google is using **HonorPlay**[6] to demonstrate the very first look of Fuchsia, and a web Interface demo[7] by **Manuel Goulão**[8]which has attracted the audiences due to the spectacular User Interface.

A. Scope

Fuchsia is an operating system which is primarily built to support Internet Of Things devices and Internet Of Things is a booming industry, more and more devices are connected with each other but we currently don't have any operating system so Fuchsia definitely have huge scope in near future.

Fuchsia uses Flutter Software development kit which is used to create native appsso developers can develop fuchsia apps android apps and ios apps via using single code base which is kind of amazing thing because nowadays we have to write codes for different platforms individually, so fuchsia has huge scope when it comes to native software development for different devices within same software development kit using Common language for all.

B. Fuchsia: A threat to android?

As observed above that android's architecture has some issues with compatibility with smaller devices.

It is observed on the basis of Google docs regarding the Fuchsia OS code[9] that Android apps will run on Fuchsia too. But regarding this, there is no official statement has been made by Google that Fuchsia will completely make Android obsolete.

Google wants to peg Fuchsia as a unifying OS, the single operating system, the company had been mulling since 2015. But at this point, it is just a kernel – the core of an operating system.

C. Fuchsia's effect on Windows

Implementation of fuchsia seems a nice strategy to catch up with Microsoft's Windows 10 IoT Enterprise [10]. However, Microsoft has sheer dominance in Desktop oriented Operating system. And Fuchsia's Target is to dominate smaller devices like Phones and Tablets.

Microsoft is also working on similar projects to create a new unified mobile platform, for example, the Universal Windows Platform and Continuum, this basically enable the apps to resize and formulate the interface for different screen sizes and orientations. Fuchsia's objective is also something similar to handle portability based on different requirements. If Google successfully develops a new OS, the market could definitely shift, experts indicate. When Microsoft Windows Mobile failed to take off, they left the field open for Google and Apple.

III OBSERVATION

Fuchsia is designed to have the ability to scale up from small devices like watches, mini cameras to larger devices like laptops and computers.

The recommended language by google for fuchsia i.e. DART is highly preferred for prototyping but can

also receive little criticism for being a modern language that doesn't handle **Null references**[11].

Dart in reference with billion dollar mistake (Null References)

Dart being a modern language is missing null able types. That might kill it as a modern language, and do not solves the Billion Dollar Mistake[12] referred by Tony Hoare[13](British Computer Scientist - inventor of quick sort), null references historically do not have positive references If the billion dollar mistake was the null pointer, the C gets function is a multi-billion dollar mistake that created the opportunity for malware and viruses to infiltrate[11]. This mistake was recovered in many modern language like Kotlin, C# etc.

IV CONCLUSION

It is intended that fuchsia will run on everything from phones and laptops to IoT devices and more.
Fuchsia is going to accomplish much of what Microsoft and Apple already have in Windows 10 and iOS-to-macOS Sierra Continuity, respectively, but in a very Google way.

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