

GREYOS

ALL ABOUT

Version 1.0

PROBOTEK

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GreyOS is a new kind of OS, a Meta-OS.

GreyOS introduces a new era of unlimited possibilities
with the concept of Cloud Computer (CC).

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The power of the cloud

Ultra-power users and most gamers have joined the debate with compelling arguments.

Some users may inquire, *"How can I effectively utilize my professional sound card or enjoy playing my beloved high-end games on a web browser?"*

In addressing this query, it is crucial to acknowledge that many individuals may not be familiar with the utilization of computing farms in research centers or AI computer farms. Furthermore, they may not have been acquainted with live streaming platforms like Live24 or Google Stadia, which employ high-speed servers equipped with NVIDIA graphics cards to facilitate game execution.

All these examples run the demanding processes on the specialized hardware and transmit the results via a connection back to you. Therefore, yes, gamers, you may be able to play games on a browser. All that is available is the rendered image (the game frames) displayed on your screen or even your smart TV.

Cloud computer era

This brings us back to the question of *"What if an account is all you need?"* or, to be more specific, *"What if you only need a Cloud Computer?"*.

At this point, you may begin to realize that owning a physical device, which is commonly referred to as a personal computer, is unintuitive and unnecessary.

This is where the narrative of GreyOS originates.



Introduction

Information is ubiquitous and has always been so. It has taken thousands of years for humans to comprehend the importance of information and, eventually, to devise ways to access its potential.

In our modern age, we rely on a variety of computing and operating systems, as well as millions of software programs, smartphones, tablets, and other peripheral devices that absorb, process, and generate new information.

Furthermore, we have access to information at an unprecedented rate and speed through fibre Ethernet connections, A/V DSL lines, Wi-Fi networks, 4G and 5G GSM networks, and more.

At the same time, we have a powerful tool in our hands, the Internet, which has enabled us to connect all of the world's knowledge and leverage multiple sources, enabling us to bring people together and achieve results in a fraction of the time it would normally take!

Personal computer, a concept of the past century

However, no matter how we perceive computers and information, our idea of the personal computer hasn't changed much. We all think of some sort of physical device when we talk about a PC, and that's fine. But is it really necessary?

What if, in the era of the Internet and the cloud, you don't need a personal computer anymore?

What if all you need is an account? Think about that for a second. You use hundreds of applications and services on the Internet every day, right? Do you really need a specific device to do that? The answer is certainly "No"!

My point is that you don't need a specific device when you watch videos, use Google Docs, access Facebook, and so on. Practically speaking, you don't even need a very powerful computer or smart device. What you need is just a terminal with a screen, possibly a keyboard and a mouse (if not a touchscreen), and access to the Internet.

So, with a fast enough Internet connection and an ordinary device with a web browser, you literally have access to all your data and can run things remotely. In other words, in the cloud!

The story behind GreyOS

For nearly ten years, I have been working on an open source, desktop-based interface that is unlike anything I have seen before. However, I did not want to simply create a web desktop; I wanted a comprehensive web-based ecosystem of applications and

tools that I could access from my laptop or any other device.

To achieve this, I needed to create a system or a platform that replicated the core functionality of a traditional operating system, but on a cloud platform. At the time, the concept of a "Web OS", as I referred to it, was still a dream and difficult to implement.

Consequently, I searched the internet and conducted research, but found nothing that was promising or even close to the desired outcome. To be more precise, I found only a handful of platforms that presented desktop environments in a graphical form, with no real applications, no interaction between them, no APIs,¹ and no backend.

I was looking for something "alive" that could interact with integrated web applications and exist in a completely new ecosystem. It was at this point that I began to realize the potential of an entire operating system on the cloud. Then the name GreyOS came to mind. It was a name that sounded professional, robust, and stable, not too heavy or flashy.

GreyOS

GreyOS, is the world's first cloud-based operating system (OS).

It effectively mimics a traditional OS while also leveraging the capabilities of well-established and thoroughly vetted operating systems (OS) in the cloud.

This unique approach distinguishes GreyOS as a Meta-OS, setting it apart from traditional operating systems. Moreover, GreyOS offers a cloud-based interface that faithfully reproduces the features and functionalities of a personal computer. As a result, it transforms the concept of a physical computer into a cloud computer (CC)².

GreyOS is a distributed, N-tier architecture, zero-failure operating system that consists of an in-browser suite of services and apps, as well as a remote platform that uses a cloud-based microkernel architecture.

The microkernel³ and peripheral software resides on a cluster of virtual machines (VM)⁴ running specialized Linux. To achieve optimal security and availability, the core infrastructure is protected by firewalls, loadbalancers, and a proposed robust cloud infrastructure, which is AWS (Amazon Web Services).

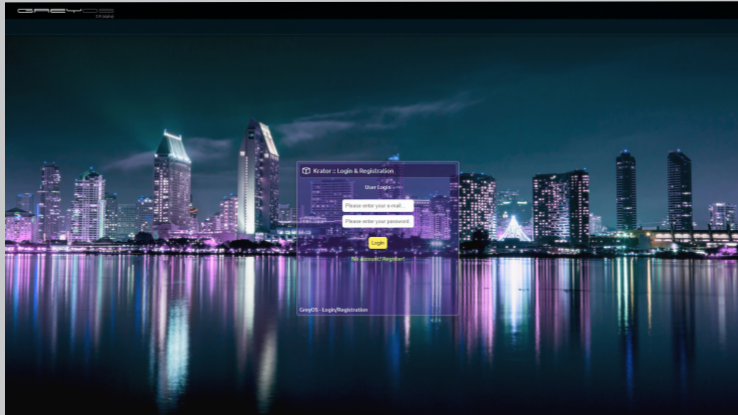
All services and provided applications are run on either their own CDN, (Content Delivery Network)⁵ or their own cluster, either AWS, Oracle, Azure, Google, IBM or another cloud or server, and are accessible from anywhere.

George Delaportas
CEO & Co-founder
PROBOTEK

GreyOS, the first Meta-OS

GreyOS, the first Meta-OS, stands apart from conventional operating systems due to its unique characteristics. However, it falls under the category of an operating system in the field of computer science, as per its definition.

GreyOS operates on a microkernel architecture⁶, where the microkernel space solely handles essential systems. The majority of tasks are efficiently executed in the user space as and when required.



GreyOS' kernel is called "CHAOS".

CHAOS does not perform any operations on the cloud and has minimal interactions with the browser. The "CHAOS" microkernel can be utilized in multiple instances to carry out non-blocking operations under heavy load, such as accommodating 1,000,000 concurrent users on a single VM. Additionally, CHAOS kernel instances can operate independently on bare hardware or on a separate VM to handle significantly larger loads, for instance, supporting 100,000,000 parallel users.

Similar to a traditional microkernel, CHAOS provides (only cloud interactive):

- Computing resources management
 - CPU management (Scheduling of processes/tasks on the cloud)
 - RAM management (Allocation of memory on the cloud)
 - Clustering (Dynamic use of cloud machine)
- Virtual file system management that unifies cloud space GreyOS offers complete user space facilities (only browser interactive):
- IPC (Inter-Process Communication) / IMC (Inter-Model Communication) in GreyOS

- Hardware Abstraction Layer (HAL)¹¹ on top of the browser VM

There is also a complete toolset for the development of apps (both cloud/browser interactive):

- A core API to build applications and interact with the OS

- Multi-threading & parallel programming framework

User space - system applications/services (both cloud/browser interactive):

- Registry
- Task manager
- Window manager
- Multimedia manager
- Search
- Clock
- Other

It is important to keep in mind that GreyOS operates solely on the cloud and does not interact with any user hardware devices. The concept of hardware is irrelevant to a Meta-OS. Instead, GreyOS utilizes the browser as its execution interface, whether it be through a browser VM or browser sandbox. Consequently, in order to utilize GreyOS, the user must have access to the cloud via a web browser. This requires the user to first gain access on a device.

There are two ways to do that:

- Using a bootable USB drive with a traditional OS
- Booting a device that hosts a traditional OS

"Carrier-OS".

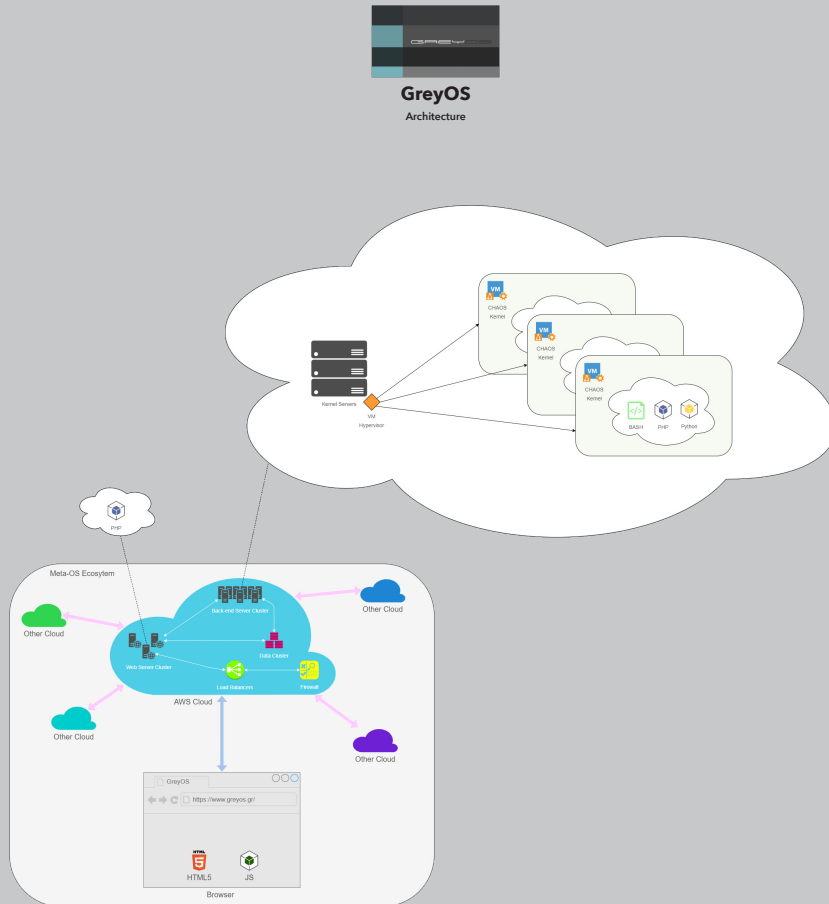
Carrier-OS is what I call any traditional operating system that runs on a bootable USB drive. In simplest terms, the Meta-OS (GreyOS) exposes the services and applications inside the browser, which in turn runs on the bootable USB drive that hosts the carrier-OS.

Carrier-OS means any operating system that boots a device to a point where the user is able to use a browser and access the Internet. The same carrier-OS exists on every bootable USB drive.

A list of possible candidate Carrier-OS (but not limited to) can be:

- Android
- iOS
- Unix
- Linux
- Windows
- Custom OS
- A newly introduced OS

GreyOS Architecture



Requirements of GreyOS

GreyOS is an incredibly efficient and robust operating system, renowned for its exceptional speed and power. With a mere few hundred MB of RAM and a compact quad core CPU, it is ideally suited for machines from 2006 or later. It is important to note that all operations are conducted on the cloud, meaning that the specified "requirements" represent the absolute minimum necessary for seamless boot time, impeccable in-browser rendering, and a reliable internet connection.

You have the convenience of accessing your cloud machine from any location using a web browser. Moreover, the operating system it runs on is incredibly reliable, as it never experiences hang-ups, slowdowns, or failures. It remains constantly active, eliminating the need for restarts or shutdowns, and it doesn't demand any updates, upgrades, or drivers. Remarkably, you don't even have to log out!

GreyOS is built on top of the following technologies:

Back-end

- AWS
- Linux
- NGINX¹³
- micro-MVC
- PHP
- Python
- Bash¹⁵

Front-end

- micro-MVC
- HTML5
- JS¹²
- Browser API (Chrome, Firefox, Edge)

Graphical User Interface

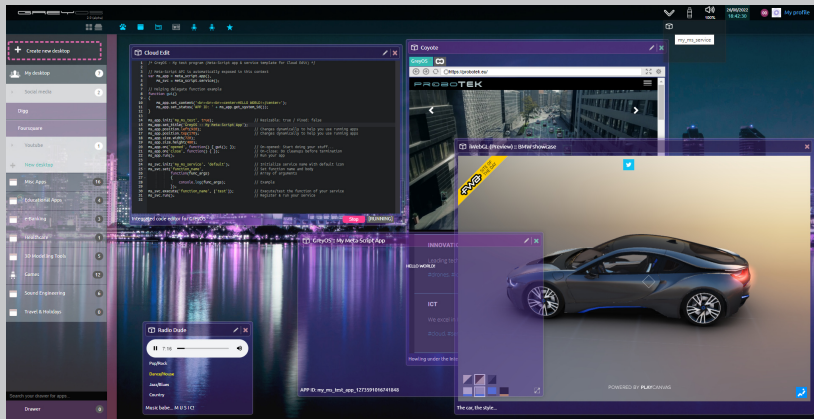
The GreyOS Graphical User interface (GUI)⁷ encapsulates all the components, features and applications that the end user encounters.

The GUI provides an abstract, individualised representation of the cloud-based back-end. It can be either a web-based interface or a mobile application for any type of smart device.

GreyOS aims to deliver a comprehensive, interactive, and user-friendly interface, akin to popular operating systems like Windows, Mac, and Linux.

The key principle behind GreyOS is to offer a seamless user experience that is both dynamic and straightforward. In GreyOS, every graphical user interface (GUI) element is presented as a floating window, allowing users to effortlessly move and organize them based on their specific needs.

These floating windows can be easily customized in terms of size, color, and labels, enabling users to personalize their workspace to their liking. The level of customization extends to all windows within GreyOS, ensuring a fully tailored and adaptable user interface.



The user has the ability to generate and uphold their very own individual digital area. This is made possible by GreyOS' personalization engine, which permits thorough customization of every integrated application.

Alongside other functionalities, this customization is accomplished through a user profile that encompasses a range of choices for both the user and the GreyOS environment.

The profile empowers the user to alter personal preferences, personalize the look of the environment, and enable or disable integrated applications.

Applications

GreyOS provides support for both integrated and third-party, consolidated applications. In GreyOS, users can still access their preferred applications either in a single frame or by navigating to the application's website and accessing them from within the GreyOS browser (the Coyote).

GreyOS installation

GreyOS is a cutting-edge computing platform based on the most recent version of the micro-MVC,⁹ and is currently being developed by a variety of developers around the world.

Users can test the platform at the following URL:

<https://greynos.gr> (access code: demo@greynos.gr / password).

GreyOS can be bootable directly from a [Meta-USB ISO](#) device.

To do this, the ISO image must be burned to a USB size of 32GB or greater using Rufus: download and open Rufus tool. Insert a USB drive and select a device. Select Disk or ISO image. Locate and select ISO image to burn.



VeNUS is an Enterprise / Commercial closed-source platform based on GreyOS.
VeNUS is utilized by PROBOTEK for all its projects and most of its solutions.

micro-MVC

An agile, small, productive, and robust MVC framework for PHP¹⁰ (with integrated AJAX¹⁴ support).

micro-MVC is a simple, agile and powerful MVC framework that empowers developers to write AJAX-based or MVC-based code very quickly. Although there are tons of free and open source MVC frameworks out there, they usually end up becoming too complicated as they are stuffed with a bunch of infinite extensions that only 5% of developers really use them at some point.

micro-MVC is trying to be hassle free, straightforward and helps you stay on track. micro-MVC API is robust and solves roughly 95% of all the everyday issues you face under development with PHP and JS.

micro-MVC is optimized, secure, lightning fast and consumes the least resources possible. The framework runs on nearly any platform including embedded systems and has been tested extensively in several hardware configurations. Also, it comes with out-of-the-box configurations for Apache and NGINX offering enterprise-ready security, smart caching and compression.

The latest releases come with the "Awesome!" platform that acts as a shorthand for micro-MVC folder structure and provides an easy way for developers to access and manage their front-end and back-end code separately and the designers to work without conflicts almost in parallel.

Finally, on Dec-10-2020, micro-MVC has been audited, tested thoroughly for security vulnerabilities and put under stress with thousands of requests per minute from all over the globe. The results proved that micro-MVC is dependable and highly secure.

You may test micro-MVC [here](#).

Copyright (C) 2015 - 2024 micro-MVC

Open Software License (OSL 3.0)

Supported by PROBOTEK

Audited for web security & certified by OCTAGON*

* Octagon specializes in and offers Cyber Security, Enterprise Networks, Endpoint Security, Mobile Security, Data Backup and Servers Administration services. <https://octagonsec.gr/>

RPOBOTEK and the market

Personal computers aren't bad.

However, the purchase of a particular piece of hardware often necessitates the expenditure of additional costs, such as extensions, upgrades, and software, in order to meet the demands of the market in the future.

On the other hand, the ability to perform any task on the cloud, self-adapt to any machine, dynamically utilize computing resources, and have a reliable and secure infrastructure, while utilizing as much space as desired at any time, and at a fraction of the cost of a physical or classic computer, is simply incomparable. Furthermore, in the IT industry, a common cloud computing platform and interface with such capabilities is a powerful tool for the enterprise.

At PROBOTEK, we have developed platforms and an ecosystem to facilitate complex operations, such as:

Software Platforms

PROBOTEK has developed an advanced ecosystem for the drone sector. Our extensive knowledge in the IoT sector and our mission critical approach enables an entirely new way of delivering complete enterprise services for all kinds and scales. This is why we built special software to aim and support both proven brands and custom solutions as well. AiRFLOW, ANAFI-Smart and Bifrost.

AI/ML

When it comes to AI/ML solutions many variables affect your decision. Among them, accuracy and speed. PROBOTEK engineers have done extensive research on the field in order to provide top-notch solutions that work out of the box. PERCEPTRON, Dragonfly, ALISA, CEREBRUM and Cyclops.

Mission Control Center

Ground station software in the market is mainly for hobbyists. PROBOTEK aims higher from an enterprise perspective. Our Mission Control Center (MCC) is an integrated platform and application for mission critical flights. AiR-MCC, Q-MCC and XB-MCC.

Connectivity/Telemetry

In the drone cosmos, one of the most demanding requirement for long range flights and uninterrupted BVLOS is the telemetry. PROBOTEK faces the challenges of terrain, sea, etc. and suggests two solutions for enterprise-ready missions.

AiRFLOW Connect, ConnectiKRON.

Robotic Drones and Bases

Robots and drones are becoming one... PROBOTEK transforms plain drones or smart drones into robotic drones with capabilities beyond the known horizon. We challenge the market by inventing future technologies, today.

Over the Drone Services

There is a new fascinating era coming soon... In this era robotic drones and UAVs provide exceptional, yet affordable services which otherwise would be either too expensive or impossible to obtain. PROBOTEK is already developing horizontal and vertical solutions to cover even the most demanding business cases in the upcoming market.

Air Traffic Control

PROBOTEK provides a next generation Air Traffic Control (ATC) infrastructure that consists of distributed low power, autonomous mini ATC devices. The modular architecture of the system enables easy and reliable monitoring over large regions. D-ATMC.

Anti-Drone Shield

PROBOTEK resells and installs DroneShield's high-tech anti-drone technologies. DroneShield offers the top anti-drone solutions on the globe.

DroneSentinel, DroneGun, DroneNode.

Integrations

In the IoT era there is not a thing, that can not be integrated or utilized as part of a larger ecosystem. PROBOTEK will make sure of that. We are experts in the field of IoT and embedded systems and for that purpose we envision a world of devices that work together with drones to provide unprecedented solutions. PROBOTEK has developed already off-the-shelf IoT integrations for the security sector.

SENTINEL, Alarm systems, Sensors and SigFox.

Miscellaneous

Certain problems need special attention, another point of view and vision. PROBOTEK as one of the top innovators in the IT market introduces technologies in the telecommunication and network sectors. Facing the challenges of security, crisis management, civil protection, medical assistance, etc. we are proud to offer unique solutions to companies and end-customers.

Silence, ZOC / TMS App.

Most of PROBOTEK's infrastructure are based on GreyOS

Appendix

1. **API** stands for Application Programming Interface. In the context of APIs, the word Application refers to any software with a distinct function. Interface can be thought of as a contract of service between two applications. This contract defines how the two communicate with each other using requests and responses.
2. **Cloud computing (CC)** is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. Large clouds often have functions distributed over multiple locations, each of which is a data center.
3. In computer science, a **microkernel** (often abbreviated as μ -kernel) is the near-minimum amount of software that can provide the mechanisms needed to implement an operating system (OS). These mechanisms include low-level address space management, thread management, and inter-process communication (IPC).
4. In computing, a **virtual machine (VM)** is the virtualization or emulation of a computer system. Virtual machines are based on computer architectures and provide the functionality of a physical computer. Their implementations may involve specialized hardware, software, or a combination of the two.
5. A **content delivery network (CDN)** is a geographically distributed group of servers that caches content close to end users. A CDN allows for the quick transfer of assets needed for loading Internet content, including HTML pages, JavaScript files, stylesheets, images, and videos.
6. The **microkernel architecture** is a flexible and extensible architecture that allows a developer or end user to easily add additional functionality and features to an existing application in the form of extensions, or “plug-ins,” without impacting the core functionality of the system.
7. A **graphical user interface (GUI)** is a digital interface in which a user interacts with graphical components such as icons, buttons, and menus. In a GUI, the visuals displayed in the user interface convey information relevant to the user, as well as actions that they can take.
8. **CMD** stands for Command, (CMD). A command is an instruction given to a computer program that tells the program what has to be done. It is an application that is found in most computers with Windows as the Operating System, and it helps in the execution of the commands entered.
9. **micro-MVC** is a simple, agile and powerful MVC framework that empowers developers to write AJAX-based or MVC-based code very quickly.
10. **PHP** is a general-purpose scripting language geared towards web development.
11. **Hardware Abstraction Layer (HAL)**. In computers, a hardware abstraction layer (HAL) is a layer of programming that allows a computer OS to interact with a hardware device at a general or abstract level rather than at a detailed hardware level. HAL can be called from either the OS's kernel or from a device driver. In either case, the calling program can interact with the device in a more general way than it would otherwise.
12. **JavaScript**, often abbreviated as JS, is a scripting or programming language and core technology of the World Wide Web, alongside HTML and CSS. As of 2023, 98.7% of websites use JavaScript on the client side for webpage behavior, often incorporating third-party libraries.

13. **Nginx** is a web server that can also be used as a reverse proxy, load balancer, mail proxy and HTTP cache. The software was created by Russian developer Igor Sysoev and publicly released in 2004. Nginx is free and open-source software, released under the terms of the 2-clause BSD license.
14. **AJAX** = Asynchronous JavaScript and XML is a technique for creating fast and dynamic web pages. AJAX allows web pages to be updated asynchronously by exchanging small amounts of data with the server behind the scenes. This means that it is possible to update parts of a web page, without reloading the whole page. Classic web pages, (which do not use AJAX) must reload the entire page if the content should change. Examples of applications using AJAX: Google Maps, Gmail, Youtube, and Facebook tabs.
15. **Bash** is a Unix shell and command language written by Brian Fox for the GNU Project as a free software replacement for the Bourne shell.

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