Cloud OS – Operating Systems

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Cloud OS Operating Systems, the OS that operates in the cloud and each of the Cloud OS servers can serve more than 100 users and each user has their own personal virtual OS in Cloud. The Cloud OS servers will connect to each other to form the Worldwide Cloud OS networks. One Cloud OS server can host **Authentication Services**, **Security Services**, Web Services, Video Streaming Services, VoIP Services, and many other services. The client devices will be the User Screen Console (USC) devices. The USC devices will be very simple and only have a Video card, Audio card and a Network card. The USC devices do not have a hard drive or storage device like the existing PCs or laptops, and will not allowing install any third party software. The user personal info, username and password will not save in the USC devices. The USC devices communicate to the Cloud OS via **Communication Services**. Communication Services will have different Protocols with different **Communication Keys** and will be different for each service. Each time the USC devices connect to Cloud OS, the Communication Services on client side and the Cloud OS side will use different **Communication Protocol** with different **Communication Keys**. This new design of Cloud OS – Operating Systems will be more secured than ever. With State Of The Art design, the Cloud OS will provide the users with more secured, more reliable, more user friendly, and save much more money on client devices with no maintenance.

The existing Linux, Windows and macOS Operating Systems are not secured. The user data, user personal information, include username and passwords are stored on both the user devices and also stored on the servers. With existing Operating Systems, the users have to remember their account login for each service like email accounts, bank accounts, credit card accounts, Web services accounts, and all other services accounts. All the username and passwords stored on the user devices can be decoded by a Super User or Windows Admin logins. This is dangerous for the users if they lose their PCs, laptops or tablets. The new Cloud OS will resolve these problems

with the **Communication Services** and **Authentication Services** running on client devices and the Cloud OS servers.

With the existing Operating Systems, the users have to install the third party drivers or software when they get new devices for their PCs or laptops. This is hassle for the users if they are not the advanced OS devices users. Not only that, the users could face with serious Spyware Codes which come from the third party drivers or software. Applications and Software are installed on every OS devices without synchronized with all different versions for each user and each corporate, this issue causes the data or documents are not printed or viewed accurately as their originally created. Another big issue is when the users bring their broken PCs, laptops or tablets to a computer repair store to fix, they may face with Spyware Codes or their username and passwords get stolen. Most computer repair stores have the Super User or Windows Admin login to fix the users' PCs, laptops or tablets. With new design of Cloud OS, all these issues are resolved with the user USC devices only have the Video card, Sound card and Network card.

The existing Operating Systems do not provide the Software Developers for the Coding Compilers, instead they support third party Coding Compilers. This problem leads to the Spyware Codes that come with the Code Compilers which left on the Developers Software and cannot able to identify and remove. The existing Operating Systems also could not able to block any Spyware Codes with their support backward compatibility. The old Spyware Codes that created more than 10 years old are still able to spy on the current OS updated versions.

The existing Operating Systems allow the users to rename the executable files to other file types, and these executable files can be run by other existing programs without other users aware of. This is one of the big issues with the existing OS; one user can rename the executable files and other programs execute these files without other users aware of. The existing OS executable files are opened and can be replaced by other Spyware programs, and create big trouble for the users and could crash the Operation Systems. One example

of a 'cp' or 'xcopy.exe' program in both Linux and Windows, these files can be replaced by Spyware programs and when the users copy files, the users get one copy and the Hackers can get another copy. The new design of Cloud OS will prevent this problem with all the Cloud OS files are hidden with multi-password layers protection.

With existing Operating Systems, most users and developers have their laptops and PC workstations running at work and at home. Their worked data and resources are stored in their PC workstations and the laptops are used for their work presentation or remote desktop login to their PC workstation as a second storage device. This is a waste of resources and money for the users and creating more trouble for the users for their data secured and maintenance.

The existing Operating Systems allow the users to change the Computer Clock; this is bad feature and creating more trouble for data and networking synchronization. The Cloud OS does not allow the users to change the computer time. The existing OS allows too much of Cache memory and Cookies. These Cache memory and Cookies may contain Spyware Codes and will track the users and make their PCs or laptops running slower.

Another big issue with the existing OS is the **Copyright protection**. Any data files, software, or documents are not able to have the Copyright protection. Any user can copy and transfer data files or any secret documents from one OS device to another. With new design of Cloud OS, the problem is resolved. The data files or document files will have the Copyright tokens; this will protect the files from transfer or copy that violate the Copyright.

Current Operating Systems can only support up to 64-bit with the current CPU limitation. However, the Cloud OS can able to support 64-bytes (8 times of the existing OS) by using Alpha-number instead of Hexadecimal number. The current Operating Systems use Hexadecimal number 0xFFFFFFFFFFFFFFFF as a biggest long value to calculate using Unary Operators. The new design of Cloud OS will use all 10 digits numbers plus 52 (2x26) both lower-case and upper-case ASCII characters with borrow two additional extended ASCII

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characters 'Å' and 'å' to form the **Alpha-number** in this format 'αx0123..9ABC..Åabc..å' to compute big whole number faster using Unary Operators. In the future, the Cloud OS can borrow other languages in combination with Alpha-number to support even bigger number more than 64-bytes long. The new Cloud OS will be written in Object Oriented Programming Language with the idea of data encapsulation for high level of protection.

Current Web services are running in Linux or Ubuntu Operating Systems, and one Linux server can host more than 100 Web sites. The owners of the Web sites have their own accounts, but the Linux or Ubuntu OS machines can be anywhere at Datacenter or at Corporate or even at the server owner's house. All the Web services are running the same protocol for all Web site owners. The server owners can able to view and edit any Web sites data running on the server boxes by their super user account.

The existing Operating Systems running on client devices are causing too much trouble to the users with high cost and maintenance. With this new design of Cloud OS, the users only need to have a simple USC device and register to use Cloud OS. All the cost of repair PCs, laptops and tablets are gone.

The new Cloud OS will allow Corporate Accounts to be configurable to their own policy to restrict data transfer outside of the organization and without or minimal required of IT supports. With new design of Cloud OS, the Corporate Organizations do not need much of IT supports. The Active Domain accounts or Corporate Network Accounts management with IT supports is not necessary.

With this new design, the users can work from anywhere and their data, documents and applications are always be there in cloud for them without worry of losing unsaved data or documents. The Cloud OS will provide tools to convert the existing documents to its new file format for user data secured purposes and the Copyright protection.

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<u>Registering USC devices with Cloud OS</u>

<u>Fig-1</u> shows the users steps when registering with Cloud OS for first use.
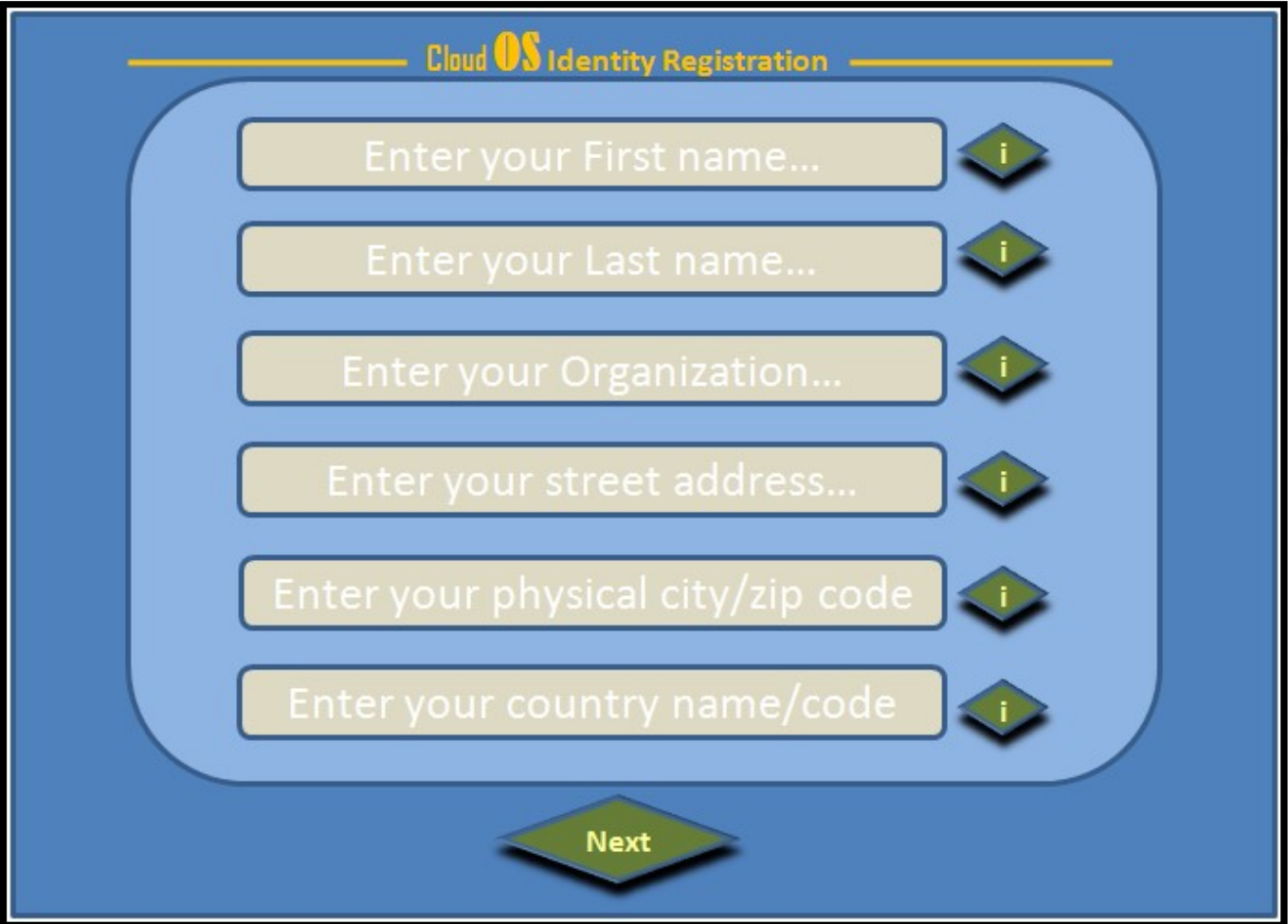

<u>Fig-1: User Cloud OS Registering Wizard-1</u>

<u>Fig-2</u> shows the users next step when registering with Cloud OS with a phone number and 3-password layers. The 2nd and 3rd passwords are optional and used for advanced users with multi-password layers when logging in the Cloud OS. These 3-password layers are configurable after the users registered with the Cloud OS. The multi-password layers can be configured all-straight-login or single-login-with-rotate-by-date or by-day-time-hours for more

secured and protected. After registered with Cloud OS, the users can able to have more options to configure the multi-password layers with their password formulas.
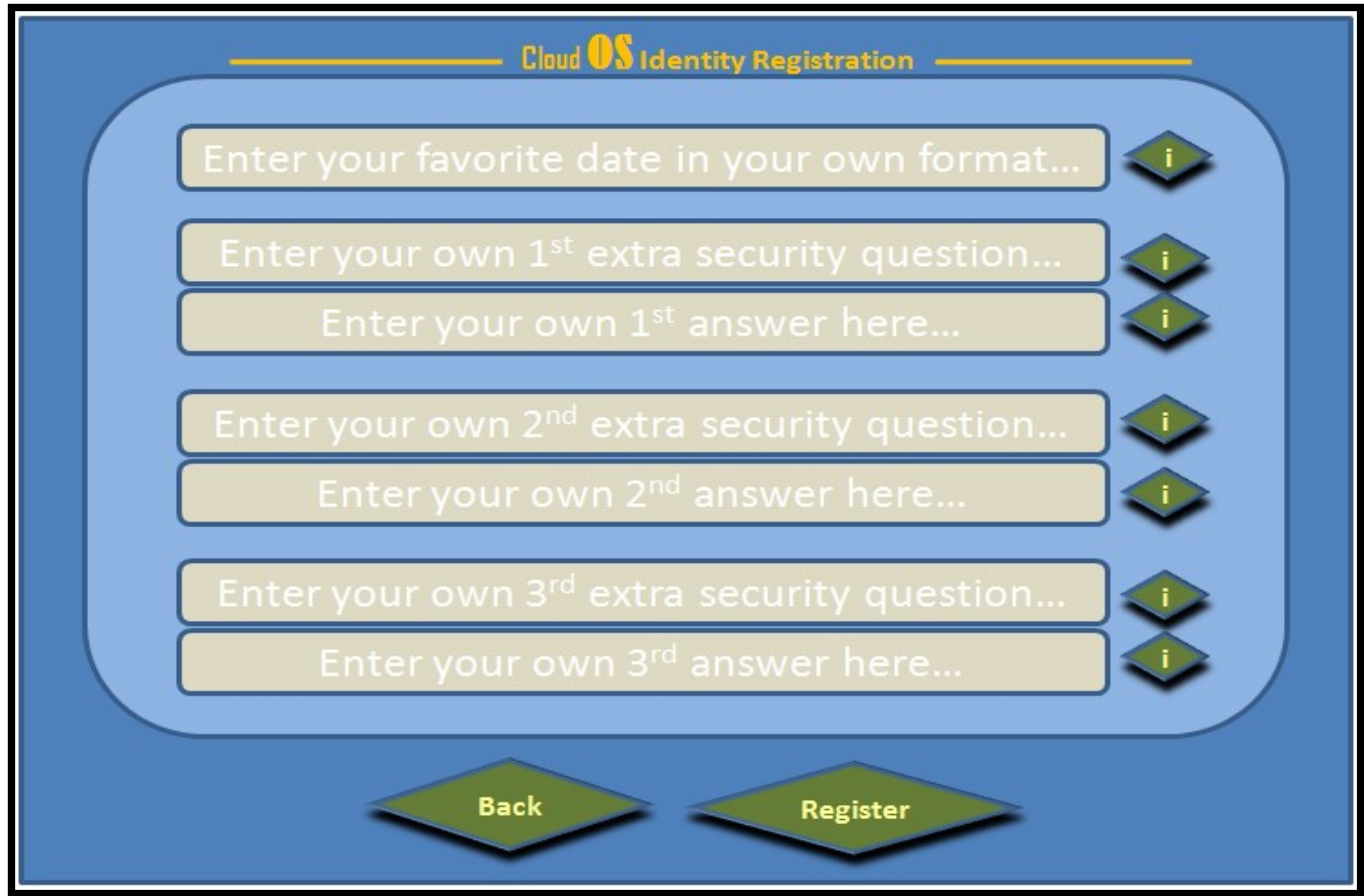

Fig-2: User Cloud OS Registering Wizard-2

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Fig-3 shows the users last step when registering with Cloud OS with some security questions.
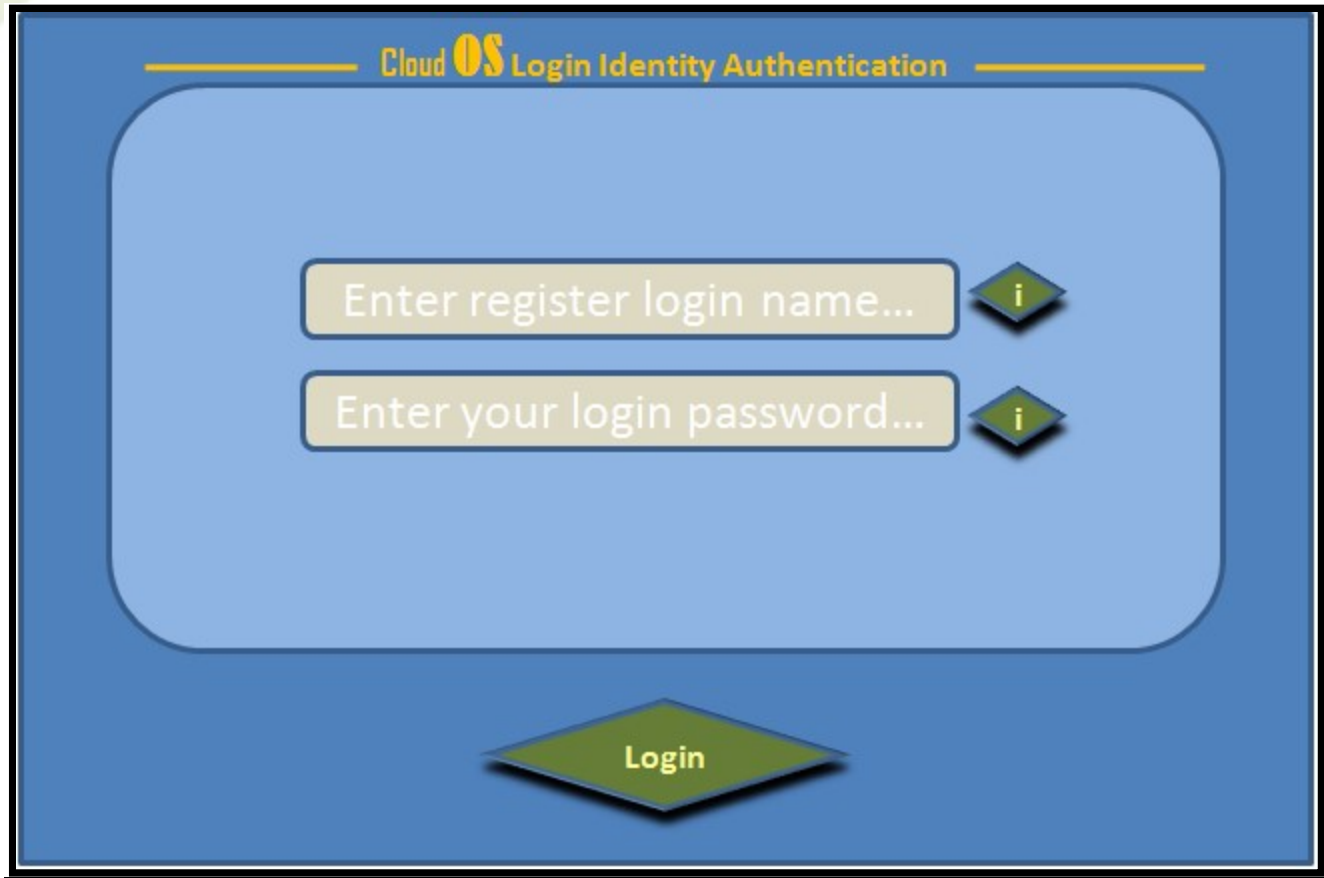

Fig-3: User Cloud OS Registering Wizard-3

Fig-4 shows the users login window with Cloud OS. By default, when the users login to their personal virtual Cloud OS account, a secured random key will send to their phone to confirm the login. The Cloud OS is designed for single user and single sign-on per Virtual Cloud OS account. The Cloud OS users will have options to configure the way their logout and login. The Cloud OS will provide options to logout user account for certain time while they are on travel or at bedtime to prevent any intruders accesses. The Cloud OS will ask more security questions if any logins during this logout time to increase security for the users.

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Fig-4: User Cloud OS Login Wizard

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User Main View in Cloud OS

Fig-5 shows the main window in English after the user login to their personal Cloud OS. The new Look-and-Feel GUI provides the users with more graphical and logical look and feel with nice user friendly GUI design. The Cloud OS keeps the 10 most recent applications on top or the main window. When the users typing to search for an application name, the Available Application scrollable view will automatically search and sort the application name list while the users typing the name. The Cloud OS provides Round-Square icon container for each file or application. The icon containers are designed different background for each type of application or files. The icon container provides a Hexagon area to hold the users defined icon with the filename or application name rendering field at bottom of the Hexagon within the icon container.
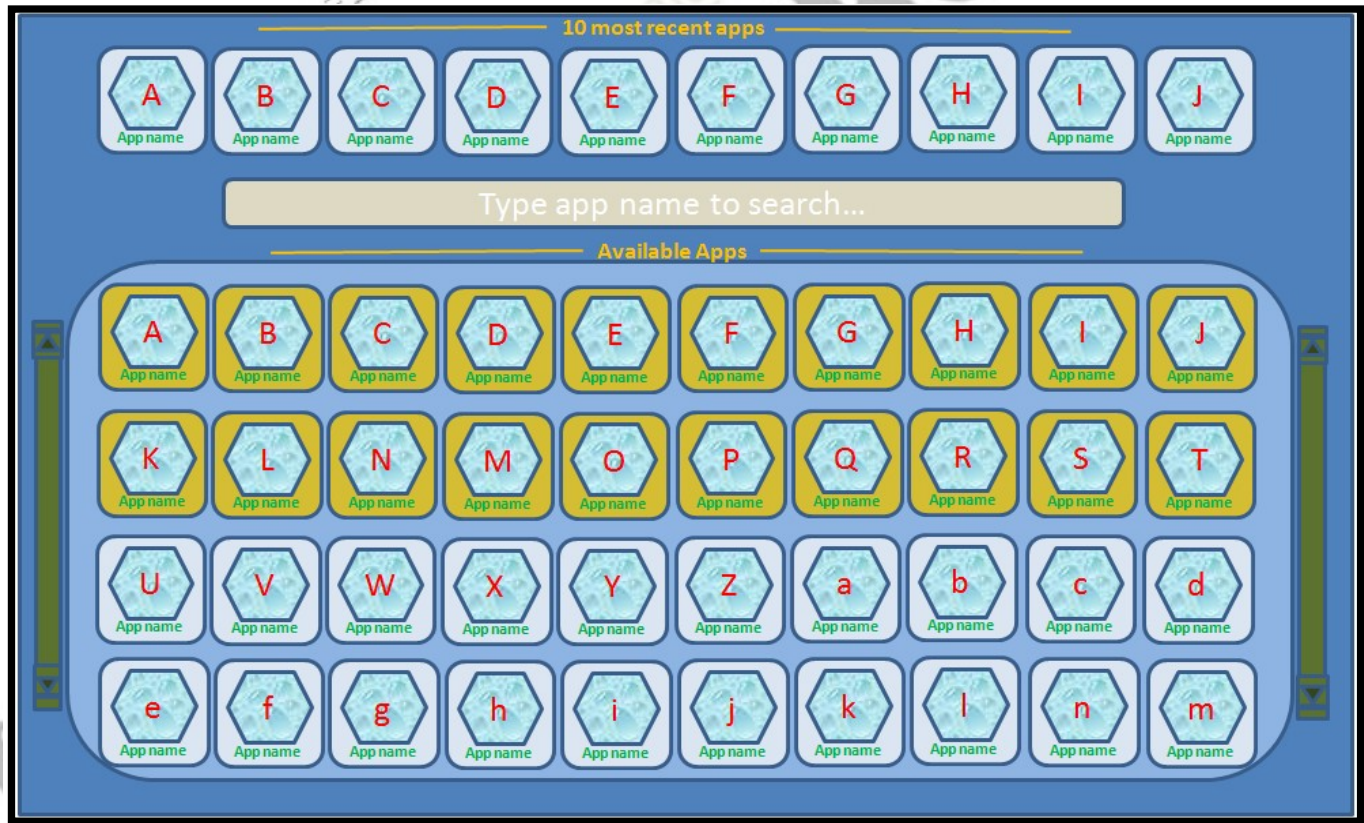

Fig-5: User Cloud OS Main View [English]

Fig-6 shows the main window in Russian after the user login to their personal Cloud OS to demonstrate worldwide supports.
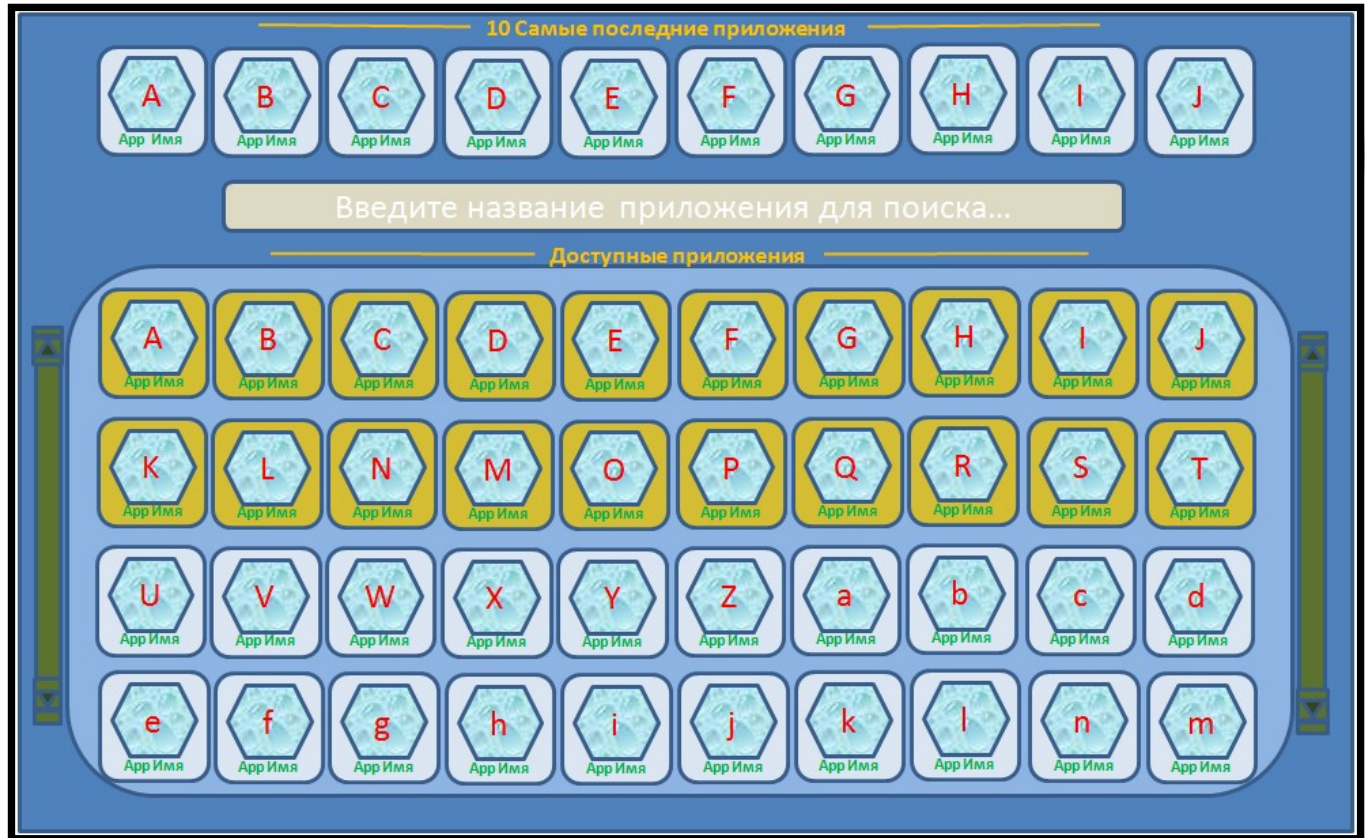

Fig-6: User Cloud OS Main View [Russian]

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<u>Fig-7</u> shows the main window in Chinese after the user login to their personal Cloud OS to demonstrate worldwide supports.
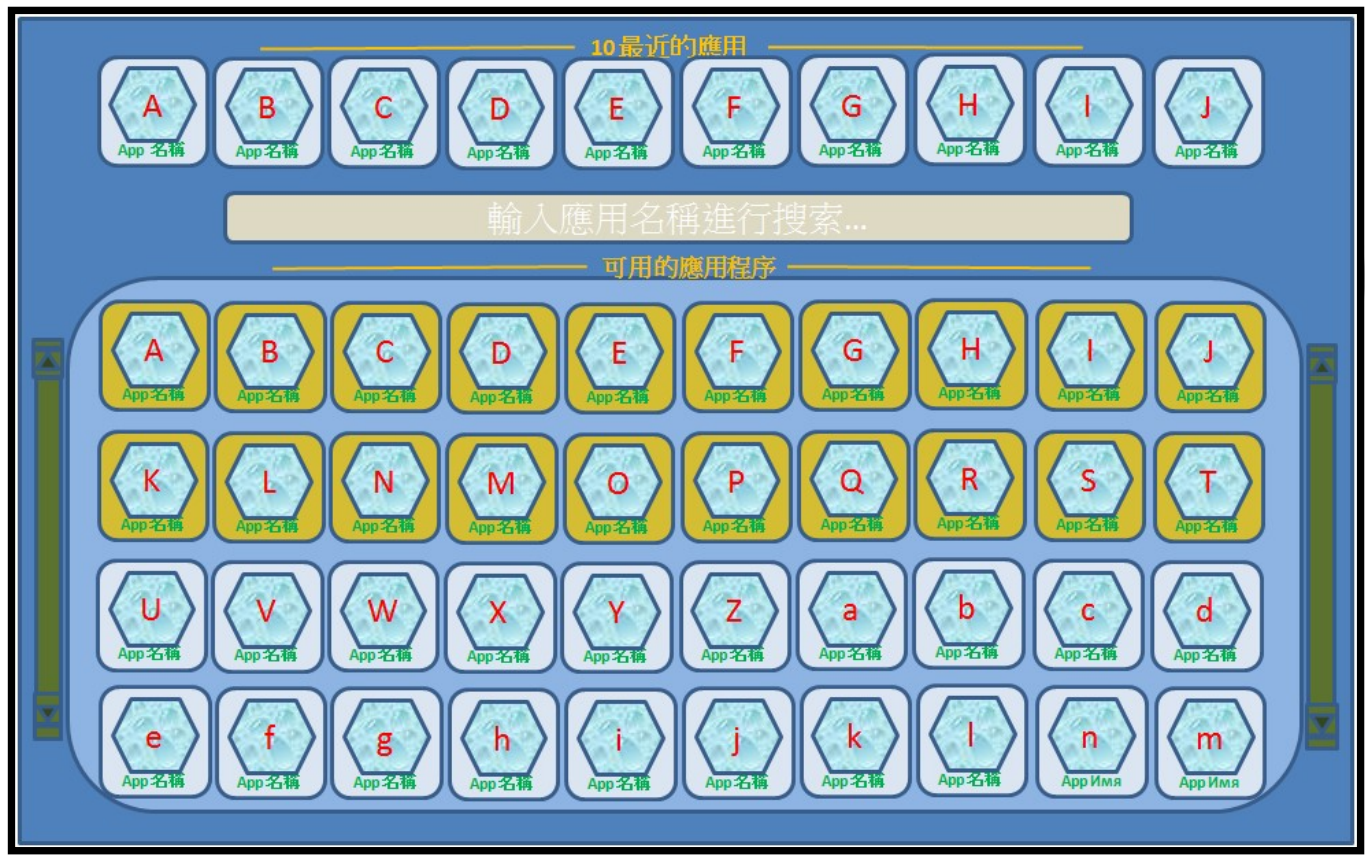

Fig-7: User Cloud OS Main View [Chinese]

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The Existing OS Infrastructure

Fig-8 shows the existing Operating Systems Infrastructure with many servers and many services everywhere in Cloud or locally. Every smart device contains Operating System, and every Operating System stores user data, username, and user password on both client devices and the servers. Hackers can hack into the servers and client devices easily. Data transfer from servers to client devices is not that secured and data is duplicated on both sides. Email data and attachments are store on both servers and client machine in personal PCs or laptops, and the Copyright is out of control.
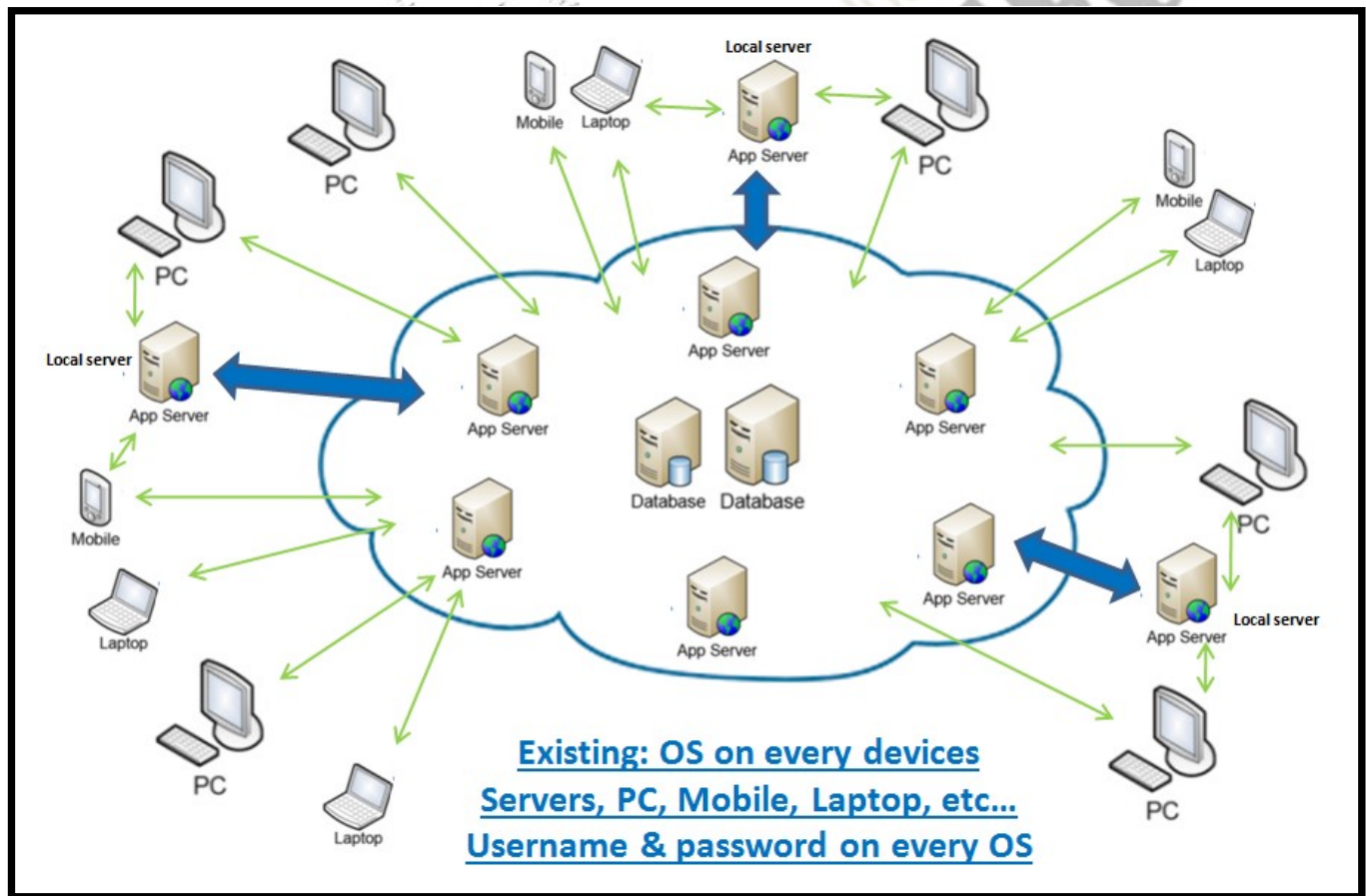

Fig-8: Existing OS Infrastructure

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The new Cloud OS Design Structure

Fig-9 shows the Cloud OS structure to support multi-users. The Cloud OS Core is stored in the middle of the hard drive and provides the users with all applications and tools to support their Virtual Cloud OS. When the user first registered into the Cloud OS, the Cloud OS Core will spawn a Virtual Cloud OS for the user and provide will all the default applications and tools and always alive to provide services for the user and available everywhere when the user login. The Cloud OS is designed in User-Sector partition format to provide the fastest and equal data and services access to all the users within the Cloud OS. The hard drive is spinning constantly so each user in each Sector Partition will have equal opportunity of data access and services. The User-Sector partition format will always create with geometry and symmetry in quart-sector. This means when the first user register, the Cloud OS will allocate four User-Sector partitions with three reserved users, then the Cloud OS will use the three reserved partitions for the next three register users. The Cloud OS will allocate again four User-Sector partitions for the next user registers in equal and symmetry partitions. The triangles show the OS applications and tools to support the user Virtual OS. All the Cloud OS Core data, tools and applications are hidden and protected with multi-password layers. The users can use Cloud OS applications and tools, but cannot able to view, modify or replace the OS file content or rename the files. Each user Virtual OS are independent to each other and they have their own **Communication Protocol** and **Communication Keys**. The users can share their data files via their Shared-Box with their Shared-Box number. The Cloud OS or Virtual Cloud OS has three layers, Data layer, Application layer and OS layer. The Cloud OS provides 3rd party application layer and data layer after they get certified with Cloud OS. The yellow sector areas will contain the user data in data container with data protected layer. When the user Virtual OS crashes, the user can able to recover their data easily. The users will have the rights to compile and create executable program, and run within their Virtual

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OS or their organization, but cannot able to execute their code or application worldwide unless the application is certified and compliant with Cloud OS.
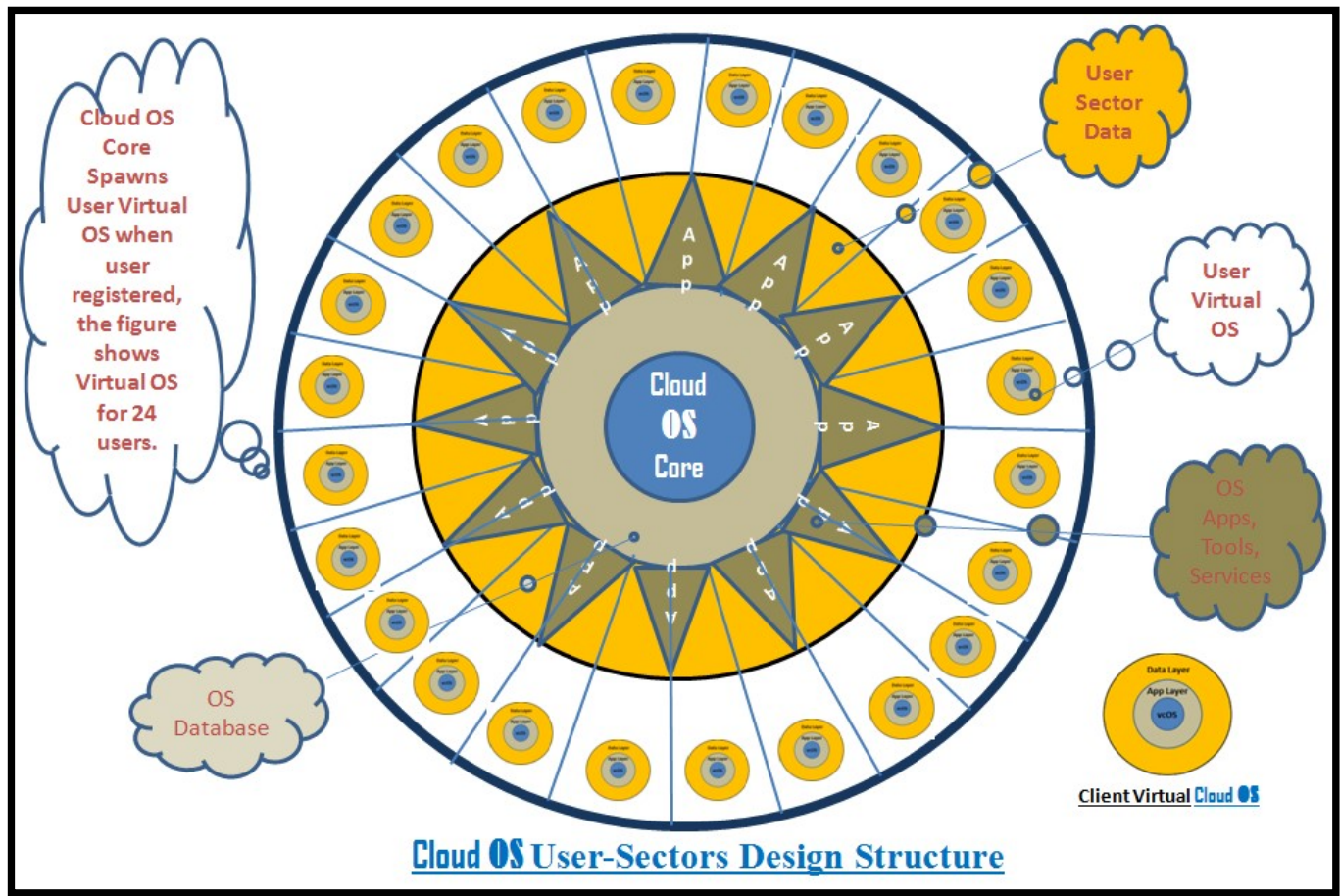

Fig-9: Cloud OS Sector-like Design Structure

Cloud OS File Format Structure

The File Format will have 16-bit for File-Type, 16-bit for File-Subtype, 32-bit Copyright Tokens, 64-bit File Date Time, 64-bit File Checksum, 64-bit Total File Length, 32-bit total of sections, and 255 bytes long for filename. The filename field is used for secured purposes, the Cloud OS do not allow the users or owners to change the executable file which are already compiled or created to prevent the executable file get renamed to other file type then execute for other purposes. The File Format below describes the new file structure with the Checksums and the 1s bits data encoding/decoding

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methodology. The Cloud OS will use the Checksums as part of the Keys to shuffle the data when writing data files to the hard drives and revert-shuffle data when read the data files back. When the Cloud OS reads the 1st file section data, the Cloud OS will use its section data Checksum as part of the Keys to read and decode the 1st section data. Then Cloud OS will use the 1st section data Checksum combine with the 2nd section data Checksum to use as part of the Keys to read and decode the 2nd Data Section. The same method applies for the following Data Sections until end of file. This method will ensure the data sections are tied together and easier for Error Checking, and to prevent the data file from modifying in the older OS or the existing Operating Systems. The 32-bit Copyright Tokens in File Format is generated when the file is created with maximum of 4,294,967,295 tokens. When a file is copied, the copied file will have 1 Copyright Token and the original file Copyright Token will be reduced by 1 token. The copied file can only view or edit by the user that have the copied one, and cannot able to copy or transfer to other users. The owner of the original files can set number of Copyright Token to transfer to other users as they wish, but the Copyright Token of the original files are reduced until they have no more token to transfer. All files will have the Copyright Token.

16-Bit File Type	16-Bit File Sub-Type	32-Bit Copyright © Tokens	64-Bit File Date-Time	64-Bit File Checksum	64-Bit Total File Length	32-Bit Total Sections	Filename (255 chars max)
32-Bit Section Length	32-Bit Section Checksum	Data Section-Begin	Data...	Data...	Data...	Data...	Data Section-End
32-Bit Section Length	32-Bit Section Checksum	Data Section-Begin	Data...	Data...	Data...	Data...	Data Section-End
32-Bit Section Length	32-Bit Section Checksum	Data Section-Begin	Data...	Data...	Data...	Data...	Data Section-End
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Fig-10: Cloud OS File Format

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Cloud OS User Common Applications Supports

Fig-11 shows the Cloud OS structure to support multi-users with multi-services. The Cloud OS will provide the user with nice and user friendly common applications like **Language Editor**, **Language Reader**, **Grid-Data Editor**, **Grid-Data Viewer**, **Grid-Data Analyzer**, etc… The Language Editor can support any human language, and the Language Reader will support read-only version of Language Editor and also have rich features for users with notes-tagging without modifying the document. The users can compile the tagged notes when open the document in Language Editor, and able to hide or show when sending the documents to other users. The Grid-Data Editor, Viewer or Analyzer will support like existing Excel in Windows OS but with more features and user friendly.
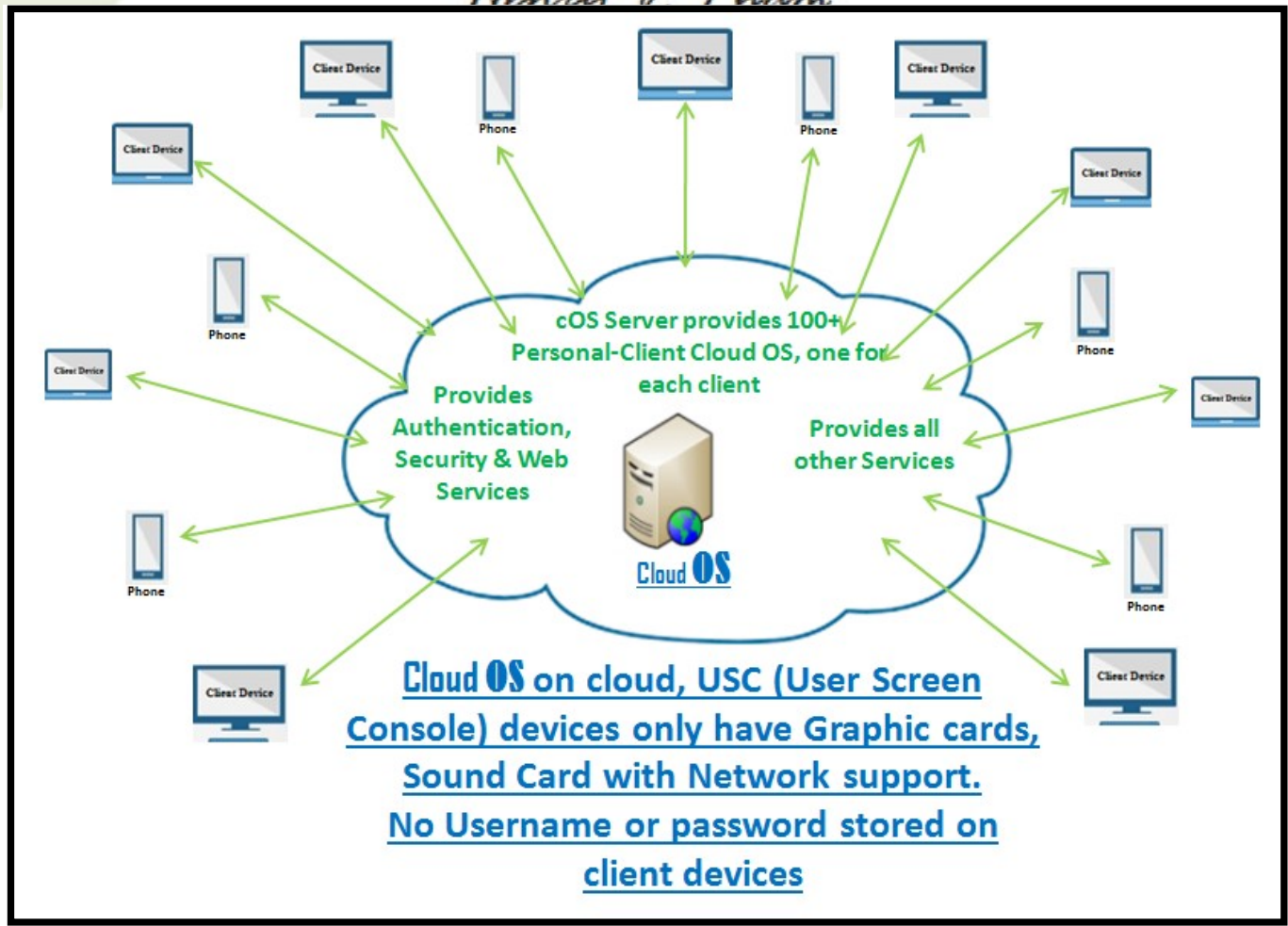
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Fig-11: UCS devices and Cloud OS server

Cloud OS Computing Services

Fig-12 shows the Cloud OS computing services to support multi-users with multi-services. **Authentication Service** will use to authenticate user login; this service will run on both client devices and the Cloud OS servers. **Communication Service** will use in any client-to-servers or server-to-clients communication or transferring data between client devices and the Cloud OS. Communication Service will use different protocol and different keys for data, voice or video communication. This service of Cloud OS will be more secured for Video Conference for Web meeting or other secret communications. Cloud OS will provide **Email Service** and any email attachments will be

handled by **Download Service**. The Download Service will use **Copyright Service** to handle transferring of the Copyright tokens. **Web Service** will also be provided by the Cloud OS when the user registered and enable the Web Service with the domain services. The Web Service will be more secured than ever compare to the existing Linux or Ubuntu OS servers. Cloud OS also provides **Printing Service**, the users can print their documents to their local network printers via Printing Service. To support more data storage for personal or private, Cloud OS will support **Network Storage Service** and mount to a network storage device or network hard drive to allow the user access their data from their local network hard drive from their Virtual Cloud OS. Network Storage is very critical for data transferring over the network with data security concerned; the Network Storage Service will work with Communication Service to secure data transfer over the network even when printing documents from the user Virtual Cloud OS.
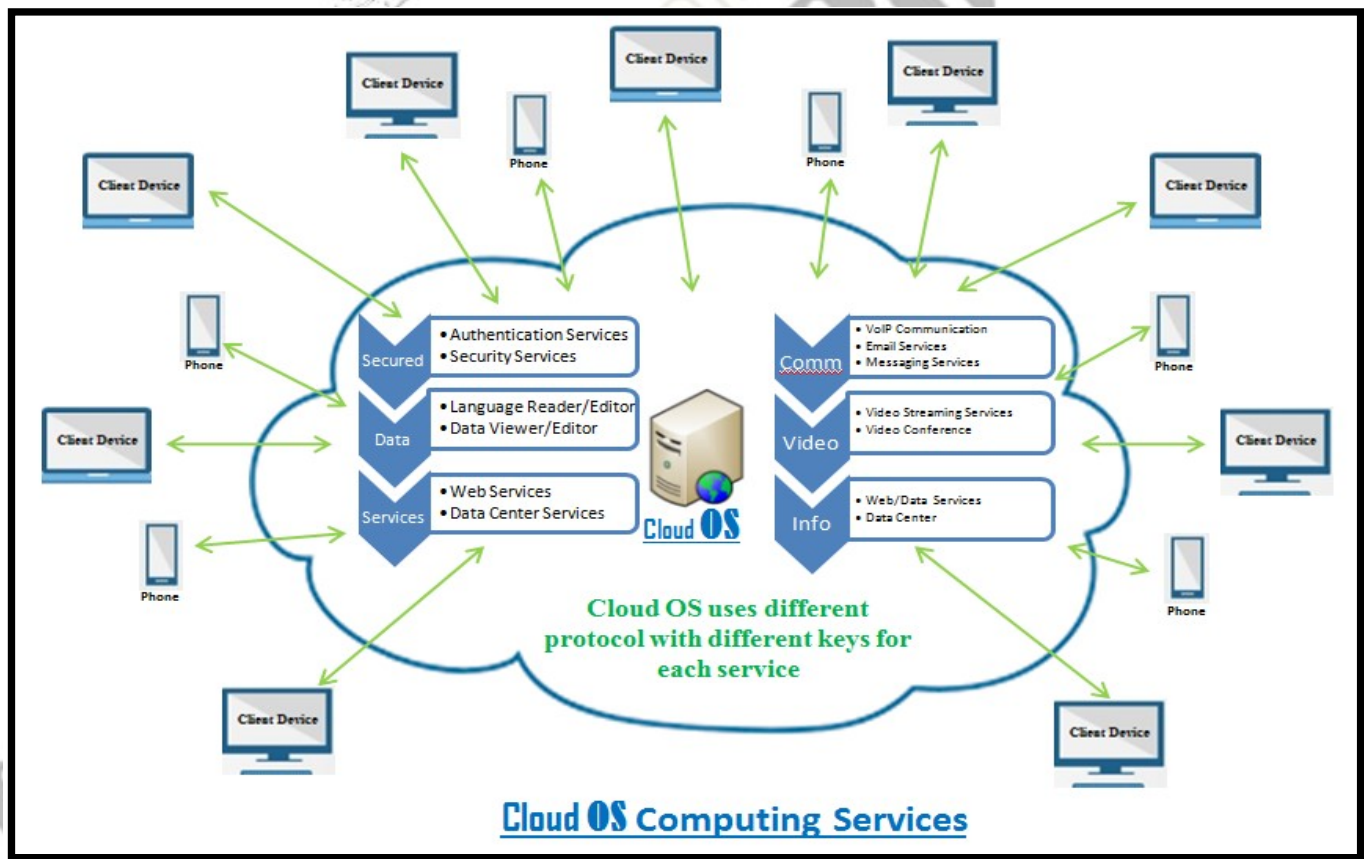

Fig-12: Cloud OS Computing Services

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Cloud OS Networking Infrastructure

Fig-13 shows the Cloud OS networking infrastructure. One Cloud OS connects to others to create a community Cloud OS network, and many communities Cloud OS networks will connect the whole world of Cloud OS networks. Entire world will be more secured with the new design of Cloud OS networking infrastructure.
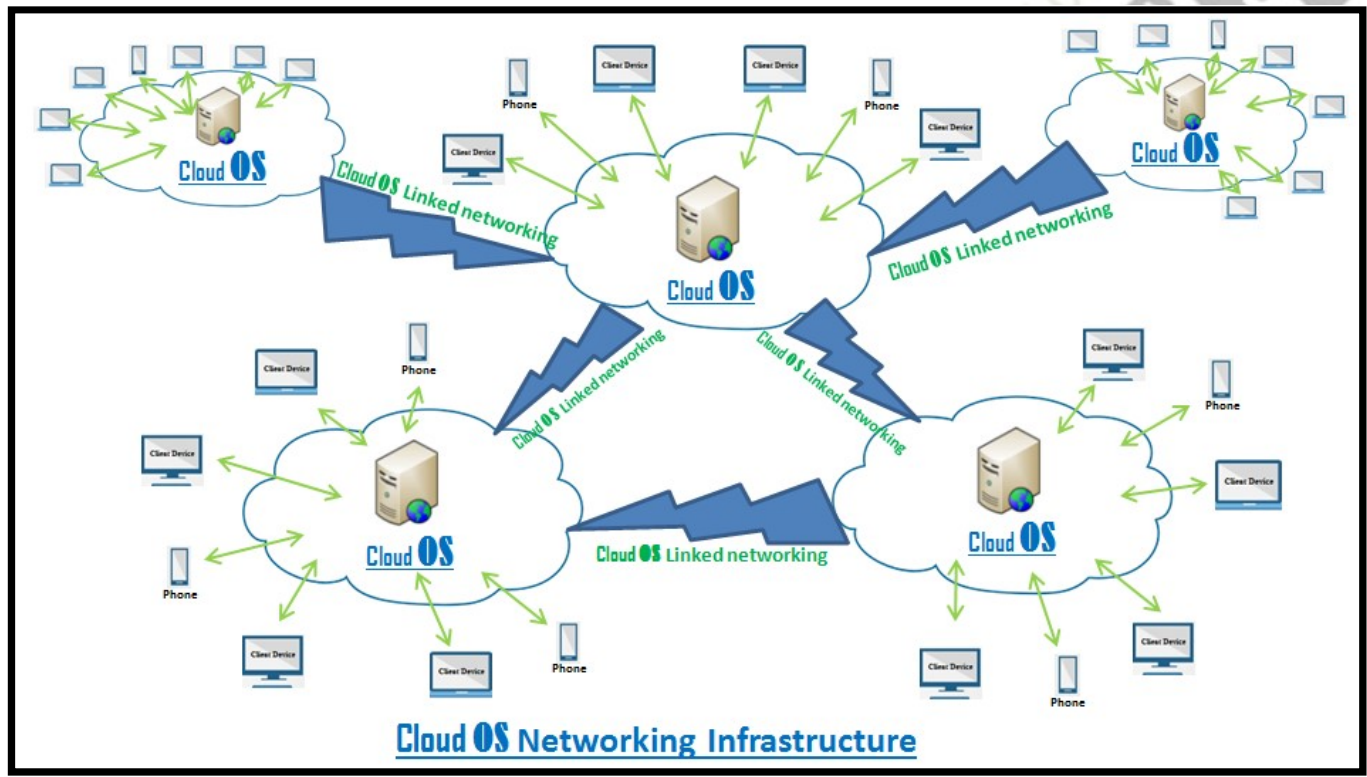

Fig-13: Cloud OS Networking Infrastructure

Fig-14 shows the client device hardware without hard drive or storage devices and users do not need to configure the BIOS settings like the existing OS devices, PCs and laptops. The client devices have to support **Communication Service Container** to allow the Cloud OS synchronize the Communication Service for data secured purposes.
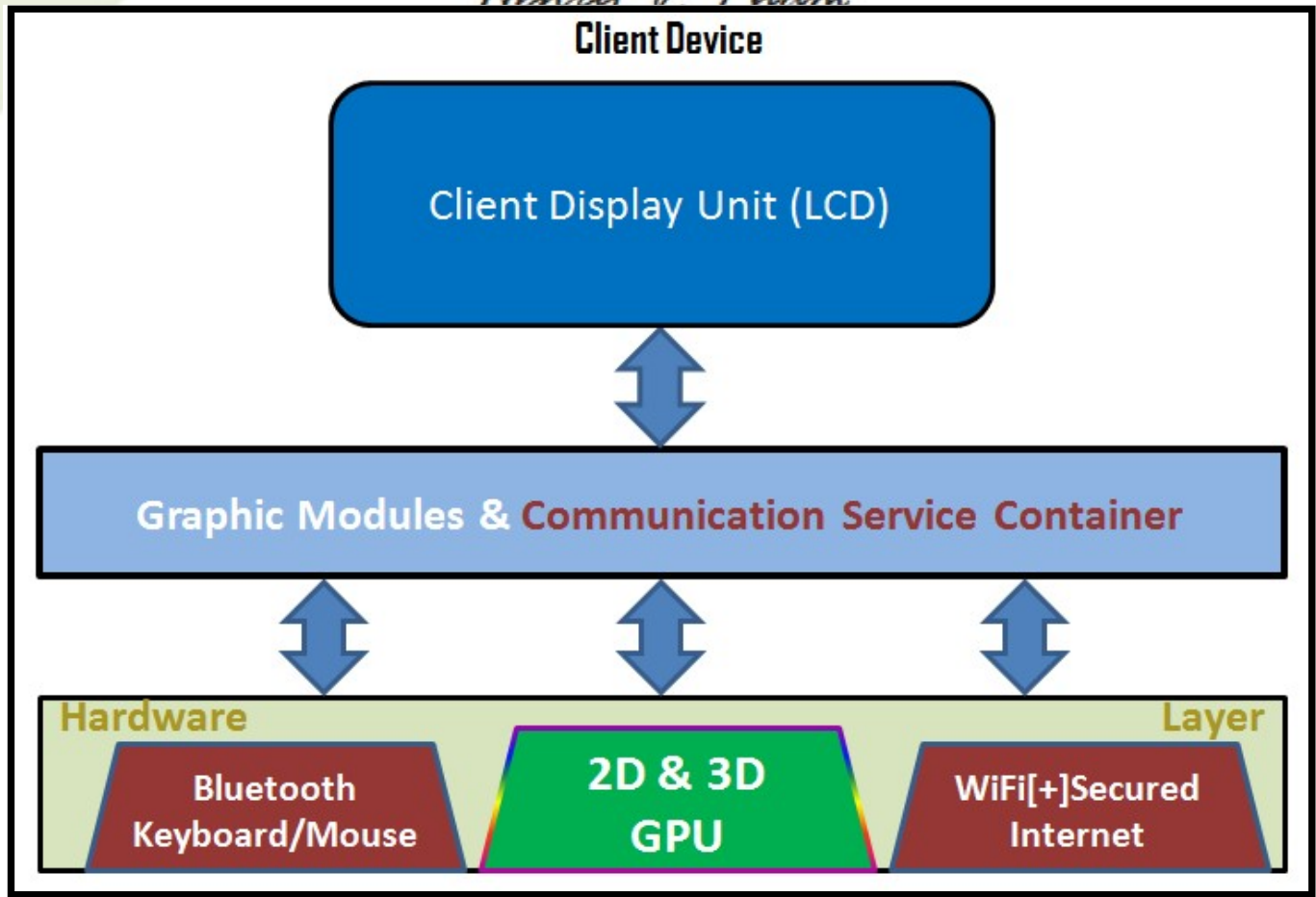
Fig-14: Client Device

Fig-15 shows the Cloud OS hardware layer and device driver modules to support the Cloud OS with more secured than ever. The Cloud OS server will have the hardware keys for secured user direct interactive supports. The Cloud OS server will able to support tracking location with GPS receiver to allow the Cloud OS have a capability of auto tracking and drawing the Cloud OS networks backbone. This could be an optional feature depends on the geographical requirements.
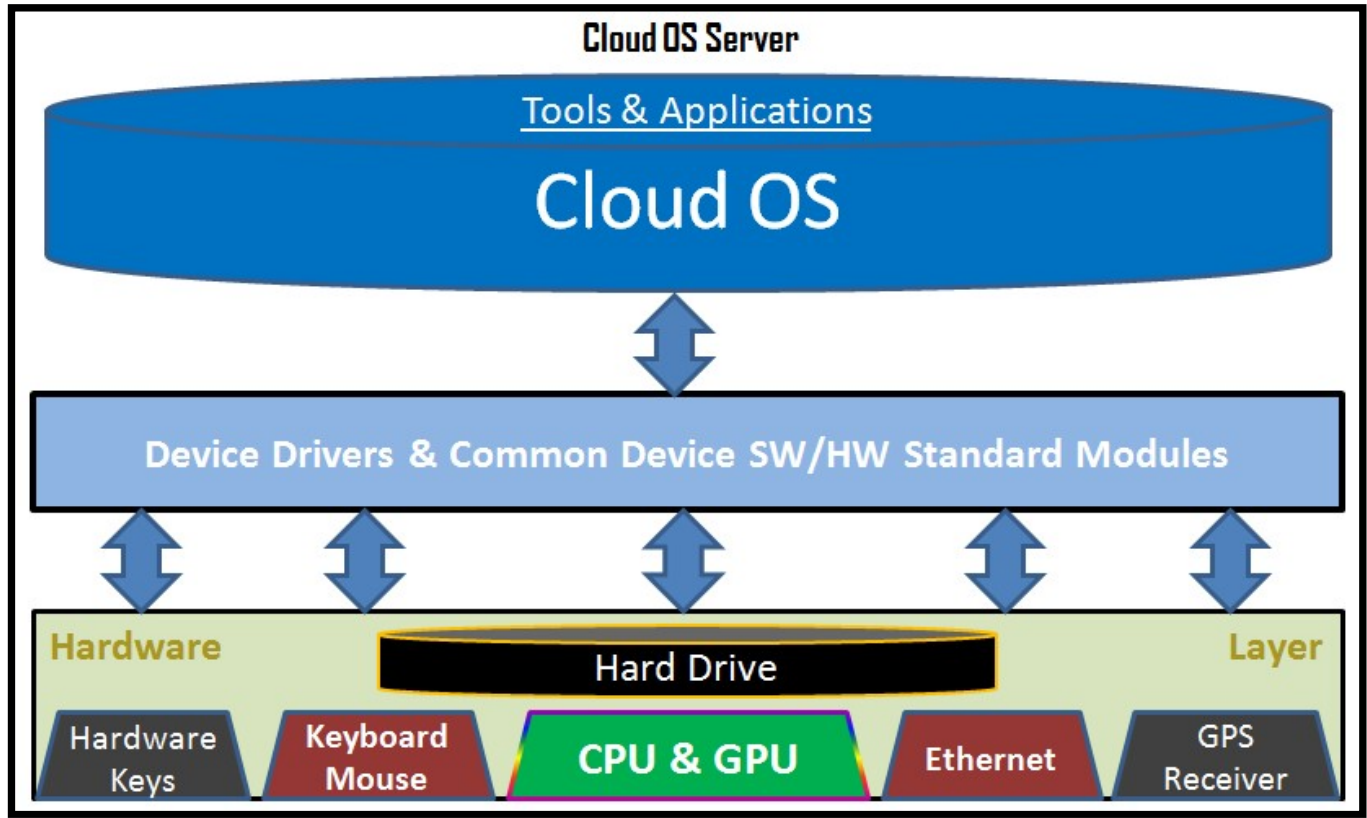
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Fig-15: Cloud OS Server

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Operating Systems Features & Issues Summary Table

Features/Issues	Existing Operating Systems	Cloud OS
Supports Copyright protection	No	Supports Copyright© Protection with Tokens for photos, video, data files, documents, etc…
Secures User Data and Documents	No. Data and documents are stored on both client devices and the OS severs. If the users lost their devices PC or laptop, they lost their data and documents.	Yes. Data and documents are secured in Cloud OS with single login and single user with Secured Communication Services.
Supports multiple login accounts on a client device	Multiple login users can use the same client device, and event at the same time; this is not secured and violates the natural laws.	Supports only single login and single user for more secured purposes.
Stores username and password on client devices	Yes	No. With Authentication Services, the users no need to

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		worry of losing their devices.
Supports Secured Coding/Programming Compiler	No. Not secured with many 3rd party compilers.	Supports Secured Compiler with the Cloud OS.
Users need to install 3rd party Drivers and Software on their client devices	Yes, this is hassle for the users.	No, the client devices do not need to install any Software.
Users need to update OS Service Patches and Applications to newer versions	Yes, this is hassle for the users.	No, the Cloud OS handle all these for the users.
Users need to install Antivirus Tools/Application to protect themselves	Yes	No
Client devices need BIOS settings and Bootable OS	Yes, this is hassle for the users.	No BIOS or Bootable OS in client devices.
Client devices have hard drive or storage devices	Yes	No
Users costs and maintenance	More cost and maintaining on their devices with require of IT supports and repair.	No maintenance or IT requires on client devices since there is no Operating System and no hardware storage devices

		in client devices.
Supports Web Services	Yes, but not secured, plaintext is transferred without encoded via browsers.	Yes. All Data and documents are encoded and transferred within the Cloud OS and with Communication Protocol.
Supports Authentication Service to simplify multi-account logins	No	Yes. Cloud OS will host Authentication Services on both client devices and the Cloud OS; the users don't have to remember multiple usernames and passwords.
Supports Corporate Accounts and reduce IT supports	Requires lot of IT supports	Requires no or much less of IT supports
Supports bigger number up to 64-Bytes long for Unary Operators	No, currently limited to 64-bits in Hexadecimal	Yes, supports Alpha-number

<u>Conclusion</u>

The Cloud OS will provide the users with nice Look-and-Feel and great user friendly interfaces. The client devices are much simpler without hard drive or storage devices, and provide the users with more data secured, low cost and low maintenance. This new design of Cloud OS – Operating Systems with State Of The Art design and high secured data protection, and much more reliable with great secured communications for VoIP, Video Conference, Data, Text, and Messaging services will be a promise future Operating System to replace the existing Linux, Windows, macOS and other existing Operating Systems. Entire Worldwide networks will be more secured, more protected, and more challenge for the future of our younger generations for Software Development and any other inventions with the Copyright protection supported.