Wolke A Cloud Based Web Desktop

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Abstract — The idea behind Cloud Operating System is that the whole system lives in the Web browser. The client must have only a web browser to work with Cloud Operating Systems and all its applications. This applies for both modern and obsolete PC’s. It is an Open Source Platform designed to hold a wide variety of Web applications. Cloud Operating Systems can be thought of as a new definition of an Operating Systems, where everything inside it can be accessed from everywhere inside a Network. All you need to do is login into your Cloud Operating System server with a normal Internet Browser, and you have access to your personal desktop, with your applications, documents, music, movies and all etc. just like you left it. Cloud Operating Systems lets you upload your files and work with them no matter where you are. It contains applications like a Word Processor, Address Book, PDF reader and many more developed by the Cloud developers and Cloud vendors. In this paper we describe Wolke, a Cloud Operating System based on the similar concept described above with some additional functionalities that isolated this Cloud Operating System from the other traditional Cloud Operating Systems.

Keywords — cloud computing; operating system; web desktop; cloud operating system.

I. INTRODUCTION

The computing industry has come a long way since its inception. We have gone from shelved racks filled with tens of computers to sizable computing infrastructure farms designed to provide and facilitate needs of the industry. Ever since the concept of computing was introduced there have been problems associated with computation and storage of data. In order to design an efficient system we came up with the concept of cloud computing. Today cloud computing is being called as one of the most democratizing invention of all time. The ease of storage and platform independence resulted into a need of computing the said data which lead to the concept of Cloud Operating System. Cloud Operating System is an open source web desktop following the cloud computing concept. It is mainly written in HTML, CSS, PHP and JavaScript (Front End). It acts as a platform for web applications written using the Cloud Computing concepts. It includes a Desktop environment with number of applications and system utilities. It is accessible by portable devices via its mobile front end. Every Cloud Operating System lets you upload your files and work with them no matter where you are.

We are all familiar with an Operating System (OS) since we use one every day. Be it is Microsoft Windows or Apple MAC OS or even Linux, they are the indispensable software that make our PC run [1]. An operating system manages the machine resources, abstracts away the underlying hardware complexity and exposes useful interfaces to upper layer applications. A traditional OS manages resources within the machine boundary (such as the CPU, memory, hard disk, and network), but it has no visibility beyond the box [7]. “Wolke” is a German word for “Cloud”. It is a Cloud based OS which contains all the mainstream Cloud Operating System features along with integrated Social features just like Facebook and Google+. Wolke is a simplified Operating System that runs just on a Web browser, providing access to a variety of web-based applications that allow the user to perform many simple tasks without booting a full-scale Operating System. Because of its simplicity, Cloud can boot in just a few seconds. Wolke is designed for Net books, Mobile Internet Devices, and PCs that are mainly used to browse the Internet. The integrated social features will allow users to add friends/connections to their account. They can also chat with the people inside the friends/connection list. They can also share the files, documents, music etc. privately with the people only in their friends list. The applications for Wolke will be developed using basic HTML5 and CSS3. Therefore, these applications are often referred to as Web Applications.

II. LITERATURE SURVEY

There are many innovative products and services that exploit cloud computing. More and more companies are shifting from their hardware constricted room into cloud based farms. There are more devices, more applications, more users and thus more data than ever as a direct result of adapting cloud computing industry wide. Most of the systems provide varied different services associated with the OS. Cloud OS attempts to take these services online so that it would be accessible everywhere via browser and provide functionalities associated with conventional OS [6]. However, the operating systems that browsers run on were designed in an era where there was no web.
Thus Cloud OS is an attempt to rethink and modify operating system based on our needs. One such product is Google’s Chrome OS. Google’s announced a new project that’s a natural extension of Google Chrome — the Google Chrome Operating System. It was Google’s way to modernize the computing environment. Computers need to get better. People are in a hurry to get to their email instantly, without wasting time waiting for their computers to boot and browsers to start up. They want their computers to always run as fast as when they first bought them. They want their data to be accessible to them wherever they are and not have to worry about losing their computer or forgetting to back up files. Even more importantly, they don’t want to spend hours configuring their computers to work with every new piece of hardware, or have to worry about constant software updates. So any time users have a better computing experience related to their tasks and needs, results in having happier users who are more likely to spend time on the Internet. Thus introducing powerful new features that reinforce the social dimension of the platform and make the delivery of Hybrid Desktop Virtualization happen is and should be one of the main priorities [5]. So basically employing services on cloud via browsers would definitely help in enhancing work aspect and performance of users. However, browsers don’t yet do everything, and there are two decades of Windows applications that have been written, performing functions that can’t yet be replicated in a browser thus the concept needs to grow overtime in order to encapsulate the true idea of social cloud operating system.

III. METHODOLOGY

Wolke Operating System can be defined as:

- An environment used to create contents in a user’s machine from an online application stored on the cloud and run through a web browser.
- An Internet based computing environment where you pay only for resources that you use.

Combining a browser with a basic operating system allows the implementation of cloud computing, in which applications and data "live and run" on the Internet instead of the hard drive. Wolke OS can be used together with other Operating Systems. Because of its simplicity Wolke OS can boot in just a few seconds. This is also referred to as platform as a service (PaaS) and Software as a service (SaaS). This amazing technology allows a user to access their own virtual desktop from anywhere around the world, without even using having network access to a remote PC. In addition, you are essentially using the Internet to work as a desktop.

A. The Front End

The Front End refers to the interface between the “User” and “The Back End”. It is mainly developed using the latest version of Web Standard Markup Language HTML5 and recommendations for stylesheets, CSS3 from W3C. For some validation purposes PHP, jQuery and JavaScript is used.

![Fig. 1. User Interface of Wolke](image)

Most of web applications inside Wolke is based on ASP.NET [2]. However, some compact web applications such as calculators, clock etc. will be developed mainly using HTML5, CSS3 and JavaScript specifically using its JQuery Library.

The front end web desktop environment will be visually responsive, due to which it can adapt and adjust the desktop’s look & feel according to the resolution and size of the display.

The interface of the applications as well as the desktop projects a clean, flat, elegant look and feel which provides a huge promise in able to deliver all the necessary functions on the front page. It exhibits a fast, responsive, clear and coherent structure. It has been developed by keeping in mind the user’s requirements in order to provide the necessary functions in the best way possible visually without any muddle or confusion.

Iterating some of the essential components from the project. One of the essential part is the File manager to superintend the files being uploaded to the user account and keeping track of all the files associated with the said user. Along with this, providing the user with a direct upload link to their dedicated user space. In order to incorporate the relief structure of the web page and plethora of applications have been developed and are kept in mind for future development.
B. Applications
Wolke includes a File Manager which provides a desktop like user interface to manage files and folders. It can perform operations on files or groups of files which include uploading, opening (e.g. viewing, playing, editing or printing), renaming, moving or copying, deleting files.
The Email Client inside Wolke facilitates a dedicated communication channel between different users or among groups. It incorporates the social as well as a corporate element by able to keep in touch and contact different users or share material among peer groups.
It also includes a WYSIWYG system based Word Editor. It has the ability to display bold, italic, underlined, strike out, superscript, subscript as well as formatted texts along with some additional support of paragraph alignment, bullet as well as numbered lists, font styles and sizes etc. just like a conventional desktop word processor.
With all the huge applications as mentioned above Wolke also includes some small utility web apps like Calendar, Calculator, Notes, Google Search and a Code Tester etc.

Fig. 2. Multiple Applications

The main aim of developing a Cloud platform based OS was to extend the features of the standard cloud systems available in the market and able to provide additional functionalities in form of Text Editor, Email Client, Search Portal, Storage Area etc. at all times via any device. The project not only contemplates the necessities of the users but try to deliver via added functionalities combined with a swift coherent work space in order to achieve good working system.

C. The Back End
Every module of the back end resides in a remote server. The server responds to all the requests made such as upload, download, share etc. The algorithm that will be used for scheduling and servicing the requests will depend on the type of server used and also the server space provider (Hosting Company). Wolke will include applications created using ASP.NET hence we will be implementing this project on a Windows Server, it also has support for PHP, MySQL etc. the core components of Wolke [2].

D. Architecture
The vital components of the architecture of Wolke are the Front End as well as the Back End as mentioned above which comprises of various web technology components such as HTML5, CSS3, JS & JSPs, ASP.NET, PHP, SQL Database etc.[2][5]. These web technologies are altogether responsible for making this Cloud Operating System work efficiently & robustly.

Fig. 3. Architecture of Wolke
E. Workflow
Users can access the Wolke Desktop just by logging in to their respective accounts from any device. As Wolke is responsive, it can adjust itself for different screen resolutions i.e. there is no separate mobile site, no tablet site, no desktop site — there’s just one Wolke for everything. A Web Browser installed on a client machine is the only thing used to access Wolke OS. When a user visits for the first time he/she has to sign up for a new account so that they get themselves registered & hence authorized to use the OS. If the user is an old visitor he/she can use their registered Username and Password and can directly login to the Desktop. Whenever a new user registers on the front end using the sign up form, a post method is invoked which sends a request to the server along with the entered information by the user and hence, the database is updated with the newly registered user.

IV. ADVANTAGES

A. Worldwide availability
As the entire system resides in a remote server it will be available worldwide across the internet. Users can access Wolke from anywhere by just using there ID/Username and password to login.

B. Requires only a modern Web Browser
Users will only require a modern web browser that supports latest web standards, examples of such browsers are Internet Explorer 9+, Google Chrome 33+, Mozilla Firefox 29+, Maxthon Cloud Browser and Opera 12+ as the old browsers do not have the capability to handle dynamic HTML5 and CSS3 codes.

C. Applications
Includes various utility light web apps such as a Calendar, Calculator, Image Viewer, Clock, Google Search, Notes, and Code Tester etc. along with some heavy applications like Email System, File Manager and a Word Editor as mentioned above.

D. Cloud Storage
All the data created and uploaded will be stored in the cloud so that users can access them anywhere from any device anytime they want.

E. Platform Independent
Wolke is platform independent as it is browser dependent i.e. it can run on any Windows, Mac, Linux, Android or iOS based devices.

F. Social Connections
Social Connectivity is an important aspect of any software system these days. Wolke provides users the ability to add peoples to their connections and communicate with them just like Facebook & Google+.

G. Share data publicly or privately
Users have to option to share the data publicly (i.e. the data can be viewed by everyone) or privately (i.e. the data can be viewed only by the limited set of individuals) only with the people in their connections.

H. No Drivers or Plugins Required
No drivers or 3rd party plugins installation required to run Wolke, all that is needed is just a Modern Web Browser & Internet Connectivity.
I. Low Resources Used
Wolke only uses the resources used by the Web Browser on the Client Machine, no auxiliary memory space or any other hardware resources used.

V. DISADVANTAGES

A. Limited Server Space
Due to the economic constraints associated with our project as students we are imposed to implement Wolke on a limited server space.

B. Limited Storage Space
As the server space is limited, each user will get a limited amount of storage space. (Approximately 500MB/User)

C. Mandatorily requires Internet Connection
Wolke resides on a remote server on the internet, therefore it is mandatory to have Internet Connection to access the Cloud Operating System.

D. Old browsers not supported
Require a modern web browser that supports latest web standards, examples of such browsers are Internet Explorer 9+, Google Chrome 33+, Mozilla Firefox 29+, Maxthon Cloud Browser and Opera 12+ as the old browsers do not have the capability to handle dynamic HTML5 and CSS3 codes.

E. App Store is difficult to implement at project level
It is currently difficult to include an App Store in Wolke, as it would require us to release API to large number of third party developers and vendors.

F. Traditional SQL Database
We are implementing the traditional SQL database that stores the information in the RDBMS format, which is not scalable and we are confined to this limited database size due to server space problem.

VI. FUTURE SCOPE
In order to comprehend the full potential of Cloud computing it is essential to expand its horizon for which purpose we introduced the concept of Cloud Operating System in form of Desktop Client. It still does not have a clear and concise definition in computing literature as a result it is open to interpretation which in future will help in expanding its domain to incorporate other services based on needs and computing aspects of the industry [4]. The basis of our attempt to build such a system is attributed to provide a global unified fusion of cloud platform and operating system functionalities. The full potential of this project is constricted due to limited funds and server space availability. In future, if taken up and supported by relevant venture it can be taken up to a global platform by further extending its functionalities by utilizing the server space. With our potential it is named as a Desktop Client. However, if backed with proper resources ,it can be seen and developed as a true Cloud based Operating System. It will act as a direct source of access for communication, storage, manipulation of data information portal and lot more.

Imagine there is only one single unified Operating System running on all devices that you own. Implemented by installing only on a single primary device (e.g: desktops) and all the secondary devices (e.g: laptops, tablets & smartphones) have access to that Operating System without any installation, therefore there will be only one single OS running across all your devices. Hence, we don’t have to keep on copying data from one device to another, get the data only on a primary device or any other secondary device, and it will be readily available across your devices. This will save a lot of Storage space to the users and Hardware costs to the manufacturers.

REFERENCES