











unloading on to their devices on demand. A client can either obtain the SIMs synchronously or asynchronously. Each client sends a request and gets a unique Session ID allocated when connection is accepted. If it's a direct request the connection gets terminated as soon as response is obtained while an indirect one a notification or redirect commands are also availed to the client. For instance, a message notification or call is loaded to the client's other SIM on the cloud comes while a call is in progress on the active one the alert manager will be raised. PCaaS can be incorporated can easily into the current underlying communication infrastructure using a powerful API but it requires altering of the Client Phone OS to include the virtual SIM services. This raises tight coupling to a particular mobile platform and most likely there will be SIM loading delays for communication to be established.

Limitations of PCaaS:

- Supports a finite number of Service Providers unlike other Cloud Computing Services.
- Virtual SIMs can't be accessed simultaneously but relies on the notification algorithm and alert mechanism employed at the Cloud.
- Does not fully support real time and distributed computing as it requires enhanced communication services.
- Benefits of using PCaaS:[2]
- PCaaS integrates social networking, cloud computing, and phones together.
- Provides the choice of network providers thus reducing the capital expenditure
- Reliable and resilient services are provided by multiple secure sim hoards which are loaded in to the cloud which are highly scalable.
- Ease upgrading process which is availed in the form of new services.
- Client phones use an efficient notification system.
- Session ID is used to identify and provide authentication to a user.

## 8. Proposed Hybrid Web Service Based Communication Model for Telephony Services

Each Web Service Communication Model based on the SOAP seems to have a glitch in achieving asynchronous real time communication. At the same time RESTful web services make use of Open APIs to build dynamic and complex web applications but require a trusted Server to contain your URI resources. The security of Open APIs is still flaccid and can be easily comprised. Fusing both the good aspects of SOAP and REST Web Services will be the key to achieving distributed computing communication as a service while incorporating the Virtualization of SIM cards and the networking infrastructure. This will bring about a flexible and extensible telephony services which are offered on demand and with less OPEX (Operational Expenses) and CAPEX (Capital Expenses) being used by CSPs.

## 9. Conclusion and Future Works

Technology is advancing likewise communication is following suit, to try and meet the growing user needs. Web

services are shifting from mere service integration methodologies to communication frameworks. WIP is a greater example of a SOA Web service based paradigm offered via IP and uses SOAP to transmit messages between end points. The UDDI registry enables a Web Interface for the end points while making them discoverable or after incorporating then with RESTful Web services. Services can be added in a dynamic manner and this promoted the raise of WIPdroid a WIP architecture being adopted on an android platform to provide real-time communication with a distributed computing nature. A WIP Switch implements a WIP End point which has a 2SAP supporting unconventional web services capabilities and the switch can be controlled by the user from the Android GUI views. Like all SOA applications it has message overloading and programming complexity when unifying SOAP applications. The REST framework tries to eradicate SOAP shortfalls through its simplicity and lightweight nature. RESTful Web Services are well suited for the asynchronous real time and distributed web applications as they are easy to identify, scalable, self-describing URI and use HATEOS. SIPS is just as ease to implement and discovered using URI like RESTful WSs but are not as scalable and require a special framework to be adopted for real time communication. Virtualization is moving to the smart phones and can be applied through augmentation techniques while tasks are loading to a clone phone on a Cloud. This will increase processing power and increase multitasking. Moreover a Phone call can be offered as a service as the advent of virtual SIMs comes into play. This will remove the hustle of carrying to multiple phones or SIMs as one can simply use one mobile device to load multiple SIM on demand while being offered various services. For future works much has to be carried out in the analysis of the integration of Web Services and Android in SIM card virtualization.

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