

A thick dark blue vertical bar runs along the left edge of the slide. A blue arrow-shaped banner points to the right from this bar, containing the date. Below the banner, several thin, curved lines in dark blue and light grey sweep upwards from the bottom left corner.

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# DISTRIBUTED SYSTEMS AND CLOUD COMPUTING

Topic: Web Interactive Notebooks as an emerging  
technology in Distributed Systems Architecture  
and parallel computing

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*Abstract:*

**In this survey paper I discuss Web Notebooks as an Integrated tool in distributed system Architecture. Several use cases of Web Notebooks have been discussed. In this paper the integration with Grid computing and parallel distributed systems have been discussed. A trade study form has been Integrated into a single document to give a better perspective of how web notebooks work. A presentation has been attached to this survey paper where an actual notebook is created and discussed in detail. Capturing of trade study text and data across multiple tools forms in this day and era is a cumbersome approach. This survey papers Intends to simplify the distributed and Grid computing architecture using the Era of Interactive Web Notebooks.**

***Keywords:*** Jupyter Notebook; Grid Computing; System Engineering based Models; Knowledge Management

## **1. INTRODUCTION**

This document discusses the plethora of techniques, methods and systems for managing web notebooks which is a method of adding web based content to distributed computing and Grid computing [1]. The Web Interactive Notebooks is a modern day/new era application which is used to cache content to increase performance, to distribute the workflow among the web based distributed and grid computing machines.

A Method of using the web notebook by adding web-based content can produce plethora of search results which are responsive to the search request put forward by the user. By doing this Multiple corresponding icon are generated which is distributed evenly in the web-based content and each corresponding icon can thus be Invoked. This will further be placed in a user account [1] and hence forming and forming a correlation between one of the multiple search results and the web notebook.

Within this paper we speak about the use of online notebooks and a System connected with the behaviour, management and presentation of Results of studies of engineering trade in a manner that both Captures the design of trade studies and offers interactive Exploration of results of the commercial research. We are using the new ones Jupyter Notebook Project [2] as the basis for the study of commerce Execution and reporting, and explanation of how to do that.

Engineering trade as a core system engineering process. The studies serve to develop decision-making information, provide design supporting documentation for the decision, use the communicable format for stakeholder presentation, and Provide visibility to the customer in developing the design. The Jupyter Notebook is a open source software developed using the existing proprietary and open source multimodel tools, such as OpenModelica [2] and IPython [2] Notebooks. The Architecture of notebooks, in Stores source code in addition to running machine code and the output to an editable document with notes and text Figures in the Markdown hypertext language (HTML) format.

In this survey paper, I also discuss how the Interactive Web Notebooks can be made more Interactive and can be used to support and incorporate decision data with other model-based

systems development tools [2]. Between design based on a model and detailed engineering Design. Finally, I Intend to present maturity status and community adoption for these powerful tools. We believe that web notebooks or similar technologies will emerge over time as a key component of the Distributed web system architecture.

## **2. FEATURES OF WEB NOTEBOOKS**

For an example, this section uses the Jupyter Notebook to implement a web notebook. The Jupyter Project is an open-source software project with a broad user / developer base and various third party open-source software application and framework providers for integration. The Jupyter Notebook [4] framework is written in the programming language of Python, which facilitates the quick development and integration of tools

### **(1) Knowledge sharing:**

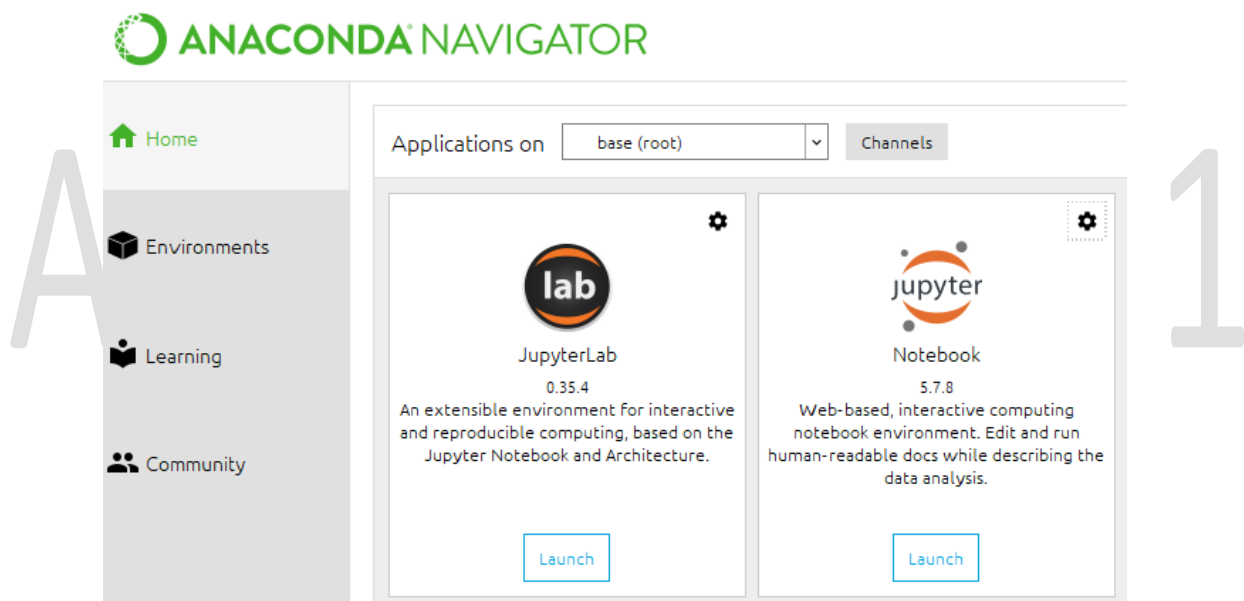
The web notebooks is used to provide access to both the fixed and mobile nodes. By doing this, the access and control among various set of resources is distributed. It is also Important to note that the access, sharing among the web notebooks is enabled by default.[4] Users may act both as the consumers as well as providers of the information. A good example of this structure is the Jupyter notebook.

### **(2) Subscription and notification:**

In a typical working environment, collaborative work is important. It usually happens that a particular department at the workplace [3] has to wait for another task to me completed

before resuming their work. For Example, the testing team in a software development firm might have to wait for another team to complete. Membership components are required that capable a client to buy in to business occasions and to receive warnings. Notice on the accessibility of different clients is additionally required for correspondence and in-development trade purposes.

### (3) Mobility:



**Figure (1) – The web notebook Interface**

The Web notebooks come with an interface that is highly interactive. Below is screenshot of the Jupyter Lab interface. The web notebooks systems support different connectivity forms like the connected mode, disconnected mode and ad-hoc node. In the disconnected mode, the user does not have any network connectivity.

#### **(4) Communication:**

There is a requirement for improving between close to home cooperation and correspondence among the various gatherings inside the procedure organize. Alongside texting this incorporates support for cutting edge coordinated correspondence, for example, voice-and video-gushing.

#### **(5) Device Independence:**

The Web Interactive notebooks are device Independent and can be run across multiple operating system environments. As this is an interactive way of adding web-based content to the distributed system framework, the web notebooks offer device Independence.

ASSIGNMENT 1

### **3. ANALYSIS AND FINDINGS**

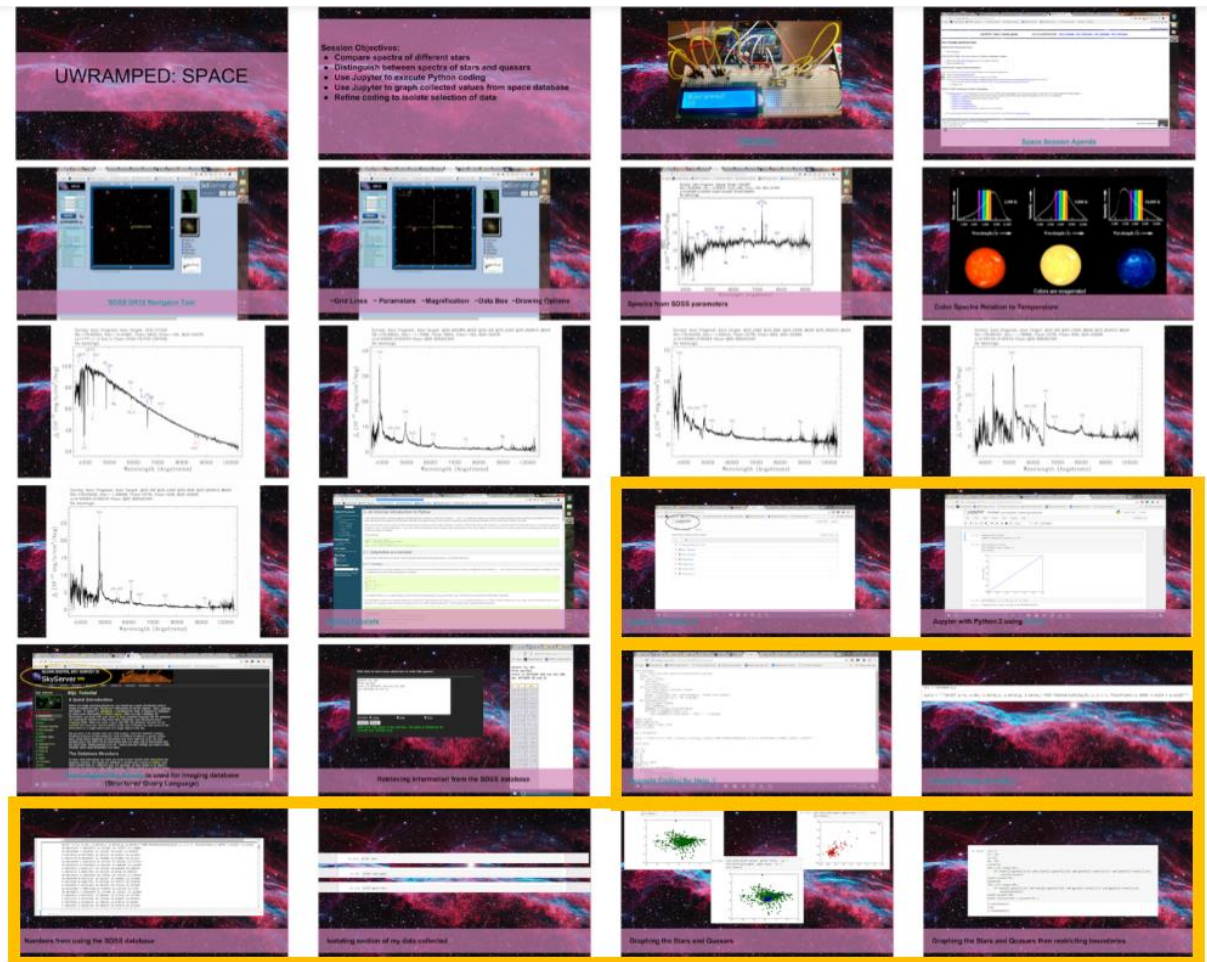
This section of the survey paper deals with the analysis and findings of using a Web Notebook as an interactive platform in the distributed system architecture.

#### **High School teachers Self Guided – Learning :**

A physics teacher with less than 2 years of teaching experience was one of the K12 instructors who has Implemented CS in their teaching curriculum. One of the tasks that has been assigned to her is the implementing of a web based tool for self learning of the python application. This has been implemented on the Jupyter notebook.

At the end of the survey it was noted that The educator's introduction for her friends demonstrated how she took the mid year PD content, and applied it, in her own independently directed learning, yet additionally in her guidance of her own material science class. Over 30% of her introduction was devoted to the utilization of programming scratch pad (Jupyter) in a cloud-based condition (JupyterHub) – see Figure 2. A subsequent meeting discovered that rate lined up with the focal point of her in-class usage plan. The below screenshot is from Jupyter Notebook console which is used to configure variety of python scripts on a distributed Environment like Jupyter Lab.[2] The Jupyter Notebooks make use of the whole study analysis in one document. In the same notebook, one can also develop a model to generate results, then explore the model and this is used for sharing the complete analysis.

A



**Figure (2) – Cloud Based Web Notebooks condition**

ICalico supports plethora of languages that is python, java, scheme, flow. All of these languages are treated nguages allow plethora of activities like entering the code recursively and making changes to the code snippets and incrementally develop programs. ICalico comes with rich library



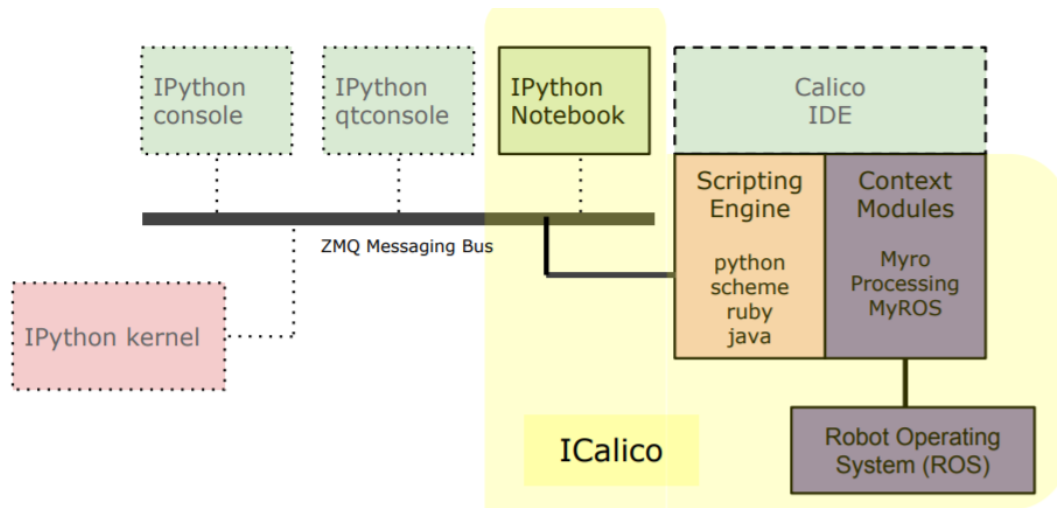
of exploring introductory books[6] which can further be used in the distributed framework. This has an Inbuilt library called Myro, the myro library allows students to interactive website.

The below is the architecture of Iclico and Ipython web notebook. Ipython Kenel is divided into a number of sub books which is further connected to a ZMQ Messaging bus[5]. The Ipython Notebook is connected to the ZMQ Messaging Bus which is further connected to the Ipython Notebook.

The robot operating system (ROS) is further divided into two modules. The Scripting Engine which is mainly designed based on the python, ruby and java scheme. The context modules Is further divided in the Myro processing MyROS which is mounted into a Calico IDE.

By the usage of this web notebook, as seen in the below figure, the Messagin bus is used to distribute tasks among the number of consoles that are attached to the IPython qtconsole.

The Calysto venture takes all the Python-based segments from Calico and makes them accessible without the .NET/Mono system. This permits Calysto-based dialects and libraries to utilize standard CPython-based libraries,suchasnumpyandmatplotlib.TomakeourCalystobased dialects have a similar sort of utility that Python has in IPython, we have worked with other open source engineers to make metakernel4.[5] Metakernel includes magics, order fruition, order history, shell get to, equal handling backing, and more to Calysto-based dialects. In this manner, understudies can utilize equal handling with Calysto Scheme and Calysto Prolog. The accompanying areas depict how one can investigate themes in AI through Jupyter scratch pad.



Figure(3) – Architecture of Icalico and IPython web notebook

## 4. CONCLUSION

Jupyter notebooks provide a perfect platform for computational work. Notebook documents contain the inputs and outputs as well as additional text that accompanies the code but is not meant for execution. In this way, notebook files can serve as a complete computational record of an analysis, interleaving executable code with explanatory text, mathematics, and rich representations of resulting objects. As most of science is becoming increasingly computational, tools such as Jupiter Notebook will help to record and share the many computations a scientist will perform on a daily basis.

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