

The Cloudy Distribution in Community Network Clouds in Guifi.net

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Abstract—This demo paper presents Cloudy, a Debian-based distribution to build and deploy clouds in community networks. The demonstration covers the following aspects: Installation of Cloudy, the Cloudy GUI for usage and administration by end users, demonstration of Cloudy nodes and services deployed in the Guifi community network.

Index Terms—community networks; cloud computing;

I. INTRODUCTION

We present the demonstration of a community network cloud, a cloud which is deployed in community wireless networks. While we report experiences in [1] and [2] discusses the foundational architectural elements of such a community cloud, we demonstrate in this paper a real deployed system. The community cloud which we demonstrate materializes the vision of clouds in community networks, hosted on community-owned computing and communication resources, and providing services of local interest.

II. COMMUNITY NETWORK CLOUDS

A. Community networks

Community networks consist of IP-based communication networks which local communities of citizens build and operate on their own. The dimensions of community networks range from tenth of nodes to large deployments with several thousands of nodes. Guifi.net¹ is our target community network where we deployed the cloud infrastructure. With more than 25000 nodes, Guifi can be considered the largest community network worldwide. Figure 1 shows the wireless links and nodes of Guifi.net in the area around Barcelona.

Community networks often originated as a solution for providing Internet access to the population of areas which were unattended by commercial telecom operators. Internet access is therefore still seen by many users as important (and often the only) service of community networks. Community clouds

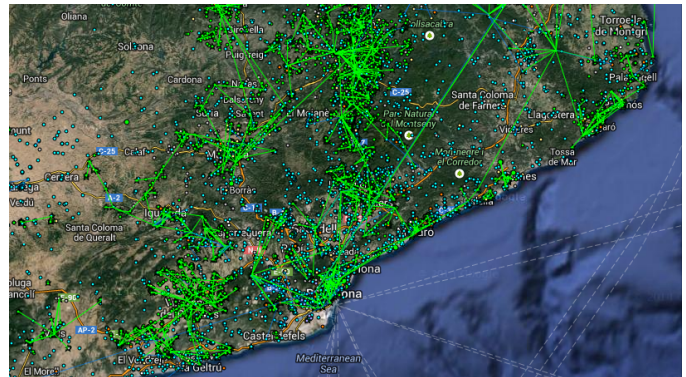


Fig. 1. Guifi.net nodes and links in the area around Barcelona.

should help recognizing the value of service provision *inside* of the network, beyond Internet access.

B. The vision of clouds in community networks

Our goal is to provide cloud-based services *within* community networks. As a consequence, if community network users consume cloud services inside, not going outside the network, several benefits may be obtained: 1) Services inside the network can be shaped to the local user needs, 2) user experience in terms of latency may improve through cloud services inside the network, 3) local idle resources at the users' premises could be part of the community cloud infrastructure, which may be favourable in terms of energy consumption and infrastructure provision cost.

C. Materializing community network clouds

In collaboration with the Guifi.net community network, and supported by Community-Lab² provided by the CONFINE project³[3], and as part of the CLOMMUNITY project⁴, we

²<http://community-lab.net/>

³<http://confine-project.eu/>

⁴<http://clommunity-project.eu/>

¹<http://guifi.net/>

have developed *Cloudy*⁵, a Debian-based distribution to build community network clouds.

Cloudy is open-source and can be downloaded from public repositories⁶. Cloudy is meant to be useful and usable for the end-user, to be installed on any kind of on-premise devices, which then can become part of community network clouds. Therefore, Cloudy has also been installed on desktop PCs as well as on low-resource single-board-computers such as RaspberryPI and BeagleBoard Black⁷.

Figure 2 shows Cloudy's Web-GUI after login. It can be seen that Cloudy contains three main types of services: 1) search, 2) community services, and 3) Guifi.net services.

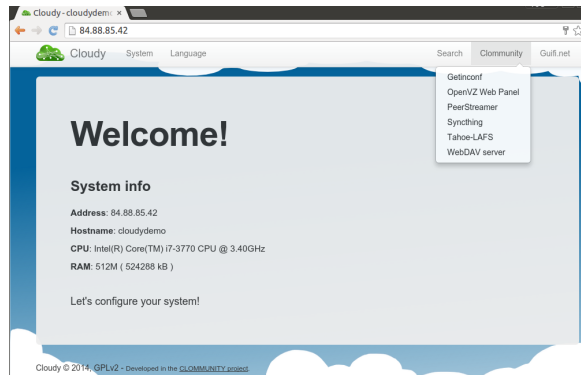


Fig. 2. Services in the Cloudy distribution.

1) *Search service*: The search service is available through two systems: Avahi-Tinc and Serf⁸. Figure 3 shows some services which are discovered by Serf. Here it is dnsservice, owp, peerstreamer, proxy3, serf, snpservice, synchthing, tahoe-lafs, tincvnp. If clicked on a particular service, e.g. proxy3, the list of cloudy instances which have this service are shown.

2) *Community services*: If clicked on the community services in Figure 2, a list of applications appear. These applications can be activated by the user. Currently, Cloudy provides Getinconf, OpenVZ, Peerstreamer, Syncthing, Tahoe-LAFS, WebDAV. OpenVZ allows Cloudy users to provide infrastructure resources to the cloud. Peerstreamer allows live streaming of events. Syncthing allows to synchronize and share folders among machines and users. Tahoe-LAFS provides a secure and fault-tolerant data storage service.

3) *Guifi.net community network management services*: The services for community network management are shown in Figure 4. The Proxy3 service enables with the Squid-Proxy a gateway to the Internet. SNPServices is a tool used for network monitoring and DNSServices activates a DNS server.

D. Status of community network cloud deployment

More than 20 instances of Cloudy are deployed in the Guifi community networks. Some Cloudy instances run on Jetway bare bone devices, others run on desktop PCs within

⁵<http://cloudy.community/>

⁶<http://repo.clomunity-project.eu/images/>

⁷see boards and guides in <http://wiki.clomunity-project/howto>

⁸<https://serfdom.io/>

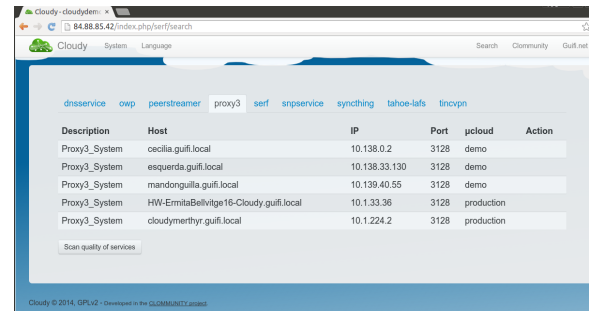


Fig. 3. Service instances discovered by Serf.

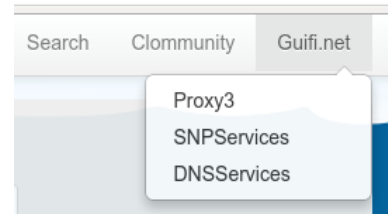


Fig. 4. Guifi services in Cloudy.

virtual machines provided with Proxmox. The current number of active Cloudy nodes and running services inside the Guifi community network can be seen through an open Cloudy instance accessible from the Internet⁹.

III. DEMONSTRATION

The community network cloud demonstration at the IM 2015 conference is a live demo in two parts: 1) A demo of our experimental facility, Community-Lab, which allowed us to conduct experiments, test and evaluate many of the community cloud services [4]. We will connect to the Web interface of Community-Lab, connect to testbed nodes, and show how we used the testbed for experimental community cloud research. 2) A live demo of Cloudy, the community network cloud distribution. For this purpose, we will connect to the Web-GUI of Cloudy instances and explore the cloud deployed in the community network, use the service discovery and see some cloud services, e.g. Tahoe-LAFS, Peerstreamer and Syncthing.

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⁹with guest:guest login <http://http://84.88.85.42/>