The Computerworld Honors Program

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ORGANIZATION:
CISAR

ORGANIZATION URL:
http://www.cisar.it

PROJECT NAME:
CisarNet

PROJECT OVERVIEW

CisarNet is the name of the project that CISAR, one of the largest italian radio amateurs associations, is developping in these months to achieve association's targets of experimenting and supporting national civil defense in emergency situations in case of EarthQuake or other kind of disaster. CisarNet consists of an extended wireless digital backbone, that is covering a large part of italian national territory, with medium and long distance wireless connections (up to 304 Km, world record of permanent radio amateurs digital connection using 5.7 Ghz technology), for a total of about 2.000 Km of wireless paths interconnecting almost 100 network subnets. Around this backbone, Cisar's members built a complete ICT infrastructure, to manage and maintain the network backbone up and running, and to erogate services for collaboration, monitoring and for supporting rescue teams in emergency conditions (civil defense). Very positive has been the usage of this project during the Terex 2010, an international simulation emergency event of an EarthQuake, who involved five different european countries team and with observers from all the 27 states of European Union. The same infrastructure has been used in those cases where, depending on territory orography, any other kind of large bandwidth connectivity was not available, to overcame digital divide issues situations. The technical solution is not dependent to a single vendor devices, standardization and usability has been a strong requirements who helped the Cisar team in all the choices. Wireless connection are primarly 802.11a standard connection, at 5.7 Ghz regulamented frequency assigned to radio amateurs. 802.11b/g are used for short range connections and hot spots. Hardware is mainly Mikrotik, but we used also D-Link, LinkSys (with OpenWRT), Cisco and other vendors equipments. Redundancy is permitted by implementing the dynamic Open Shortest Path First (OSPF) routing protocol (using Zebra/Quagga on Linux environment), to improve availability and resilience. Services are running on a top of a virtualized VMWare ESXi infrastructure, and are all based on Linux Operative System (CentOS distribution) and with duplicated servers installed in two different places, in a hot/standby topology. Other than DDNS and DHCP integrated services, on the infrastructure you can find SYSLOG and

SNMP monitoring services (based on Cacti), RADIUS/LDAP authentication, VoIP solutions (based on Asterisk/Ascotia), Video over IP and collaboration (based on TeamSpeak), WEB, FTP and NTP services, and to support radio amateurs technology D*STAR operations. The killer application has been a live map monitoring all the networks on national territory, derived from Cacti software and customized by CisarNet team using Google Map (Appendix 1). This kind of infrastructure is now the difference from other similar project developed by radio amateurs in other countries, and this kind of approach has became surely a best practice to improve overall quality of the solutions for a nation-wide scenario project. Using radio ham assigned IP plan 44.0.0.0/8 and ampr.org directives, the quality of this kind of approach permitted succesfully interconnection to other country radio amateurs digital network (in specific way from Italy to Austria, that is already running with a wireless connection trough Alps).

SOCIETAL BENEFITS

The CisarNet project permitted to overcame digital divide situations, and in case of emergency in situations derived from EartQuake or other disaster events, could permit to support rescue team with connectivity and other tecnological services after few hours from the event.

PROJECT BENEFIT EXAMPLE

The most representative experience of CisarNet by the utilization of this project during the european simulation event of Terex 2010 (Tuscany Earthquake Relief EXercise of the last november), where the integrated model for civil protection intervention has been tested on a national and international level, and in particular a new plan for reception of European teams involved in search and rescue. Other questions monitored and checked out were assessment of buildings and health assistance to the population after an earthquake. 2,400 men and women from the operating units of the Civil Protection Italian National System took part in the working area between the provinces of Lucca, Massa Carrara, Pisa and Pistoia. 595 vehicles were used for the simulation exercise. The whole of Tuscany took part in the initiative with the evacuation of 194 schools on the morning of 25 November, drills that were held to coincide with the VIII school safety day. The civil protection system was activated with simulation of an earthquake of magnitude 6.4 at 11.00 am. Assembly areas set up onsite saw arrival in the evening of the eight Usar - Urban Search and Rescue teams from participating countries: Austria, France, Croatia, Slovenia and the Russian Federation. During the first 48 hours, six Advanced Medical Trailers were set up, as was a field hospital provided by the Russian Federation plus 12 emergency medical points. In this scenario, CisarNet team operated in a Working Area to setup an emergency radio connectivity for the most important campus of the exercitation; one citation is deserved to the Italian Military Cross Red Manager, who experienced real emergency situations during Abruzzo EarthQuake in 2006 and war experience in IRAQ and Afghanistan. He was surprised to have this kind of quick response in having Internet connectivity, when in other occasion he had to wait for several days, and in this case was enough just few hours to have, by means of a double hops wireless connection lied on CisarNet Infrastructure, a broadband connection who helped a lot the search and rescue operation, even if they were simulated!

IS THIS PROJECT AN INNOVATION, BEST PRACTICE? Yes

ADDITIONAL PROJECT INFORMATION

The exclusive utilization of open source or free software and a “zero budget” concept for the whole project have to be considered to fully understand the efforts and consequently the results aimed by the team of CisarNet. Some extreme conditions that you could find in installing and maintening up and running the systems, for example on the top of Marmolada mountains (on the Italian Alps, Appendix 2), where at 3.000 mt. above the sea, and temperature near -30 Celsius degree the weather conditions are not so comfortable to support for these kind of devices. On the other hand, keeping in mind that in emergency condition digital connectivity should be considered a must, where analog voice radio communications are not enough anymore to support rescue teams. Having a fully ICT infrastructure delocalizated and spread in a large part of the national territory, is the solution that make the difference when you have to provide connectivity in emergency condition, because you already know the topology of your Point of Presence, and easily could provide what you need, considering that usual cellular network and Internet Provider are not working or at least are congested and not efficiently usable by the rescue teams. In our case, CisarNet could be used esclusively for the emergency scope.