

4. IMPLEMENTATION SCHEME OF EDUROAM BASED ON SDN AND NFV TECHNICAL STRUCTURE

4.1 Basic preparation

To plan new Vlan and SSID in tested SDN network and to configure IPv4/IPv6 information in DHCP server; to allocate one virtual machine on Cloud platform with Cent-OS (Enterprise Operating System Community, community enterprise operating system) 7.1 as the operating system, acting as Eduroam RADIUS server.

4.2 To propose access application to Chinese Eduroam organization

To make an access application via email to Chinese Eduroam organizations, and the receiver will returned the KEY and testing account number via mail after identity confirmation.

4.3 To install and configure Eduroam RADIUS Server

According to the actual need, FreeRADIUS and Sever SQL software package are directly installed when Cloud platform is serving as the virtual machine. We only need to install the GIT software to track the changes of FreeRADIUS and to configure the /etc/raddb/proxy.conf files to achieve strategy forwarding. According to the above obtained KEY, RADIUS server information is connected so as to add records of testing users to the data base, thus establishing testing users.

4.4 To configure wireless controller AC

Configure the name of this SSID named as Eduroam on wireless network controller, set to launch 802.1X authentication, and make RADIUS server point at Eduroam RADIUS server.

4.5 Connection for testing

Firstly open the authentication service process on the server, select the SSID named as Eduroam in the testing phone and enter users' name and password to test whether it can be properly connected. If normal connection is available, it indicates that local user can use it normally. Then test the testing accounts given by Eduroam organizations to test whether users in other domains can pass the authentication and log in.

5. CONCLUSIONS

Currently, international exchange and cooperation in higher education has been an internationalized educational

cooperation platform. Eduroam can provide convenience for teachers and students to access wireless network and to obtain various resources of foreign universities. Therefore, in this paper, a virtual and finely-controlled Eduroam model featured by flexible authorization based on SDN / NFV technical structure is proposed and the implementation scheme of this model is provided so as to facilitate the implementation or study of Eduroam technology in other colleges.

REFERENCES

- [1] L. Chen, D. Xiaodong, C. Wei and C. Weiqiang, "Thoughts and practices about SDN and NFV," *Telecommunication Science*, vol. 8, pp. 23-27, Aug 2014. DOI: [10.3969/j.issn.1000-0801.2014.08.004](https://doi.org/10.3969/j.issn.1000-0801.2014.08.004).
- [2] Y. Yanting, "Roaming around the world," *China Education Network*, vol. 8, pp. 14-15, Nov, 2015. DOI: [10.3969/j.issn.1672-9781.2015.11.008](https://doi.org/10.3969/j.issn.1672-9781.2015.11.008).
- [3] Z. Huiling, S. Fan, "Development and challenge of SDN/NFV," *Telecommunication Science*, vol. 8, pp. 13-18, Aug 2014. DOI: [10.3969/j.issn.1000-0801.2014.08.002](https://doi.org/10.3969/j.issn.1000-0801.2014.08.002).
- [4] G. Xuxiao, F. Zhongnan and C. Jie, "Research on technology of wireless roaming authentication and authorization based on eduroam and SDN," *China Higher Education Institute of Education Information Technology Branch of the Twelfth Academic Year*, 2014. DOI: [10.3969/j.issn.1000-5641.2015.z1.026](https://doi.org/10.3969/j.issn.1000-5641.2015.z1.026).
- [5] Z. Hanjie, "Shared Eduroam alliance wireless network service," *China Education Network*, vol. 8, pp. 18-20, Nov, 2015. DOI: [10.3969/j.issn.1672-9781.2015.11.010](https://doi.org/10.3969/j.issn.1672-9781.2015.11.010).
- [6] Z. Chaokun, C. Yong, T. Heyi and W. Jianping, "State-of-the-art survey on software-defined networking (SDN)," *Journal of Software*, vol. 26, no. 1, pp. 62-81, Mar 2015. DOI: [10.13328/j.cnki.jos.004701](https://doi.org/10.13328/j.cnki.jos.004701).
- [7] Z. Qinyun, C. Ming, Z. Guangsu, "Research on OpenFlow-based SDN technologies," *Journal of Software*, vol. 05, pp. 1078-1097, May 2013. DOI: [10.3724/SP.J.1001.2013.04390](https://doi.org/10.3724/SP.J.1001.2013.04390).
- [8] Y. Chen, L. Yong and J. Depeng, "Failure recovery mechanism of SDN controller based on REST-API," *Computer Engineering*, vol. 41, no. 9, pp. 211-216, Dec 2015. DOI: [10.3969/j.issn.1000-3428.2015.09.023](https://doi.org/10.3969/j.issn.1000-3428.2015.09.023).
- [9] X. Haiqiang and Z. Hao, "Network Function Virtualization and Standardization," *ZTE Technology Journal*, vol. 2, pp. 30-34, Apr, 2015. DOI: [10.3969/j.issn.1009-6868.2015.04.010](https://doi.org/10.3969/j.issn.1009-6868.2015.04.010).
- [10] Z. Peng, "Three network innovation technology focused metropolitan area network optimization," *Communications World*, vol. 41, pp. 43, Aug 2013. DOI: [10.3969/j.issn.1009-1564.2013.26.055](https://doi.org/10.3969/j.issn.1009-1564.2013.26.055).