



# IEEE

## Ottawa Section



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## Enabling IoT Services Through Secure 5G Core Slices

by

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**DATE:** Thursday October 31, 2019

**TIME:** Refreshments, Registration and Networking: 06:00 p.m.; Seminar: 06:30 p.m. – 07:30 p.m.

**PLACE:** [Ciena-Optophotonics Lab \(Room T129\)](#), T-Building, School of Advanced Technology, Algonquin College, [1385 Woodroffe Ave.](#), Ottawa, ON Canada K2G 1V8

**PARKING:** after 5:00 p.m. at Lots 8 & 9. Pay \$5 flat rate at the machine and display the ticket on your car dashboard.

**Admission:** Free Registration. To ensure a seat, please register by e-mail contacting: [Wahab Almuhtadi](#)

### Abstract

The key motivation for this work is that future smart services (e.g. IoT applications) will have competing and perhaps conflicting networking performance requirements. These services will also require flexible and agile deployment. 5G networks, an essential component of future virtualized infrastructures, deal with this issue - in part - by relying on network slicing. To define a network slice, one has to consider the allocation of resources - both in the radio and core parts - of the 5G network to form a logical entity where a service could be deployed. Network slicing has emerged as a key-enabler for proving heterogeneous services. It takes advantage of the virtualization elements of future networking infrastructures where multiple services can be hosted on the same physical infrastructure.

This talk will give a quick overview of network slicing with emphasis on 5G core networks. It will also discuss the requirement for network slice isolation and different methods that were proposed to implement it. Finally, an overview of our research group ongoing work on mitigating Distributed Denial-of-Service (DDoS) attacks using slice isolation. Our approach is to tackle slice isolation as a resource allocation problem to deal with the trade-off between offering security while achieving a certain level of performance. In other words, we utilize a mathematical optimization model to solve a security problem. In our proposed solution, we use slice isolation as security constraints for the optimization model to proactively mitigate DDoS attacks. Our experimental test results show how DDoS could be mitigated and the impact on slice availability. We believe this work will encourage further research in securing 5G network slicing.

### Speaker's Bio

**Dr. Ashraf Matarawy** (<http://www.csit.carleton.ca/~amatrawy/>) is a Full Professor at the School of Information Technology, Faculty of Engineering, Carleton University. He is also a senior member of the IEEE and a licensed P. Eng. in Ontario. Dr. Matrawy leads the Next Generation Networks group at Carleton and is a Network co-Investigator of Smart Cybersecurity Network (SERENE-RISC). His research interests include reliable and secure computer networking, secure virtualized infrastructures, and security routing in IoT. In addition to his academic work, he did consulting work for different industrial and government organizations (<https://ca.linkedin.com/in/ashraf-matrawy-5917b56>). He spent his sabbatical leaves working for industry, at Cloackware Research Center in 2010-2011 and at TELUS in 2017-2018. He serves on the editorial board of the IEEE Communications Surveys and Tutorials journal and Wiley's Security and Privacy Journal. He has served as a technical program committee member of IEEE CNS, IEEE ICC, IEEE Globecom, IEEE LCN, and IEEE/ACM CCGRID and other conferences. Dr. Matrawy has more than 10 year experience in undergraduate and graduate curriculum development for the Network Technology programs at Carleton University. He served as associate director for the School for three and half years and as coordinator for the Networking program for six years.