

ΑΡΧΙΤΕΚΤΟΝΙΚΕΣ ΤΕΧΝΟΛΟΓΙΕΣ ΚΑΙ ΠΡΩΤΟΚΟΛΛΑ ΓΙΑ ΟΠΤΙΚΑ ΔΙΚΤΥΑ ΚΑΙ ΚΕΝΤΡΑ ΔΕΔΟΜΕΝΩΝ

Θέματα Εργασιών 2020 - 2021

Θεματικές Κατηγορίες

- NETWORKING IN THE DATA CENTERS AND THE CLOUD
- PASSIVE OPTICAL NETWORKS (PONs)
- ELASTIC OPTICAL NETWORKING
- OPTICAL PACKETS SWITCHING
- OPTICAL INTERCONNECTS ARCHITECTURES
- TRAFFIC PROFILES FOR HPC AND DATA CENTERS
- MULTI-COST AND MULTI-CONSTRAINT ROUTING
- OPTICAL BURST SWITCHING
- ROUTING AND WAVELENGTH ASSIGNMENT (RWA)
- GRID SCHEDULING
- SOFTWARE DEFINED NETWORKS
- PCE, ABNO and multilayer optical networks
- 5G NETWORKS AND OPTICAL NETWORKING

NETWORKING IN THE DATA CENTERS AND THE CLOUD

1. Hitesh Ballani, Paolo Costa, Thomas Karagiannis, Ant Rowstron "Towards Predictable Datacenter Networks" ([link](#))
2. Ang Li, Xiaowei Yang, Srikanth Kandula, Ming Zhang "CloudCmp: Comparing Public Cloud Providers" ([link](#))
3. V. Shrivastava, P. Zerfos, L. Kang-won, H. Jamjoom, L. Yew-Huey, S. Banerjee, "Application-aware virtual machine migration in data centers", IEEE INFOCOM, , pp.66-70, 2011.
4. X. Meng, V. Pappas, L. Zhang, "Improving the Scalability of Data Center Networks with Traffic-aware Virtual Machine Placement", IEEE INFOCOM, 2010.
5. V. Jalaparti, et. al. "Network-Aware Scheduling for Data-Parallel Jobs: Plan When You Can", Sigcomm 2015, ([link](#))

6. J. Lee, et. al. "Application-Driven Bandwidth Guarantees in Datacenters", Sigcomm 2014, ([link](#))

PASSIVE OPTICAL NETWORKS (PONs)

1. Effenberger, F.J.; , "The XG-PON System: Cost Effective 10 Gb/s Access," Lightwave Technology, Journal of , vol.29, no.4, pp.403-409, Feb.15, 2011 ([link](#))
2. Aurzada, F.; Scheutzow, M.; Reisslein, M.; Ghazisaidi, N.; Maier, M.; , "Capacity and Delay Analysis of Next-Generation Passive Optical Networks (NG-PONs)," Communications, IEEE Transactions on , vol.59, no.5, pp.1378-1388, May 2011 ([link](#))
3. Kanonakis, K.; Tomkos, I.; , "Improving the efficiency of online upstream scheduling and wavelength assignment in hybrid WDM/TDMA EPON networks," Selected Areas in Communications, IEEE Journal on , vol.28, no.6, pp.838-848, Aug. 2010 ([link](#))
4. McGarry, M.P.; Reisslein, M.; Colbourn, C.J.; Maier, M.; Aurzada, F.; Scheutzow, M.; , "Just-in-Time Scheduling for Multichannel EPONs," Lightwave Technology, Journal of , vol.26, no.10, pp.1204-1216, May15, 2008 ([link](#))
5. Yuanqiu Luo; Ansari, N.; , "Bandwidth allocation for multiservice access on EPONs," Communications Magazine, IEEE , vol.43, no.2, pp.S16-S21, Feb. 2005 ([link](#))
6. H. Song, B. Kim, B. Mukherjee, "Long-Reach Optical Access Networks: A Survey of Research challenges, Demonstrations, and Bandwidth Assignment Mechanisms",
7. IEEE Communications Surveys and Tutorials, 2010 ([link](#))
8. M. Ruffini, et al. "DISCUS: an end-to-end solution for ubiquitous broadband optical access" IEEE Com. Mag., 52 (2), February 2014

ELASTIC OPTICAL NETWORKING

1. O. Gerstel, M. Jinno, A. Lord, S. J. Ben Yoo, "Elastic Optical Networking: A New Dawn for the Optical Layer?", IEEE Communications Magazine, Feb, 2012 ([link](#))
2. M. Jinno et al., "Distance-Adaptive Spectrum Resource Allocation In Spectrum-sliced Elastic Optical Path Network," IEEE Communications Magazine, pp. 138–45, 2010 ([link](#))
3. K. Christodoulopoulos, I. Tomkos, and E. A. Varvarigos, "Elastic Bandwidth Allocation in Flexible OFDM-Based Optical Networks", IEEE/OSA JLT, VOL. 29, NO. 9, 2011 ([link](#))

4. F. Cugini, G. Meloni, F. Paolucci, N. Sambo, M. Secondini, L. Gerardi, L. Poti, P. Castoldi "Demonstration of Flexible Optical Network Based on Path Computation Element", IEEE/OSA JLT, VOL. 30, NO. 5, 2012 ([link](#))
5. Napoli, et. al. "Next generation elastic optical networks: The vision of the European research project IDEALIST", IEEE Communications Magazine, Vol. 53, No. 2, February 2015 ([link](#))
6. Sartzetakis I., Christodoulopoulos K., Varvarigos E., Accurate quality of transmission estimation with Machine Learning, J. Opt. Commun. Netw., 2019, vol. 11, is. 3, pp. 140-150.
7. Aladin S., Tran A. V. S., Allogba S., Tremblay C., Quality of transmission estimation and short-term performance forecast of lightpaths, J. Light. Technol., 2020, vol. 38, is. 10, pp. 2807–2814.
8. Seve E., Pesic J., Delezoide C., Bigo S., Pointurier Y., Learning process for reducing uncertainties on network parameters and design margins, J. Opt. Commun. Netw., 2018, vol. 10, is. 2, pp. A298–A306.

OPTICAL PACKETS SWITCHING

1. D.J. Blumenthal et al (February 2003). Optical signal processing for optical packet switching networks. IEEE COMMUN MAG, pp. S23-S29.
2. Dimitrios Klonidis, Christina T. Politi, Reza Nejabati, Mike J. O'Mahony, and Dimitra Simeonidou , OPSnet: Design and Demonstration of an Asynchronous High-Speed Optical Packet Switch, Journal of Lightwave Technology, Vol. 23, Issue 10, pp. 2914-2919 (2005). ([link](#))
3. L. Dittmann, C. Develder, D. Chiaroni, F. Neri, F. Callegati, Member, IEEE, W. Koerber, A. Stavdas, M. Renaud, A. Rafel, J. Sole-Pareta, W. Cerroni, N. Leligou, Lars Dembeck, B. Mortensen, M. Pickavet, The European IST Project DAVID: A Viable Approach Toward Optical Packet Switching, IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, VOL. 21, NO. 7, SEPTEMBER 2003. ([link](#))
4. David K. Hunter, Meow C. Chia, and Ivan Andonovic, Buffering in Optical Packet Switches, Journal of Lightwave technology , vol. 16,no. 12, Dec 1998 ([link](#))
5. D. K. Hunter, W. D. Cornwell, T. H. Gilfedder A. Franzen, and I. Andonovic, "SLOB: A switch with large optical buffers for packet switching," J. Lightwave Technol., vol. 16, pp. 1725-1736, Oct. 1998.([link](#))
6. C. Guillemot, M. Renaud, P. Gambini, C. Janz, I. Andonovic, R. Bauknecht, B. Bostica, M. Burzio, F. Callegati, M. Casoni, D. Chiaroni, F. Clerot, S. L. Danielsen, F. &c. ;i. Dorgeuille, A. Dupas, A. Franzen, P. B. Hansen, D. K. Hunter, A. Kloch, R. Krahenbuhl,

- B. Lavigne, A. L. Corre, C. Raffaelli, M. Schilling, J. -C. Simon, and L. Zucchelli, "Transparent Optical Packet Switching: The European ACTS KEOPS Project Approach," *J. Lightwave Technol.* 16, 2117- ,1998 ([link](#))
7. W. D. Zhong and R. S. Tucker, "Wavelength routed based photonic packet buffers and their applications in photonic packet switching systems", *J. Lightwave Technol.*, vol. 16, pp. 1737-1745, Oct. 1998 ([link](#))
 8. Varvarigos, E.M. "The "packing" and the "scheduling packet" switch architectures for almost all-optical lossless networks", *Journal of Lightwave Technology*, Oct. 1998, vol.16, (no.10):1757-67 ([link](#))

OPTICAL INTERCONNECTS ARCHITECTURES

1. N. Farrington, G. Porter, S. Radhakrishnan, H. H. Bazzaz, V. Subramanya, Y. Fainman, G. Papen, and A. Vahdat, "Helios: a hybrid electrical/optical switch architecture for modular data centers," in *Proceedings of the ACM SIGCOMM 2010*, 2010, pp. 339–350. ([link](#))
2. H. H. Bazzaz, M. Tewari, G. Wang, G. Porter, T. S. Eugene Ng, D. G. Andersen, M. Kaminsky, M. A. Kozuch, and A. Vahdat, "Switching the optical divide: fundamental challenges for hybrid electrical/optical datacenter networks", *ACM Symposium on Cloud Computing*, 2011.
3. Singla, A. Singh, K. Ramachandran, L. Xu, and Y. Zhang, "Proteus: a topology malleable data center network", in *Proceedings of the Ninth ACM SIGCOMM Workshop on Hot Topics in Networks*, ser. *Hotnets '10*, 2010, pp. 8:1– 8:6. ([link](#))
4. K. Kodi and A. Louri, "Design of a High-Speed Optical Interconnect for Scalable Shared-Memory Multiprocessors", *IEEE Micro*, 25(1):41–49, 2005. ([link](#))
5. O. Liboiron-Ladouceur, A. Shacham, B. A. Small, B. G. Lee, H. Wang, C. P. Lai, A. Biberman, and K. Bergman, "The data vortex optical packet switched interconnection network", *J. Lightwave Technol.*, vol. 26,no. 13, pp. 1777–1789, Jul 2008. ([link](#))
6. S. Peng, "Multi-Tenant Software-Defined Hybrid Optical Switched Data Centre", *IEEE Journal of Lightwave Technology*, 2015

TRAFFIC PROFILES FOR HPC AND DATA CENTERS

1. Kamil, S., Olikar, L., Pinar, A., Shalf, J.: "Communication Requirements and Interconnect Optimization for High-End Scientific Applications", *IEEE Transactions on Parallel and Distributed Systems*, 2009. ([link](#))

2. T. Benson, A. Akella, and D. A. Maltz, "Network traffic characteristics of data centers in the wild," in Proceedings of the 10th annual conference on Internet measurement (IMC), 2010, pp. 267–280. ([link](#))
3. S. Kandula, S. Sengupta, A. Greenberg, P. Patel, and R. Chaiken, "The nature of data center traffic: measurements & analysis," in Proceedings of the 9th ACM
4. SIGCOMM conference on Internet measurement conference, ser. IMC '09, 2009, pp. 202–208. ([link](#))
5. Roy, et. al. "Inside the Social Network's (Datacenter) Network", Sigcomm 2015 ([link](#))

MULTI-COST AND MULTI-CONSTRAINT ROUTING

1. Roch A. Guerin, and Ariel Orda, QoS Routing in Networks with Inaccurate Information: Theory and Algorithms, IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 7, NO. 3, JUNE 1999 ([link](#))
2. Piet Van Mieghem, Fernando A. Kuipers: Concepts of exact QoS routing algorithms. IEEE/ACM Trans. Netw. 12(5): 851-864 (2004) ([link](#))
3. F. A. Kuipers, T. Korkmaz, M. Krunz, and P. Van Mieghem, "An overview of constraint-based path selection algorithms for QoS routing," IEEE Commun. Mag., vol. 40, pp. 50–55, Dec. 2002. ([link](#))
4. F. Gutierrez, E.A. Varvarigos, S. Vassiliadis, "Multicast Routing in Max-Min Fair Networks", 38th Allerton Conf. on Communicating, Control and Computing, 2000. ([link](#))

OPTICAL BURST SWITCHING

1. J. Turner. Terabit burst switching. Journal of High Speed Networks, 8(1):3-16, 1999. ([link](#))
2. Lisong Xu, Harry G. Perros, and George Rouskas, Techniques for Optical Packet Switching and Optical Burst Switching. ([link](#))
3. M. Yoo, C. Qiao, S. Dixit, "QoS performance of optical burst switching in IP-over-WDM networks", Journal on Selected Areas in Communication, vl. 18, Oct. 2000. ([link](#))
4. P. Pavon-Marino, F. Neri, "On the Myths of Optical Burst Switching", IEEE Transactions on Communications, Volume 59, Issue 9, 2011

ROUTING AND WAVELENGTH ASSIGNMENT (RWA)

1. Zang, Jue, Mukherjee, A review of routing and wavelength assignment approaches for wavelength-routed optical WDM networks, SPIE Optical Networks Magazine, vol. 1, no. 1, Jan. 2000. ([link](#))
2. Asuman E. Ozdaglar, Dimitri P. Bertsekas, Routing and wavelength assignment in optical networks, IEEE/ACM Transactions on Networking (TON), Volume 11 , Issue 2 (April 2003) ([link](#))
3. R. M. Krishnaswamy and K. N. Sivarajan: "Design of Logical Topologies: A Linear Formulation for Wavelength Routed Optical Networks with no Wavelength Changers", IEEE/ACM Transactions on Networking, vol. 9, no. 2, pp. 186-198, 2001. ([link](#))
4. Tomkos, D. Vogiatzis, C. Mas, I. Zacharopoulos, A. Tzanakaki, and E. Varvarigos, "Performance Engineering of Metropolitan Area Optical Networks through Impairment Constraint Routing", IEEE Communications Magazine, pp. 40-47, Volume: 42, Issue: 8, Aug. 2004. ([link](#))
5. K. Christodoulopoulos, K. Manousakis, E. Varvarigos, "Offline Routing and Wavelength Assignment in Transparent WDM Networks", IEEE/ACM Transactions on Networking, Vol. 18, Is. 5, 2010 ([link](#))

GRID SCHEDULING

1. K. Krauter, R. Buyya, and M. Maheswaran, A Taxonomy and Survey of Grid Resource Management Systems, Software Practice and Experience, Vol. 32, No. 2, Feb. 2002, pp. 135-164. ([link](#))
2. Olivier Beaumont, Arnaud Legrand, Yves Robert, "Scheduling divisible workloads on heterogeneous platforms", Parallel Computing, Volume 29, Issue 9 , September 2003, Pages 1121-1152. ([link](#))
3. P. Kokkinos, K Christodoulopoulos, E. Varvarigos, Efficient Data Consolidation in Grid Networks and Performance Analysis, Future Generation Computer Systems, 27 (2), pp. 182-194 ([link](#))
4. K. Christodoulopoulos, N. Doulamis, E. Varvarigos, Joint Communication and Computation Scheduling in Grids, 8th IEEE International Symposium on Cluster Computing and the Grid (CCGrid 2008), May 2008, Lyon, France ([link](#))
5. T. Stevens, M. De Leenheer, C. Develder, B. Dhoedt, K. Christodoulopoulos, P. Kokkinos, E. Varvarigos, Multi-Cost Job Routing and Scheduling in Optical Grid Networks, Future Generation Computer Systems, Elsevier, Vol. 25, issue 8, pp. 912-925 2009 special issue on networks for Grid applications, 2008 ([link](#))

6. Andrei, D. Tornatore, M. Ghosal, D. Martel, C.U. Mukherjee, B. On-Demand Provisioning of Data-Aggregation Sessions Over WDM Optical Networks, Journal of Lightwave Technology, June 2009 ([link](#))
7. Zhenyu Sun, Wei Guo, Zhengyu Wang, Yaohui Jin, Weiqiang Sun, Weisheng Hu and Chunming Qiao Scheduling Algorithm for Workflow-Based Applications in Optical Grid. Journal of Lightwave Technology, vol 26 , September 2008 ([link](#))
8. Yan Wang, Yaohui Jin, Wei Guo, Weiqiang Sun, and Weisheng Hu, Joint scheduling for optical grid Applications, Journal of Optical Networking, Vol. 6, No. 3 , March 2007 ([link](#))

PCE, ABNO and multilayer optical networks

1. F. Paolucci et. al., "A Survey on the Path Computation Element (PCE) Architecture", IEEE Communications Surveys & Tutorials, 2013.
2. R. Munoz, et. al. "PCE: What is It, How Does It Work and What are Its Limitations?", Journal of Lightwave Technology, Volume 32, Issue 4, 2013
3. R. Casellas, et. al. "SDN orchestration of OpenFlow and GMPLS flexi-grid networks with a stateful hierarchical PCE", IEEE/OSA Journal of Optical Communications and Networking, Volume 7, Issue 1, 2015
4. Aguado, et. al. "ABNO: a feasible SDN approach for multivendor IP and optical networks", IEEE/OSA Journal of Optical Communications and Networking, Volume 7 , Issue 2, 2015
5. M. Bahnasy, et. al. "OpenFlow and GMPLS unified control planes: Testbed implementation and comparative study", IEEE/OSA Journal of Optical Communications and Networking, Volume 7 , Issue 4, 2015
6. Martinez, et. al. "Network Management Challenges and Trends in Multi-Layer and Multi-Vendor Settings for Carrier-Grade Networks", IEEE Communications Surveys & Tutorials, VOL. 16, NO. 4 2014
7. O. Gerstel, et. al. "Multi-layer capacity planning for IP-optical networks", IEEE Communications Magazine, Volume 52 , Issue 1, 2014

SOFTWARE DEFINED NETWORKS (SDN)

1. N. McKeown, et al. "OpenFlow: enabling innovation in campus networks", ACM SIGCOMM Comput. Commun. Rev., 38 (2), April 2008

2. B. Nunes, et. al. "A Survey of Software-Defined Networking: Past, Present, and Future of Programmable Networks", IEEE Communications Surveys & Tutorials, Volume:16, Issue: 3, 2014
3. D. Kruetz, et. al. "Software-Defined Networking: A Comprehensive Survey", Proceedings of IEEE, 2015 ([link](#))
4. S. Gringeri, N. Bitar, T. J. Xia, "Extending software defined network principles to include optical transport", IEEE Communications Magazine, Volume 51 , Issue 3, 2013. ([link](#))
5. A. Mercian, M. P. McGarry, M. Reisslein, W. Kellerer, "Software Defined Optical Access Networks (SDOANs): A Comprehensive Survey", ([link](#))

5G NETWORKS AND OPTICAL NETWORKING

1. Vassilaras S., Gkatzikis L., Liakopoulos N., Stiakogiannakis I., Qi M., Shi L., Liu L., Debbah M.; Paschos G., The algorithmic aspects of network slicing, IEEE Comm. Mag., 2017, vol. 55, is. 8, pp. 112-119. ([link](#))
2. Zhang H., Liu N., Chu X., Long K., Aghvami A., Leung V. C. M., Network Slicing Based 5G and Future Mobile Networks: Mobility, Resource Management, and Challenges, IEEE Comm. Mag., 2017, vol. 55, is. 8, pp. 138-145. ([link](#))
3. Raza M. R., Fiorani M., Rostami A., Öhlen P., Wosinska L., Monti P., Dynamic slicing approach for multi-tenant 5G transport networks, J. Opt. Commun. Netw., 2018, vol. 10, is. 1, pp. A77-A90. ([link](#))
4. Bega D., Gramaglia M., Fiore M., Banchs A., Costa-Perez X., DeepCog: Cognitive Network Management in Sliced 5G Networks with Deep Learning, INFOCOM, Paris, France, Apr.-May 2019. ([link](#))
5. Sciancalepore V., Costa-Perez X., Banchs A., RL-NSB: Reinforcement Learning-Based 5G Network Slice Broker, IEEE Transactions on Netw., 2019, vol. 27, is. 4, pp. 1543-1557. ([link](#))
6. Sciancalepore V., Samdanis K., Costa-Perez X., Bega D., Gramaglia M., Banchs A., Mobile traffic forecasting for maximizing 5G network slicing resource utilization, INFOCOM, Atlanta, USA, May 2017. ([link](#))
7. Afolabi I., Prados-Garzon J., Bagaa M., Taleb T., Ameigeiras P., Dynamic Resource Provisioning of a Scalable E2E Network Slicing Orchestration System, IEEE Transactions on Mob. Comp., 2020, vol. 19, is. 11, pp. 2594-2608. ([link](#))
8. Gutterman C., Grinshpun E., Sharma S., Zussman G., RAN Resource Usage Prediction for a 5G Slice Broker, Mobihoc, Catania, Italy, July 2019 ([link](#))