Visit of Jon Crowcroft

Schedule for the 19th of March

[11:00 → 12:30] Visit of the laboratory

Visit of the LIP6 including short meetings with researchers of different teams:

11:00 → 11:30 Meeting with Gilles Muller (Whisper)

11:30 → 12:00 Meeting with Stefano Secci (Phare)

12:00 → 12:30 Metting with Clémence Magnien (ComplexNetworks)

[12:30 → 14:00] Lunch

[14:00 → 15:00] Visit of the laboratory

14:00 → 15:00 Visit of NPA team with Olivier Fourmaux

[15:00 → 17:00] Masterclass (room 26-00/101)

Short presentations (10 min.) followed by an open discussion with Jon Crowcroft (15 min.):

- Salah-Eddine Belouanas (NPA)

  Title : Delayed Transmission of Popular Content Constrained Cellular Networks

  Supervisors : Marcelo Dias de Amorim, Kim Thai, Prométhée Spathis

  abstract : At the time when operators struggle with unprecedented mobile data growth, saving cellular resources is of utmost importance. The first traffic that we must get rid of is redundant traffic. This happens, for example, when popular data must be disseminated to a population of subscribers. We propose SCoD, a strategy that benefits from the delay-tolerance of some applications to defer transmissions to appropriate instants. The idea is to wait for nodes to gather around a reduced number of access points so that the total number of transmissions is decreased. SCoD leverages as much as possible node mobility for the sake of clustering; to this end, SCoD relies on different guiding functions that trigger, whenever appropriate, a transmission. This work is supported by the ANR DataTweet project.

- Wafa Badreddine (NPA)

  Title : Broadcast strategies in Wireless Body Area Networks.

  Supervisors : Maria Potop-Butucaru

  abstract : The rapid advances in sensors and ultra-low power wireless communication has enabled a new generation of wireless sensor networks: Wireless Body Area Networks (WBAN). We first analyze several broadcast strategies inspired from the area of Delay Tolerant Networks (DTN). The proposed strategies are evaluated via the OMNET++ simulator that we enriched with realistic human body mobility model issued from the recent research on biomedical and health informatics. Our results show that existing broadcast strategies for DTNs do not perform well with human body mobility. However, our extensive simulations give valuable insights and directions for designing a novel broadcast strategy that we called MBP for Mixed Broadcast Protocol. Our strategy outperforms the existing ones in terms of end-to-end delay, network coverage and energy consumption.

- Noé Gaumont (ComplexNetworks)

  Title : Finding remarkably dense relevant sequences of contacts in link streams

  Supervisor : Matthieu Latapy, Clémence Magnien

  abstract : A link stream is a sequence of quadruplets (b,e,u,v) meaning that a link exists between u and v from time b to time e. Link streams model many real-world situations like contacts between individuals, connections between devices, and others. Much work is currently devoted to the generalization of classical graph and network concepts to link streams. We explore here the notion of dense sub-streams of link streams, capturing specific groups of nodes both structurally and temporally densely connected during specific periods of time. We propose a method to find such sub-streams using graph community detection algorithms, and an assessment of obtained sub-streams. We apply them to several real-world contact traces (captured by sensors) and demonstrate the relevance of obtained structures.

- Tyler Crain (Regal)

  Title : Charcoal: A causally consistent protocol for geo-distributed partial replication

  abstract : Modern internet applications are usually geo-replicated across several data centres (DCs) spread throughout the world, providing clients with fast access to nearby DCs and fault-tolerance in case of a DC outage. Using multiple replicas also has disadvantages, including extra storage, bandwidth and hardware costs, as well as being more difficult to program. To address the additional hardware costs, data is often partially replicated, meaning that only certain DCs will keep a copy of certain data. To address the issue of programming these systems, consistency protocols are run to ensure different guarantees for the data, but as shown by the CAP theorem, strong consistency, availability, and partition tolerance cannot be ensured at the same time. Thus, for many applications where availability is paramount, strong consistency is exchanged for weaker consistencies like causal consistency. Unfortunately, present day casually consistent protocols are not designed with partial replication in mind and either end up not supporting it, or do so in an inefficient manner due to expensive meta-data and large amounts of extra messages sent between severs required to preserve causal ordering. In this work we propose a protocol designed to support partial replication under causal consistency more efficiently by using a combination of small meta-data in the size of O(DCs) per update and heart beat messages sent at a fixed interval.

- Duy Nguyen (Phare)

  Title : Equilibrium routing: from theory to practice

  Supervisors : Stefano Secci

  abstract : Competitive routing across peering links is a notable problem in Internet routing. A few years ago, a proposal to incrementally modify the Border Gateway Protocol (BGP) decision process was done, to improve routing coordination by leveraging on the existing multi-exit discriminator BGP attribute as signaling medium among peering Internet networks. It is called Peering Equilibrium Multipath (PEMP) routing: based on a non-cooperative potential game, it can improve routing stability and efficiency while respecting unilateral routing choice, by supporting strategic multipath forwarding decisions. The contribution of this paper is twofold. First, we specify how weighted load-balancing should be done in PEMP routing. Then we document an implementation of PEMP routing in the Quagga open source router, better specifying some aspects. We provide a performance evaluation of the implemented PEMP routing system, showing that the computing overhead is limited.

[17:15] Cocktail (Amphi 25)

[18:00] Colloquium (Amphi 25)