WP4: Standardisation, Dissemination & Exploitation

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mami

measurement and architecture for a middleboxed internet

measurement | architecture | experimentation

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A Few Remarks on the WP4 Tasks

- Standardisation
  - Key aspect, taking into account project technical goals
  - Significant results from all the other WPs
- Publications, Workshop and Conference Activities
  - Supported by previous encouraging results
- Exploitation and Innovation Management
  - Connected with ongoing initiatives of the industrial partners
- Academic Exploitation
  - Activity follow-up through the project collaboration mechanisms
- Public Communication Activities
  - Steps taken even before the official start of the project
- Middlebox Observatory Web Site Development and Maintenance
  - Data management and accessibility

WP4 Goals

- Monitor standards and other relevant activities that can contribute to the project objectives
- Identify opportunities for new work to provide contributions and publish/influence new standards
- Support the standardisation of the MCP as a basis for large-scale deployment
- Produce guidelines for vendors and operators on observed limitations to enhance future development and deployment processes
- Contribute to open-source projects the produced results on measurement techniques, transport stack flexibility, as well as NFV-based implementation of the MCP
- Build visibility of the project and its results among the research and scientific community
- Maximise exploitation of the project outcomes, ensuring a successful market orientation of them
- Ensure application of project results by industry

WP4 Deliverables

- ✓D4.1 - *Data Management Plan*. M4
  - Plan for managing the data generated by measurements and open access to that data
- ✓D4.2 - *Initial Standardisation, Dissemination, and Exploitation Report*. M6
- D4.3 - *Intermediate Standardisation, Dissemination, and Exploitation Report*. M18
- D4.4 - *Final Standardisation, Dissemination, and Exploitation Report*. M30
  - Summarise the achievements about standardisation, dissemination, and exploitation of MAMI results, including a report of the communication activities

WP4 Tasks

- T4.1 Standardization
  - Focused on MCP and its ancillary support
  - NFV applications and implementations
- T4.2 Publications, Workshop and Conference Activities
  - Journals, magazines, conferences, and workshops as well as operator conferences
- T4.3 Exploitation and Innovation Management
  - Identify and collaborate with other organisations, key market players and potential users
  - Identify key application(s) of the project results and define the maturity of the technology
- T4.4 Academic Exploitation
  - Integrate aspects of the research into advanced teaching modules of involved academic partners
  - PhD school on measurement infrastructure and datasets, and about middlebox (co-)operation
- T4.5 Public Communication Activities
  - Visual and Internet identity: Website, social networking and general promotion material
- T4.6 Middlebox Observatory Web Site Development and Maintenance
  - Making datasets accessible and usable

WP4 Tasks and Partners

Partner	PM	T4.1 Standardization	T4.2 Publications, Workshop and Conference Activities	T4.3 Exploitation and Innovation Management	T4.4 Academic Exploitation	T4.5 Public Communication Activities	T4.6 Middlebox Observatory Web Site Development and Maintenance
1. ETH	10	✓	✓		✓	✓	✓
2. TID	8	✓	✓	✓		✓	
3. ULg	2		✓		✓		
4. UoA	8	✓	✓		✓		
5. ZHAW	4		✓		✓	✓	✓
6. SRL	2		✓		✓		
7. Nokia	8	✓	✓	✓			

T4.1 - Standardisation Targets

- **IETF** transport-related groups
  - TAPS, QUIC, tcpm, tsvwg as well as PLUS activity and IAB StackEvo Program
- Other **IETF** groups
  - I2NSF: Interface for security function management
  - Multi-context trust and security: LURK and ACME
- **IRTF** groups
  - MAPRG: Measurement collection, processing and access
  - NFVRG: VNF deployment. Trust models and network-application communication
- **ETSI**
  - NFV IFA and EVE: Management and orchestration for MAMI-enhanced VNFs
  - NFV SEC: Multi-context trust and security mechanisms
  - MEC: MAMI-enhanced VNFs as part of mobile edge (fog computing) deployments
  - NGP: Middlebox-friendly transport, transport-friendly middleboxes
- **ONF**: App-network interfaces as part of the intent NBI initiative
- **5G** activities: As part of the network support for new applications

T4.1 - Standardisation Activities on MCP (up to M6)

- Follow up of the ACCORD workshop at IETF 95 (April 2016)
  - Alternatives to Content Classification for Operator Resource Deployment
- Preparation of the PLUS BoF for IETF 96 (July 2016)
  - Path Layer UDP Substrate
  - Collecting support from key players in the IETF transport arena
- Coordination with the proponents of QUIC
  - Alignment with MCP goals
  - Co-chairing of the planned QUIC BoF at IETF 96
- IETF related documents
  - draft-trammell-spud-req
  - draft-kuehlewind-spud-use-cases
- Building awareness in ETSI NFV
  - Report on MCP goals at NFV#14 (May 2016)

T4.1 - Standardisation Activities on Measurement (up to M6)

- HOPS RG reconstituted as the Measurement and Analysis for Protocols (MAP) RG
  - Slightly wider scope
  - Co-chaired by ETH
- MAP RG expected to be confirmed at IETF 96
- Measurement results presented at IETF 95 (April 2016)
- IETF related documents
  - draft-trammell-mplane-protocol
- Building awareness in ETSI NFV
  - Report on measurement results and plans at NFV#13 (February 2016)

T4.1 - Standardisation Activities on Transport Interfaces and Security (up to M6)

- Exploring the interoperability of the MAMI FTL (Flexible Transport Layer) will strive to interoperate with the TAPS facility
- Preparation of the LURK BoF for IETF 96 (July 2016)
  - Limited Use of Remote Keys
  - Related to multi-context security and trust
- IETF related documents
  - draft-ietf-taps-transports
  - draft-mglt-lurk-tls-use-cases

T4.1 – Brief on Standardisation Activities beyond M6

- Discussions on PLUS and LURK at IETF 96 (July 2016)
  - PLUS: “A transport-independent method to signal flow semantics under transport and application control”
    - Not chartered, mostly because of emotional arguments
    - Work to make it progress ongoing, connected to the IAB Stack Evolution Programme
  - LURK: “Scheduled with the objective of discussing approaches to mitigating security risks to TLS private keys”
    - Exploring the applicability of temporary certificates via the ACME interfaces
    - And the feasibility of crypto oracle functions
- NFV#15
  - Initial discussions on LURK and the multi-context trust approaches at NFV SEC

T4.2 – Conferences and Workshops

- Dagstuhl Seminar on Global Measurements: Practice and Experience, Schloss Dagstuhl (January 2016)
  - https://www.dagstuhl.de/en/program/calendar/semhp/?semnr=16012
- CleanSky Workshop, Heidelberg (February 2016)
  - http://www.cleansky-itn.org/conference-series/heidelberg/
- ICIN 2016, Paris (March 2016)
  - http://www.icin.co.uk/
- Cisco/Ecole Polytechnique Networking Innovation and Research Symposium, Paris (March 2016)
  - http://www.cisco.com/web/FR/events/2016/ecole_polytechnique/index.html

T4.2 – Conferences and Workshops beyond M6

- Applied Networking Research Workshop
  - https://irtf.org/anrw/2016/
  - 1 full and 2 short papers
- CoNEXT 2016
  - http://conferences2.sigcomm.org/co-next/2016/
  - 1 full paper
- Submissions
  - ACM Sigcomm Computer Communication Review
    - http://www.sigcomm.org/publications/computer-communication-review
    - 1 technical paper with repeatable results, 1 technical paper
  - Passive and Active Measurement
    - https://research.csiro.au/pam2017/
    - 1 full paper

T4.3 – Exploitation Plans

- MCP-based signalling to be applied to the UNICA, Niji, and virtualised home environment initiatives
  - UNICA is Telefonica's telco cloud, redefined to address NFV
  - Niji is a Telefonica anonymization and optimisation service currently deployed into the 3G/4G network
  - The virtualised home environment is the first commercial NFV pilot
- Initial contacts with Telefonica's corporate and business units dealing with technology and network planning
- MAMI being considered for many different areas of Nokia's product portfolio: mobile edge and core, Software Defined Networking (SDN), and Content Distribution Network (CDN)
  - The standardisation around from LURK expected to have a great impact on the CDN product

T4.3 – Exploitation Through Industrial Contacts

- Active collaboration with GSMA
  - In the framework of GSMA's POP project
    - "Identifying differences and possible impacts between mobile network implementations and IETF Protocols (and discovering methods to improve these."
  - Alignment of observatory data collection and access
    - Coordination on MCP-related approaches
- RIPE 72, Copenghagen (May 2016)
  - https://ripe72.ripe.net/
- EC 1st Stakeholder Consultation Workshop, Brussels (June 2016)
  - https://www.broadbandmapping.eu/wp-content/uploads/2016/07/Agenda-Workshop_Mapping-Broadband-Services-in-Europe.pdf

- Introducing MAMI at the SDN World Congress, The Hague (October 2016)

T4.4 – Academic Exploitation Plans

- ETH Zurich
  - Two semesters' thesis projects (to end July 2016) on MCP prototyping and measurement using Pathspider
  - One masters' thesis project thesis project includes implementation and proof of concept operation of the observatory, together with ZHAW
  - Considering a potential doctoral thesis position
- ZHAW
  - Offering a number of Bachelor and project theses on Linux kernel development and observatory operation (together with ETHZ)
  - Plans on offering more theses, depending on the project's needs.
  - MCP will serve in teaching security and risk analysis, so that protocol users have a realistic sense of what kind of security they can expect
- University of Aberdeen
  - MAMI results to contribute to its portfolio of research and standardisation activities
  - MAMI-focused research will also further the work of postgraduate students.
- Simula Research Laboratory
  - Contributions to the PhD summer school that will be organised later in the project.
- University of Liege
  - Master theses and research projects currently being proposed to students for next academic year, on implementing the middlebox simulator, as well as analysing the observatory dataset
  - Leverage the knowledge and experience acquired within MAMI in advanced networking courses

T4.5 – Communication Actions

- The MAMI visual identity
  - Logos (and stickers…)

- The MAMI domain and website
  - The mami-project.eu domain name has been secured: web site, observatory and project repository
    - https://mami-project.eu/ on-line since September 2015
    - In January 2016, the MAMI webpage was according to the project structure and goals
    - Main means for communication and dissemination
- The MAMI Twitter profile
  - The profile https://twitter.com/mamiproject was created in March 2015
  - Stats by the end of June 2016: 47 followers, 108 tweets that got 52 likes
    - By mid October: 85 followers, 424 tweets that got 67 likes
- Active coordination with the FIRE Dissemination WG

T4.5 – Public Repositories

- MAMI organization hosted on github.com
  - https://github.com/mamiproject
  - Contains several repositories for open-source software and public information created by the project
    - Up to 12 by June 2016
    - MAMI intends to publish several open source releases
- Plans to distribute software via software distribution systems
  - Debian Operating System - https://www.debian.org/
  - Python Package Index2 - https://pypi.python.org/
  - The project will keep contributing packages to these and other systems

T4.6 – The Goals of Data Management

- Managing the data generated by measurements
  - Open access to that data
- “Data Management Plan” has a specific meaning in H2020 projects
  - What types of data will the project generate/collect?
  - What standards will be used?
  - How will this data be exploited and/or shared/made accessible for verification and re-use?
  - How will this data be curated and preserved?
- And in addition: How will this data contribute to the project innovation impact?
- Considering Management of
  - Raw data derived from MAMI measurements (stored at the MAMI observatory)
  - Data generated through the query interface (dynamically generated by the MAMI observatory)
  - MAMI software (stored at Github)

T4.6 – Data Management Plan

- Initial discussion of the Observatory architecture and software
- Description of the Observatory datasets
  - Structured around raw data and *observations* derived from them
  - Access open to observations, not to raw data
  - Commitments on archiving and preservation
- Description of data produced by the different sources considered to date
  - PathSpider, a generalized tool for A/B functionality tests
  - Tracebox, based on accessing remote servers from vantage points
  - Copycat, to detect differential treatment of UDP and TCP traffic
  - Revelio, detecting IPv4 network address translation on access networks

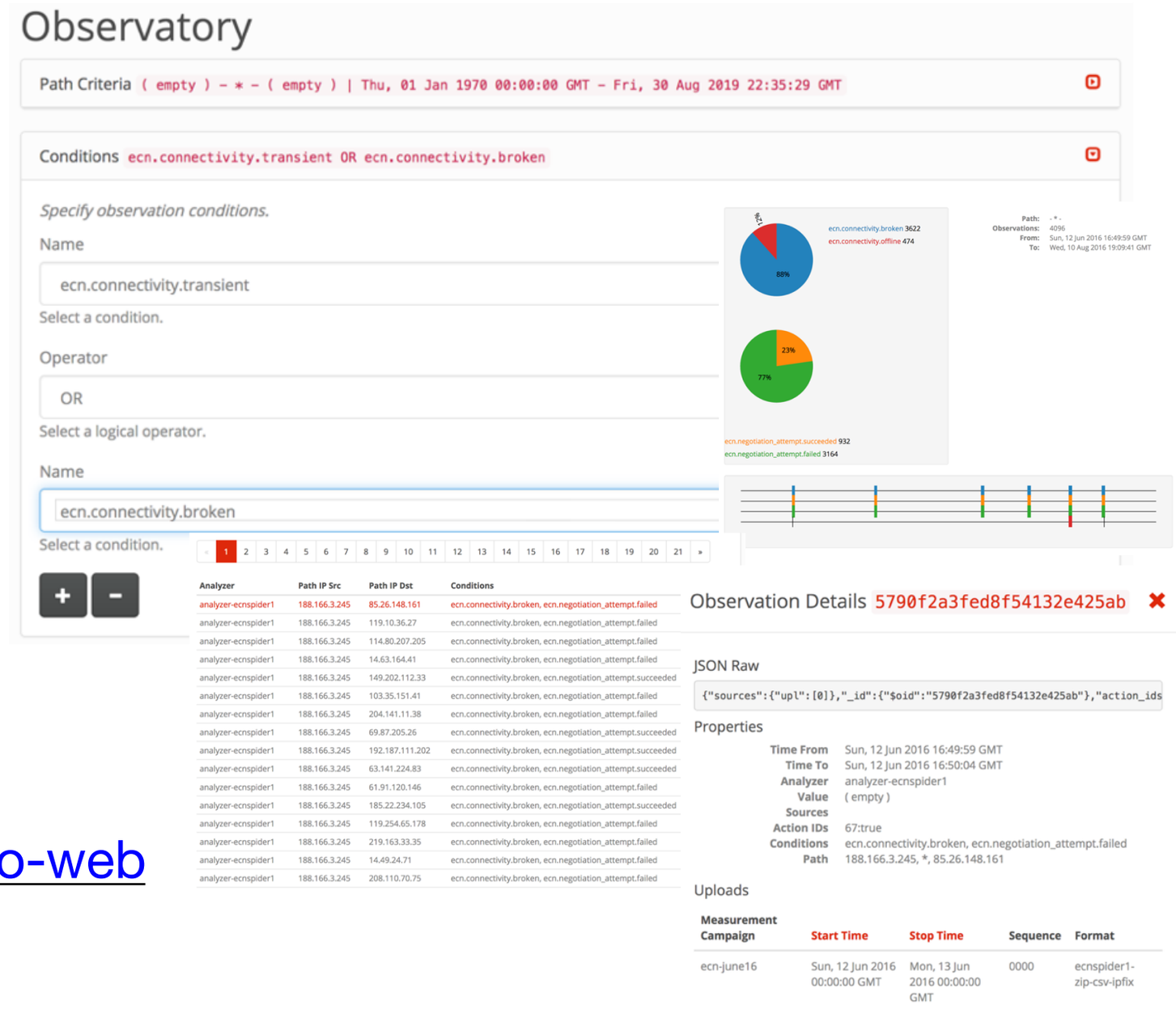
T4.6 - Data Access Policy

- Anyone can query data in the MAMI observatory
  - MAMI-created raw data in the observatory are "all rights reserved” and will be given out to researchers on a contractual basis
  - Query results are CC BY
  - ND and NC are not essential – Even could hamper further exploitation, especially NC
- Anyone can (try to) combine data sets obtained through MAMI queries with other data
- Host data not originating in MAMI on a best-effort basis
  - Data not available online elsewhere
  - Data available but nice to have close to MAMI
  - Do not host if foreign data is not compatible with MAMI’s data access policy
  - But open to specific agreements with third parties
  - MAMI data has priority

T4.6 – PTO UI Design

https://observatory.mami-project.eu/#/observatory

1) User selects criteria: {t,p,c}
2) Query is submitted to PTO
3) PTO queries database
4) PTO returns JSON to PTO UI
5) PTO UI renders JSON



- Sources on GitHub

https://github.com/mami-project/pto-web