



# F2F Meeting Minutes

Day 1: 27/Nov/2018

## Technical Board Meeting

### Agenda

- EC review #1 report
- Overall Project Technical Progress review (Gantt, Project KPIs, etc.)
- Main milestones achieved and approaching
- Technical Risks identified (Yellow or Red Flags)

### Participants

- **i2CAT** (Sergi, Shuaib, Apostolos, August)
- **NXW** (Gino)
- **ITL** (Antonino, Viscardo)
- **VOSYS** (Michele)
- **UNIVBRIS** (Carlos, Borja)

## DISCUSSION

- Project is in the last 12 months and we need to generate value
  - EC calls us for generating these results, as per Review #1 report
  - Jointly, as a consortium, we need to meet workplan objectives, fulfil recommendations, achieve the joint objectives set as a project.
  - But also individually, some partners could be looking for tangible results to exploit. These availability of these results goes beyond the individual actions and is related to project overall progress and coherence

## RISKS

- The lack of clear definitions, measurement strategies and plans for KPI list in DOA is critical. It seems this aspect has not been properly tackled in previous TB actions.

## ISSUES

- Contribution by all the partners is not continuous and not at the expected level by some partners. Proactivity is often missing.

## DECISIONS

- PC & TM will start looking more carefully into coherence of results and efforts reported by partners
- WPL and Task Leaders are expected to stimulate actions but partners role is fundamental
- PMB calls will run every week but on the week of plenary meeting we merge
  - I.e. over a month: w1 - PMB, w2- PMB, w3-PMB, w4-Plenary Call

## ACTIONS

- **AP. TM** to set PMB calls for the next period **by 7-12-2018**
- **AP. WP Leaders** to continue write minutes for all the meetings but to add also individual actions (in confluence) in order to keep track of progress by each and every assignee

## Plenary Meeting

### Project status overview (mgmt+technical)

#### Agenda

- EC review#1 report
- status of Amendment 2
- QMRs
- Major objectives for the next period
- KPIs
- 5G PPP activities

## DISCUSSION

- Sergi/i2CAT introduces the meeting
  - Changes in TM (G. Carrozzo taking over from F. Huici), Shuaib more formally covering the Deputy Project Coordinator role
  - Huge amount of effort remaining to be accounted in the last 12 months: it sums up to 35 FTE

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- All the team has to keep and improve focus: sometimes there is unclarity of link of partners' activities to the 5GCity objectives, often reaction times are slow
  - Josemi/i2CAT presents an update on management matters
    - Amendment 2 is progressing and is substantially closed. List of major issues sent to all partners for review and approval.
    - The distribution of second payment has been communicated to partners and will be executed during December
    - A proposal for cost sharing of dissemination costs is advanced, to avoid a few partners to always cover expenses for events
      - No objections is made to the proposal which will be put in action for MWC2019
      - In addition, it is clarified that participation as 5GCity project to events has to be notified to the WP6 leader in due time ahead of the execution, in order to be evaluated, approved and properly organized.
    - QMR structure and dates
      - As result of the EC Review #1 we have to produce QMRs
      - It is decided at PMB level to prepare Technical QMR every 3 months and an internal financial update every 6 months.
        - Objectives are to track the technical progress but also the budget consumption, in order to avoid deviations
      - Timeline for QMRs
        - @DIC-2018: Jul-Dec 2018 + internal financial status check (efforts, direct costs, other costs)
        - @APR-2019: Jan-Mar 2019
        - @JUL-2019: Apr-Jun 2019 + internal financial status check (efforts, direct costs, other costs)
        - @OCT-2019: Jul-Sept 2019
      -
  - Gino/NXW introduces the tech management part
    - Discussed the tech mgmt approach. Focus on three main line of action:
      - Listen and get aware of the various directions
      - Seek for coherence of all actions (5W: who, what, where, when, why)

- Platform
- Pilot and use-case
- Innovation & outreach
- Track & measure
  - Use Confluence and mailing list to communicate internally, share project knowledge, assign and track action points
- A brief analysis of the EC review report is presented
  - 9 recommendations on work done, 25 on future work
  - We need to work on coherence and more clearly tangible results
  - Innovation and KPIs are the main expectations
- KPI are key, many formally written in DoA (i.e. contractual obligations).
  - Each development team and use case team has to discuss how to target these KPIs and how to measure them.
- On 5G PPP side, 5GCity has good visibility and recognition
  - Need to update list of representatives to the various WPs and update on progress in various WGs via confluence

## ISSUES

- None specific

## DECISIONS

- New Technical Management Approach and todos approved by partners

## ACTIONS

- **AP.Shuaib** to coordinate update of 5G PPP representatives to the various WGs **by 14-12-2018**

## Updates from WPs

### WP2 status update

- activities executed, summary results/achievements, next deadlines

### WP3 status update

- activities executed, summary results/achievements, next deadlines

**WP4 status update**

- activities executed, summary results/achievements, next deadlines

**WP5 status update**

- activities executed, summary results/achievements, next deadlines

**WP6 status update**

- activities executed, summary results/achievements, next deadlines

## DISCUSSION

- **WP2. Major work items in short-mid term**
  - D2.3 - 5GCity Architecture, and Interfaces Update
    - Additional details started to be uploaded in confluence on overall system update, particularly for interfaces (as requested in EC review report)
    - Initial business models and regulatory aspects will be covered and added to D.23
    - Deadlines
      - 7/Dec - Partner contributions
      - 14/Dec - Integrated clean version
      - Reviewers Cellnex/David, Wind Tre/Rita, MOG/Alex
      - 21/Dec - Release to PC for submission
  - Task 2.4 on business modeling
    - Public administrations (IMI BCN, COMUNE LUCCA) have to work more on the Neutral Host value and business modelling from their specific standpoint
    - Business units from organizations have to be involved in this activity to make something that can achieve impact
- **WP3. Major work items in short-mid term**
  - Work towards MS7, as documented in confluence ([link](#))
  - Next internal milestones from WP3 are aligned to D3.2, D3.3, MS8
- **WP4. Major work items in short-mid term**
  - Work towards MS7, as documented in Confluence and GitHub
  - WP4 results grouped in two groups:
    - Integrated: Dashboard, Slice Manager, NFVO, AAA

- Not yet completed: SDK, MEOA, multi-layer orchestrator
- To Be Assigned: SLA Manager, Infrastructure Abstraction
- Next internal deadlines from WP4: ICT 2018 demo, Jan-19 commits on non-interim releases, release 1 (May 2019), release 2 (Sept 2019)
- **WP5. Major work items in short-mid term**
  - Work focus is on implementation of pilots
  - Weekly calls to track progress
  - Lucca & Bristol are at a good stage of progress. Barcelona is a bit behind
- **WP6. Major work items in short-mid term**
  - 2 hackathons to be organised
  - 3 submissions for EUCNC main track
  - Events under preparation have to be discussed with WP6 leader and tracked in Confluence (e.g. Lucca Comics & Games)
  - T6.2 task leader will be Cellnex (Aitor+David)

## RISKS

- Coherence of the various technical activities, tools and developments into the 5GCity picture. We really need to invest in limiting this risk by working together and informing of ongoing activities
- Open source contributions risk not to be properly linked to project objectives

## ISSUES

- WP4. Level of integration is not satisfactory, we could have done better
- WP5. Delays in APs and low attendance to WP5 calls
- WP6. Not all the events are reported in Confluence before the actual event

## DECISIONS

- Tracking of features from WP3 will be done in Confluence
- Feature lists from WP3 and WP4 are essential input to hackathon organization
- WP3 can tackle a paper submission for EUCNC19 (feb 2019)
- Conditions of poor contribution by some partners will be analysed in PMB and actions on partners will be taken
- All components to be updated on monthly sprints

## ACTIONS

- **AP. WP3 partners.** Provide all the development roadmaps **by 19-12-2018**
- **AP. TM and AP.WP4** to discuss about underperforming conditions and address work to be done **by 14-12-2018**
- **AP. TM & AP.WP6** lead to discuss preliminary contents and scope of Hackathons **by 4-1-2019**

## Focus on WP3: 5GCity Virtualization Platform

<p><b>WP3: Virtualization on Resource-constrained Devices (T3.1)</b></p> <ul style="list-style-type: none"> <li>- status and next steps of UNIKRAFT for 5GCity</li> <li>- status and next steps of EdgeNFVI trusted computing</li> </ul>	NEC, VOSYS
<p><b>WP3: 5GCity multi-tiered Network and Virtualization (T3.2)</b></p> <ul style="list-style-type: none"> <li>- status and next steps of RAN virtualization</li> <li>- status and next steps of VOSYSSwitch</li> <li>- status and next steps of GTP flow redirection</li> <li>- status and next steps of Multi-VIM</li> </ul>	i2CAT, VOSYS, NXW
<p><b>WP3: VNF Data Models and Systems for MEC Nodes (T3.3)</b></p> <ul style="list-style-type: none"> <li>- models and packages for network functions (Type1)</li> <li>- models and packages for Use Cases (Type2)</li> </ul>	i2CAT & all WP3
<p><b>Discussion of WP3 development roadmap &amp; prioritization</b></p>	VOSYS, All WP3, TM

## DISCUSSION

- UNIKRAFT. It is important to select some of the latest achievements on UNIKRAFT which map to 5GCity, to better and more precisely report how they fit into 5GCity
  - Also the features in the roadmap showed by NEC should be prioritized to focus on those that are needed for 5GCity and when these can be available (to align)
  - Michele/Yuri agree to confirm selection of unikernel development directions to be reported as 5GCity results (inline with project objectives):
    - Networking, storage, memory
    - optional: pytorch (for machine learning) and libhttpd (caching)
- EdgeNFVI trusted computing. Working now on geofencing
  - Northbound of Openstack is not modified, working more with VM flavours

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- It is under discussion the procurement extra hw (trusted computing board) in infrastructure in BCN, by UW for UC6
    - The same hardware could be available in Bristol
  - Lightweight VOSYSwitch. This new switch is to be used inside the WiFi AP to substitute OVS and save power
    - It can be used to benchmark deployments with OVS
  - RAN slicing. Work progressing, next steps are on
    - Netconf client on finalizing APIs
    - Scheduler to be implemented after simulations
    - There was initial confusion on what has to be developed and where
      - I2CAT, UNIVBRIS, VOSYS, UW worked together in a splinter meeting to converge and came up with an agreement
  - GTP flow redirection.
    - Matching and terminating tunnels capabilities have been tested. Result is not satisfactory (we are not able to use it)
    - VPP has been tested as an alternative (under investigation)
    - Proposed workplan:
      - Evaluation to be done by M19
      - Integration of MEPM-V and MEAO (demonstration) at M24
    - Since there is no way to implement GTP flow redirection in 5GCity (no vEPC split) it is decided not to progress on this development
  - Multi-VIM. Three options presented (VPNaaS, Tricircle, DVR).
    - too many options make unclear which one is applicable to 5GCity. In absence of relevant infrastructure limitations/information, NXW shall proceed with 1 reference design to propose and document.
  - MEC/NFV integration
    - ADLINK will provide part of the MEC support, to be showcased in the context of UC6
    - A simple cache application can be the first target
    - We need to decide how to work with the vEPC (how many of them? Where do we run them?) and to understand whether it makes sense to proceed
      - Edge EPC to run neutral host
      - NVO1 and NVO2 connected at 3GPPP level

## RISKS



- Many UNIKRAFT features give the impression of something not directly related to the 5GCity project if not related to specific unikernel based functions to deploy in the pilots
- Too many multi-VIM options make unclear which one is applicable to 5GCity. In absence of relevant infrastructure limitations/information, NXW shall proceed with 1 reference design to propose and document.

## ISSUES

- GTP analysis work is not usable in 5GCity

## DECISIONS

- For UNIKRAFT. We need to elaborate with NEC what and how fits into 5GCity
- For the coherence of edge trusted computing and multi-VIM works, WP3 and WP4 teams shall
  - Define a roadmap to implement the various scenarios
    - Single VIM trusted computing capable as single VIM
    - Edge VIM and CoreVIM to cover different areas of the virtualized infrastructures
  - Define the control plane and data plane reference implementation guidelines to select among the various solutions the one/two which apply to 5GCity
    - This info with table detailing main features of the constrained devices might be useful for the
- Lightweight VOSYSwitch. Possibility to execute performance tests to compare to OVS performance achievable now
- GTP flow redirection. It is not to be used because there is no vEPC splitting in 5GCity and GTP interception is not possible.
  - WP3 has to close the discussion on the PoC of a MEC application scenario with a more concrete scenario that can be implemented by UC6
- RAN resource manager. The team confirmed design and deployment in BCN and BRS.

## ACTIONS

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- **AP.NEC & AP. Michele** to specify UNIKRAFT features (done and in roadmap) that specifically apply to 5GCity **by 14-12-2018**
  - **AP.NEC** Finalize answers to Reviewers comments **by 14-12-2018**
    - Machine learning stakeholder question: The license of the ML technology is proprietary and NEC has plans of exploitation. There is a need to specify that the benefit of the NEC work for 5GCity is the bandwidth saving that the technology is bringing by processing the first step of the DNN in the edge.
    - PM/Exploitation question: Open source building blocks developed in P1. An exploitation plan from NEC is under development and will be ready by end of the year (Action point)
  - **AP Yuri/NEC:** Report back to 5GCity (in a form of a document or a presentation, etc.) **by 14-12-2018**
    - the final list of features for UNIKRAFT applicable to 5GCity context,
    - An approximate timeline/roadmap of the developments in these directions from now to Nov. 2019 (end of WP3)
    - Link/impact of these developments to the 5GCity objectives
  - **AP. Michele & AP. Apostolos** to discuss the interaction between the EdgeVIM features (authentication, geofencing) and the platform (currently done with pre-defined flavors) **by 21-12-2018**
  - **AP. Michele & AP. Apostolos & AP.Gino** to coordinate the definition of the control plane and data plane reference implementation guidelines for selecting and deploying the various VIMs and multi-VIM control configurations (among the various options in T3.2 and NFVO capabilities in T4.1) **by 21-12-2018**
  - **AP. August** to coordinate with VOSYS to test VOSYSwitch and to evaluate-compare it with OVS **by 12-01-2019**
  - **AP. August** to produce a detailed roadmap for RAN slicing components **by 14-12-2018**
  - **AP.UC6 & AP. Michele** Decide what to demonstrate in the NFV/MEC and how (i.e. where the MEC apps run, who will deliver it) **by 14-12-2018**
  - **AP.I2CAT, UNIVBRIS, VOSYS, UW** to work together and clearly define development work planned for WAN resource manager **by 21-12-2018**

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## 5GCity business models, regulations, and techno-economics

### DISCUSSION

- Ioannis/Incities reports on the status of Business model activities
  - Operators are skeptical
  - We should highlight the value propositions (benefits / advantages) of our solution in order to address most of operators concerns
  - It is fundamental to have an active role by municipalities to consolidate the model
- Techno-economic analysis will help quantifying. At the beginning of next year, we should start thinking about the required inputs (from all partners).

### RISKS

- Incomplete contributions may lead to poor business modelling

### ISSUES

- Poor participation from partners

### DECISIONS

- Action plan to target D2.3 by Dec-2019 and after Christmas break start with techno-economic analysis

### ACTIONS

- **AP Use case Leaders** Follow the MOG template and provide business model canvas and provided products and services **by 14-12-2018**:
  - Some guidelines:
    - Forget your position and company and assume that you are a new entity providing the product/service describing in the use case
    - Try to find other companies, associations, communities etc. that can be your partners in order to develop the product/service
    - Identify the activities of this new company (e.g. provision of...., R&D, consulting etc.)
    - Try to find the resources needed to run your company (e.g equipment, personnel etc.)

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- Define all the expenses required in order to run your company (e.g. CAPEX, OPEX, marketing etc.)
  - Provide the value propositions of your “new” company e.g. the provided benefits. In other words, your Value Proposition is the reason why customers turn to your company over another. It solves your customer’s problem or satisfies your customer’s need. So, try to answer the following questions:
    - What value do we deliver to the customer?
    - Which one of our customer's problems are we helping to solve?
    - Which job are we helping the customer get done?
    - Which customer needs are we satisfying?
    - What bundles of products and services are we offering to each Customer Segment?
  - Channels: Means to reach your customers
  - Customer Relationships: Clarify the type of relationship the company wants to establish with each Customer Segment (e.g. Transactional, personal assistance, self-service etc.).
  - Identify your potential customers
  - Revenue streams: Define the model(s) that you will follow to generate revenues (e.g. subscription fees, usage fee etc.)
  - Provide 3-4 pages describing your business model (see MOG’s document)
  - **AP.Cities and Operators** to provide contribution on regulatory aspects **by 14-12-2018**
    - Facilitation of 5G deployments
    - Radiation considerations
    - Non-discrimination
    - Prices regulation
    - Spectrum ownership
    - Electrical power
    - Existing regulations and plans in the three countries under investigation (Italy, Spain and UK)
    - ...

## Focus on WP4: 5GCity MANO and Service Programming Models

<b>WP4: Backend Orchestration Platform, and Service-aware Placement Algorithms (T4.1)</b> - status of developments, integration and next steps	i2CAT & all WP4
<b>WP4: Data-driven Edge Service Programming and orchestrator-integrated SDK (T4.2)</b> - status of developments, integration and next steps	NXW
<b>WP4: Location-aware Machine Learning (T4.3)</b> - status of developments, integration and next steps	NEC & all T4.3
<b>Discussion of WP4 development roadmap &amp; prioritization</b>	i2CAT, All WP4, TM

### DISCUSSION

- **Orchestration Platform (T4.1)**
  - Development is progressing but some modules are still to be assigned
  - Some agreements are ongoing among partners
- **Data-driven Edge Service Programming and orchestrator-integrated SDK (T4.2)**
  - Development is not complete on Composer,
  - Plan to implement the editor release 1 by M24
  - Release plan can fit into the plan for hackathons, but further delays are not tolerable
- **Location-aware Machine Learning (T4.3)**
  - NEC presented their evaluation work on various frameworks
  - This work seems a different approach to FML described in D4.1
  - This will be presented as a study in the D4.3, but it would be really needed that the deliverable will contain an applicability to 5GCity

### RISK

- Agreement in some functionalities may result in a lot of unplanned work to be done

### ISSUE

- Disagreement on some modules generates confusion and possible duplication of work
  - PLEASE look at the "DECISIONS" section below

## DECISIONS

***As result of offline parallel sessions reached the following agreements and plans in order to address the identified issues and risks:***

- The **WAN Manager** consists of the software elements that talk to the lower-layer network controllers (SDN/RAN controllers etc.). The WAN manager has coarsely 2 main parts (each of them including various software modules or "drivers"):
  - The part that talks to network controllers (esp. SDN controllers like OpenDaylight) **ONLY** for implementing (or complementing) network service deployment. This part is being implemented by Bristol as OSM extension under the name "WIM" (WAN Infrastructure Management - plugin). However, this still has to be brought into the 5GCity codebase/platform, and be used/tested there.
  - The part that talks to (mainly access) network controllers (esp. the i2cat RAN controller, Ruckus, etc) for configuring them (as required for slice creation and setup) **AND** to SDN controllers (such as OpenDaylight, again) for retrieving all information and doing all configurations that have nothing to do with the network services deployment/lifecycle (e.g., retrieve configs of deployed switches/routers). The ingredients of this part need to be implemented incrementally by all partners that have a respective component to use in the lower layer (e.g., i2cat will code the driver for their RAN controller, Bristol for Rukus, etc), but VOSYS has the leadership of the overall component, along with the task to design an abstraction API on top of those drivers.
- From an implementation perspective, the part that is not implemented as OSM extension is merged with the "**Infrastructure Abstraction**" component (under VOSYS leadership), because "Infrastructure Abstraction" is also a collection of southbound drivers, which has a very similar scope with the "WAN Manager", but acting upon VIMs instead of upon network controllers.
- Depending on technical expertise and re-evaluation of the next TODOs, the leadership of the "**InfAbs + WAN-Manager**" module might be moved from VOSYS

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to Bristol, VOSYS would then take the responsibility of the "Resource Placement" module from Bristol. For the moment, the responsibilities are confirmed as they were, i.e., Bristol for "ResPI" and VOSYS for "InfAbs + WAN-Manager"

- The **next steps for "InfAbs + WAN-Manager"** are implied by the above descriptions (selection of southbound drivers to consider and study of their methods, abstraction API design, placement algorithms/tools selection, ...), but they will be consolidated and recapped in an upcoming WP4 call.
- The **SLA Manager** remains the only component without clear decisions about i) responsibilities, ii) scope of implementation, and iii) possibility of omitting from the implementation, but there are ideas about a prototypal/minimal monitor-and-react cycle.
- The **next step for SLA Manager** is to list these possibilities during the upcoming presentation / tutorial of the (closely related) Monitoring module, which will be done by ITL very soon.
- For **all other components** (which were included, either integrated or not) in the INTERIM RELEASE, the **next steps** are captured in GitHub etc, as well as summarized in the presented T4.1 slides, and they are less critical/debatable. They just have to be implemented.

## ACTIONS

- **AP. Apostolos** to consolidate the development roadmap for 5GCity orchestrator by 21-12-2018



Day 2: 28/Nov/2018

## Plenary Meeting

Focus on WP5: 5GCity city-wide pilots' implementation and validation

**WP5: Bristol Site overview**

- Infrastructure deployment status & plans
- Open Issues

UNIVBRIS

**WP5: Barcelona Site overview**

- Infrastructure deployment status & plans
- Open Issues

IMI/i2CAT

**WP5: Lucca Site overview**

- Infrastructure deployment status & plans
- Open Issues

LUCCA

**DISCUSSION**

- BRISTOL infrastructure status and presentation
  - We have initial Small Cells location in Bristol. Needs approval from M-Shed. May take max two months to be approved (end January 2019)
  - Accelleran needs one month notice in advance to send the equipment and engineer to set it up in Bristol.
  - 5GNR is going to be used in Band42, same as Small Cells, therefore, testing has to be planned to avoid overlapping.
- BARCELONA infrastructure status and presentation
  - **Extra site** in Barcelona for BTV use case.
    - Initial site survey done. In progress
    - Permission pending. [This could be a show-stopper]
- LUCCA infrastructure status and presentation
  - 2nd small cell will be shipped by ACCELERAN to Lucca within Decemberr 2018, Antonio/Acceleran is checking for equipment details to be shipped in order to anticipate the ARPA authorizations to be requested by Wind 3 and Comune di Lucca
- **For all the pilot sites, we have to design common tests** (targeting certain network parameters/KPIs) which will be executed once deployment is completed to evaluate the performances achieved in the each of the three cities.
  - These tests then will be used as reference baseline to test all the relevant UCs on top.
  - In parallel, **all UC leaders** need to test if their application software could be deployed/instantiated via 5GCity platform, which essentially means to test



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if their application VMs can be deployable via OSM as VNFs within a set of Network Services. 5GCity platform will be releases in end of May, however, these tests will be carried out before May using OSM to ensure smooth portability to 5GCity platform.

## RISK

- Infrastructure deployment, procurement of hw and authorizations to go live can accumulate delays with impact on milestones and project plan. Infrastructure owners and WP5 leader have to highlight these risks and work to minimize and bypass showstoppers
- Usage of different version of third-party enables (OpenStack, OSM) in parallel might lead to many incompatibilities that are difficult to handle
  - Note that once the sites start installing the 5GCity platform from GitHub, concrete “requirements” (incl. versions) will be listed in the installation manual.

## ISSUE

- The list of VNFs and NSs requested by all the Use Cases is missing and needs to be inventoried as top priority in Dec-Jan

## ACTIONS

- **AP.Carlos & infrastructure Owners** to define the list of test to validate the configuration and installation and performances of the hw and sw elements **by 12-1-2019**
- **AP. UC leaders** to declare the list of VNF they need to run their UC, footprint of the VNF (flavours, OS, net interfaces CPU, HDD, RAM, fixed configuration parameters, variable configuration parameters, scalability aspects for scale-up/down nad service scale in-out based on usage, etc.) in order to cross-check in advance requirements and matching by the infrastructure **by 21-12-2018**
- **AP.Michele** to coordinate within WP3 a list of basic VNFs to verify the infrastructure deployment (unikernel, trusted computing, far edge, etc.) **by 21-12-2018**
- **AP.LUCCA/NXW** to refine/finalise NFVO descriptors for the VNFs needed for their Use Case 1 **by 21-12-2018**

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- **AP.MOG** to start working on NFVO descriptors for the VNFs needed for their use case 3 **by 12-1-2019**
  - **AP.RAI** to start working on NFVO descriptors for the VNFs needed for their Use Case 4 **by 12-1-2019**
  - **AP. BTV** to start working on NFVO descriptors for the VNFs needed for their Use Case 5 **by 12-1-2019**
  - **AP. UW** to start working on NFVO descriptors for the VNFs needed for their Use Case 6 **by 12-1-2019**
  - **AP.infrastructure Owners** to run the infrastructure hw/sw tests **by 1-2-2019**
  - **AP.i2CAT** to provide the platform components of the interim release along with installation instructions to the infrastructure owners **by 21-12-2018**

## Innovation Management & board

### DISCUSSION

- It is important to differentiate licensing from innovation. Innovation means how it can generate impact.
- In the context of innovation management, we have to show “how we decide what is innovation or not”.
- A list of items has been identified for each of the three “innovation pillars”
- Innovation items need not be research topics, but “new elements”, which can be used to create solutions with new technologies
- IPRs are very correlated with “innovation items” and it would be beneficial if VOSYS and NEC (and all...) report them appropriately
- If innovation items are identified that will be exploited WITHIN “owning” companies, then these companies should expose more details about the channels that they follow in order to use or exploit this innovation.
- Select one topic for each of the three pillars
- (With regard to “Question 7” of Antonino’s slides): The project is only responsible for advising and supporting companies in terms of exploitation, but it cannot have the action point of implementing actual exploitation steps. This must be done by the individual partners and it has been communicated to the EC.

- After having put the basis (list of items, comments, etc), we could arrange a dedicated meeting around January-February in order to select focus items and design roadmap.

## RISK

- Limited commitment of partners on Innovation activities might result in limited impact of 5GCity results and assets under development

## ISSUE

- Poor participation from previously declared reference contacts

## ACTIONS

- **AP.ITL, AP.i2cat**, arrange discussions and Jan-Feb meeting with the updated list of responsible people **by 21-12-2018**
- **AP.i2cat, AP.VOSYS**, assign 10 minutes of the next WP3 and WP4 calls to innovation items discussion **by 14-12-2018**

## Focus on WP5: 5GCity city-wide pilots' implementation and validation

### UC1: Unauthorized Waste Dumping Prevention - LUCCA

- status of development & integration
- KPIs (definition, measurement methodology, results - if any)
- open issues
- next steps

NXW, NEC

### UC2: Neutral Host - ALL CITIES

- status of development & integration
- KPIs (definition, measurement methodology, results - if any)
- open issues
- next steps

i2CAT

<p><b>UC3: Video Acquisition and Production +</b>  Community media engagement in live events - BCN, BRS  - status of development &amp; integration  - KPIs (definition, measurement methodology, results - if any)  - open issues  - next steps</p>	MOG
<p><b>UC4: UHD Video Distribution</b>  Immersive Services - BRS, LUCCA  - status of development &amp; integration  - KPIs (definition, measurement methodology, results - if any)  - open issues  - next steps</p>	RAI
<p><b>UC5: Mobile Backpack Unit for Real-time Transmission - BCN</b>  - status of development &amp; integration  - KPIs (definition, measurement methodology, results - if any)  - open issues  - next steps</p>	BTVE
<p><b>UC6: Cooperative, Connected and Automated Mobility (CCAM) - BCN</b>  - status of development &amp; integration  - KPIs (definition, measurement methodology, results - if any)  - open issues  - next steps</p>	UW

## DISCUSSION

- **UC1: Unauthorized Waste Dumping Prevention - LUCCA**
  - One of the metrics to be measured for UC1 is “Service instantiation time” and NXW hopes to achieve good numbers with the help of unikraft-created images.
  - Caching images, avoid compression, and a number of other tricks can be used for the above metric, as well.
  - We are missing details in the UC plan that are beyond the “NS/VNF implementation and deployment” part, e.g., who and when is going to use the system, which cameras are going to be used and how.
  - All measured metrics/KPIs MUST and the related achievements MUST be related to 5G and the 5GCity platform/infrastructure. If they are exclusively dependent on the application/ML logic, then we haven’t showed much...

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- Should someone work on the link between the “detection/alert of an abuse” and the “handling of the abuse”? ITL says that this step was not defined as part of the test Use Case, so it is normal that no one is working on it. Before this, need to be clarified who (recognition software?) is taking care of storing the portion of video with the possible violation and where is this being stored in the 5gCity platform.
  - **UC3: Video Acquisition and Production +**
    - The table of requirements should be updated to include the requirements related to low latency etc.
    - (Other UCs should also have a look at these tables and do updates if necessary)
    - UC3 needs a minimum of 2 mobile users in order to show all features (functionality incl. “switching”)
    - UC3 in full run consists of a functional verification of the scenario.
    - **It is necessary to understand the internal networking required for MOG service in order to create NFV service to be deployed by 5GCity Platform.**
    - Innovation highlights are missing from most Use Cases. What is new and why does this novelty comes “thanks to the underlying 5G enablers”?
    - Monitoring has to be extended in order to be able to capture “end-to-end application metrics”, and for this the UC developers need to coordinate with ITL/WP4 to request the concrete required monitoring extensions.
    - UC developers should consider using the Monitoring API, not only for retrieving Infrastructure parameters, but also for “pushing” data to it, or creating exporters that are useful for them.
  - **UC4: UHD Video Distribution Immersive Services - LUCCA, BRS**
    - Tests to be defined in the near term to change configuration parameters
  - **UC5: Mobile Backpack Unit for Real-time Transmission - BCN**
    - Functional testing ongoing
    - 2 scenarios possible:
      - 1 backpack to streaming server (only EPC on NFV)
      - 3 backpacks, 1 mixer at edge, streaming server
  - **UC6: Cooperative, Connected and Automated Mobility (CCAM) - BCN**
    - Part of applications done
    - To clarify procurement of 5G CPE for the car
      - How many are available?
    - Who takes care (who provides the software? Part of vEPC?) of MEC break

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- out? → vEPC does
  - Plan for next steps defined, some issues might arise
  - Edge VIM is part of VIM in the Data-center that is, it is controlled by same controller → the topic is under discussion in WP3 and will be decided upon soon.
  - For the monitoring metrics
  - UW brings the car for the real demonstration.

## RISK

- Lack of clear planning of use case deployment, KPIs to measure and tests to execute might result in poor assessment of the various use cases and results to exploit

## ISSUE

- UC6 service descriptor might be difficult to implement because it is not only on NFV but also on MEC part with fog05

## DECISIONS

- All use case leaders and groups to specify a detailed use case deployment roadmap, the KPIs to measure and tests to execute
- All use case leaders to start modelling VNF packages and NS packages for their use case scenarios

## ACTIONS

- **AP. NXW, NEC** to profile the VNF and package the elements to run UC1 **by 21-12-2018**
- **AP.NEC** to detail how many components/elements their UC1-application shall have and where they are supposed to run **by 21-12-2018**
  - Is it 1 VNF that gets video stream as input and provides already the video fragments upon suspicion? Are there more VNFs (e.g., for video retrieval, video analysis, distributed NNs, etc)? Do some of them have to run at the edge? Etc...
- **AP. LUCCA** to determine timing and involvement of stakeholders (police stations police agents, etc.) to execute the use case 1 storyline and measure the KPIs **by 21-12-2018**

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- **AP.MOG**, communicate to Bristol the details and the updated requirements of UC3 (which are not captured in previous descriptions), and explain also which part of the presented scenario will be implemented and shown at ICT 2018. **by 14-12-2018**
  - **AP. MOG** to describe the internal networking and service logic of their application, required for MOG service in order to create NFV service to be deployed by 5GCity Platform. **by 21-12-2018**
  - **AP.MOGI**: Need to define Application specific monitoring parameters **by 21-12-2018**
  - **AP.MOG**: Need to define Application specific tests **by 21-12-2018**
  - **AP.RAI**: Need to define Application specific monitoring parameters **by 21-12-2018**
  - **AP.RAI**: Need to define Application specific tests **by 21-12-2018**
  - **AP.BTVE**: Need to define Application specific monitoring parameters **by 21-12-2018**
  - **AP.BTVE**: Need to define Application specific tests **by 21-12-2018**
  - **AP.ACCELERAN**. Provide information to materials needed to deploy and connect to ACCLRN EPC **by 14-12-2018**
  - **AP.UW**: Need to define Application specific monitoring parameters **by 21-12-2018**
  - **AP.UW**: Need to define Application specific tests **by 21-12-2018**

## Joint discussion of 5GCity Pilots' validation against KPIs (T5.3)

### DISCUSSION

- Gino presented the KPI Definition & measurements problem and proposed a methodology
- UC leaders need to take into-account KPI table provided, see how these applies to the different use-cases
- UC leaders has to define methodology to do the measurements as tracked in previous actions from UC discussions

### RISKS

- KPIs defined in D2.1 and those set in DoA risk to be neglected in use case development, with risk of achieving poor performances

## ISSUES

- Leadership of T5.3 originally assigned to IMI did not run properly. It is under transition to i2CAT

## DECISIONS

- Merge step #3 and #4 of the proposed methodology (see T5.3 slides by Gino) to avoid the confusion that WP3 and WP4 will benchmark developments
  - They will do functional automated testing only
  - Release benchmarking is to be done on infrastructures via basic network services as discussed in previous slots

## ACTIONS

- **AP. Shuaib, AP.Gino** to coordinate formal start of activities on T5.3 **by 14-12-2018**

## Focus on WP6: 5GCity Dissemination, exploitation, and standardization

- CoDi presented the dissemination activity in events, networking etc.
- I2cat summarized the ICT 2018 booth plan and is handling all open TODOs together with CoDi
- 2 posters (merged) on one side (neutral host and 360..), the other two on the other side
- We are missing tables but we'll resolve it on the spot, probably independently of the venue organizers
- Next events
  - 5G European Conference → CODI
  - MWC19 → planning starting soon after ICT2018, all kindly invited to contribute and join
  - EUCNC19+5G Global Event → must do, demos are key



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- European Digital Forum → need to coordinate for a proper 5GCity presence with relevant 5G PPP presence by some projects (e.g. 5G-MEDIA, 5GXcast)
  - IBC 2019 → scope is publications and invited talks
  - Lucca Comics and Games 2019 → live demos during the events
  - Hackathon#1 → Lucca?
  - Publications
    - 8/15 publications → target should be higher (25)
    - Anyone presenting a 5GCity-acknowledging paper somewhere should upload the presentation also in 5GCity, or contact CoDi (Carla) to do it.
  - Exploitation
    - All partners to review exploitation plans (individual and common)

## RISKS

- Ambitious dissemination KPIs cannot be fully achieved in the remaining time of the project
- Delayed visibility on planning and execution of events by partners under 5GCity auspices/coverage can limit the impact for the project. Use of Confluence pages is mandatory and approval by WP6 leader (I2Cat).

## ISSUES

- None specific

## DECISIONS

- Planning and execution of events by partners under 5GCity auspices/coverage can limit the impact for the project. Use of Confluence pages is mandatory and approval by WP6 leader (I2Cat).

## ACTIONS

- **AP.ALL:** All partners to review exploitation plans (individual and common) **by 12-1-2019**
- **AP.i2cat:** define what is joint exploitation **by 12-1-2019**

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## Meeting wrap-up

- Gino presents final slides.
  - The meeting agenda has been covered in all the planned aspects and fruitful discussion occurred
    - Status & next steps for all the major development work items
    - Status & next steps for the 3 city pilots
    - Status & next steps for all the use cases
    - Next steps in Design & Business modelling
    - Next steps in Joint exploitations, Standardization & Dissemination
  - The expected results and follow up of the discussions of this F2F are:
    - Platform development roadmap & prioritization
    - Deployment roadmaps & prioritization for all the 3 city infrastructures
    - Use case development plan (for apps) & deployment plan & KPI validation strategy
    - Business modelling, Innovation Mgmt actions
    - Clear [coherent] plans for communications and disseminations for 2019
  - Confluence has to be the repository for all these information, to be maintained clean and updated for a profitable progress of all the activities
- Final takeaways:
  - We cannot cover all topic in plenary conf call, → more dedicated conf call on specific topics with groups of partners
  - Dedicated technical meetings in addition to plenaries are welcomed.
    - Tentative periods in which these can be planned:
      - early Feb-19,
      - mid-end of Mar-19,
      - mid May-19 (GA- Lucca),
      - early Jul-19,
      - mid end of Sept-19,
      - Nov-19 (last GA)
  - Main deadlines
    - Feb2019 → MWC2019

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- May2019 → next GA
  - Nov2019 → last GA