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| logogreen | **ASIA-PACIFIC TELECOMMUNITY**  **The 17th Meeting of APT Wireless Group (AWG-17)**  23 – 26 September 2014, Macao, China | **Document:**  **AWG-17/OUT-14**  **(Revision 1)**  26 September 2014 |

**Working Group on Service and Applications**

**questionnaire on small cell cloud services**

**Section 1: Elementary Part**

1. **Introduction:**

Small cell networks are currently seen as a new way to satisfy the increasing wireless traffic demand. The proximity of base stations to subscribers brings many possibilities for the development of new applications, including new offerings based on cloud computing. Smartphones could directly offload applications to these base stations, provided that they are equipped with additional computational and storage resources. The cloud concept applied in the framework of small cells can also combine radio and computation aspects in order to optimize the service delivery.

The main expected benefits associated to applications offloading are:

1. improving user experience when running demanding applications,

2. prolong UE (User Equipment) battery lifetime, and

3. generating a potential revenue stream for operators

To that end, novel mechanisms are needed to efficiently allocate resources (understood in a wide sense: radio, computation, storage, and energy resources) in a way to meet the optimal balance between the energy spent for processing/communicating, and delay constraints imposed by the application. Naturally, this balance is related to the radio channel state and the quality of the wired backhaul. This ambitious target entails, among others, the need of dynamically managing contextual information metrics and clustering techniques for small cells.

We would appreciate it if you could let us know if the Small Cell Cloud approach is something you would eventually contemplate as beneficial for your business (and how challenging you think this approach is) by filling a questionnaire that would be distributed to you.

1. **Objective of the Questionnaire:**
2. To gather information related to status of Small Cell in development and implementations in the Asia Pacific regions
3. To study and identify technical challenges of introducing cloud services among mobile users in the personal, home and enterprise segments.
4. To study and discuss the idea of Small Cell Cloud among APT members in the perspective of technical and business
5. **Responsible Group:**

Task Group Fixed Mobile Convergence

1. **Rapporteur of the Questionnaire:**

Chair TG FMC: Mr. F.X. Ari Wibowo

Email: ari\_wibowo@telkom.co.id

1. **Meeting at which the Questionnaire was approved:**

AWG-17

1. **Target Responder:**

APT Members, Associate Members, and Affiliate Members

1. **Deadline for Responses:**

AWG-18

**Section 2: Questionnaire Part**

**Question 1:**

Institution/Company Information and Profile

Name of the institution :

Name of contact person :

Mailing Address :

Phone :

Email Address :

My institution is (please choose) :

a. Regulator

b. Operator

c. Vendor

d. Others <please describe your answer here>

**Question 2:**

Femtocell/Small Cell Deployment status

Do your company already or in the planning phase to deploy Femtocell/Small Cell Solution? If yes please kindly describe your solution for your customer in term of:

1. Customer segment (residential or enterprise or both)

Answers:

1. Each type of offerings (in term of Fixed BB line used and number of users per Access Point)

Answers:

1. Services offered in the Femtocell/Small Cell solution

Answers:

**Question 3:**

Introducing the cloud services for mobile

Do your company have cloud related services or applications that offered to the mobile users? If yes please kindly describe those solutions in term of:

1. Type of cloud services/applications
2. Delivery model / how the user get the services
3. Business model of the services/applications
4. Challenges for operators or cloud providers in delivering the services/applications
5. Challenges for mobile users in using the services/applications

**Question 4:**

The idea of Small Cell Cloud

1. Small cell networks are currently seen as a new way to satisfy the increasing wireless traffic demand. The proximity of base stations to subscribers brings many possibilities for the development of new applications, including new offerings based on cloud computing. Smartphones could directly offload applications to these base stations, provided that they are equipped with additional computational and storage resources. The cloud concept applied in the framework of small cells can also combine radio and computation aspects in order to optimize the service delivery.

The main expected benefits associated to applications offloading are:

* improving user experience when running demanding applications

(Please give your oppinion \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

* prolong UE battery lifetime,

(Please give your oppinion \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

* generating a potential revenue stream for operators

(Please give your oppinion \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

1. Please give your opinion on the method of Small Cell Cloud:

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| **Method** | **Your Opinion and Why?** |
| 1. Application offloading (on base station platform or an external computing platform) |  |
| 1. Management of application offloading (on external platform or extension of Small Cell Gateway/HeNB-GW) |  |
| 1. Management of application offloading (on base station or by application) |  |
| 1. Integrated support of mobility and application offloading (by MME or by Base Station) |  |

1. Please kindly give 0-10 point scale of the importance of below technical achievement that will drive the idea of Small Cell Cloud:

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| --- | --- |
| **Achievement** | **Point** |
| 1. Mobility coverage |  |
| 1. Signalling and eventually user data overhead over the air |  |
| 1. Latency, as perceived by user |  |
| 1. Computation performance |  |
| 1. /Storage capabilities |  |
| 1. Increased cost of Small Base Station |  |
| 1. Cost of deployment and maintenance |  |
| 1. Implementation complexity |  |
| 1. Impact on current LTE deployments |  |
| 1. Energy consumption |  |
| 1. Others. Please specify: |  |

1. If you are a telecom operator, would you be willing to run the base-station-based cloud or you would prefer to outsource the management to a third party?

a) I am not a telecom operator

b) I would rather running the cloud

c) I prefer to outsource the management to a third party

d) We could do both

1. Do you consider (or see difficulties) in using an external cloud (like Amazon service) in the case the femtocloud cannot cope with the load through a bursting procedure? Would you prefer to use an external cloud in an exclusive way (without the Small Cell Cloud )?

a) I am not a telecom operator

b) Yes

c) No

1. Would you prefer to use an external cloud in an exclusive way (without the Small Cell Cloud)?

a) Yes

b) No

1. Considering the application of using smallcells for data storage and that the smallcell is not under control of the operator, do you see a real risk?

a) Yes

b) No

1. How do you think that that user data could be protected in those virtual machines? Why?