

**5th SG13 Regional Workshop for Africa on
"ITU-T Standardization Work on Future Networks: Towards
a Better Future for Africa"
(Cairo, Egypt, 2-3 April 2017)**

Overview on Cloud Computing Scenarios in Developing Countries



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Introduction

Cloud Computing provides plenty of opportunities for business that have socio-economic impact on Developing Countries



- 
- SG13 is accelerating its work on Cloud Computing standardization as lead study group on Cloud Computing within ITU-T
 - Q5/13 on “Applying networks of future and innovation in developing countries” agreed on a new work item on Cloud Computing since 04/2015



1- Q5/13 work on Cloud Computing



2- Results of the Questionnaires on Cloud Computing Scenarios in Developing Countries



3- Overview on the Ongoing Supplement



4- Conclusion & Recommendations



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New Work Item on CC

Supp-Y.Cloud Computing Scenarios for Developing Countries

❑ **Objective** : Develop a **Supplement** on “*Scenarios and Requirements Regarding Consumption and Provision of Cloud Computing Services in Developing Countries*”



❑ The **Supplement** will mainly:

- present the **situation relating to consumption of CC Services in developing countries** + the **obstacles** encountered + facets that would stimulate **consumption of CC Services** based on experiences from these countries
- highlight the **current scenarios and the requirements of developing countries** regarding the **provision and deployment** of CC services
- reveal to what extent **CC Standards** are applied

 **Two questionnaires were elaborated and disseminated in order to collect input information for the Supplement**

Questionnaires on CC Scenarios

in Developing Countries

1



- ❑ **SG13 meeting (29 April 2016):** agreement to disseminate **two questionnaires** on Cloud Computing Scenarios in Developing Countries one for **Cloud Service Customers (CSCs)** and one for **Cloud Service Providers (CSPs)**
- ❑ The questionnaires were disseminated on **11 May 2016** in TSB circulars **221** (for CSPs) and **222** (for CSCs)
- ❑ The **deadline** for responses was initially **20 June 2016** then extended to **30 November 2016** (at SG13 meeting of **June - July 2016**)
- ❑ The questionnaires were available in **work document format** and **online** to facilitate for a wide range of feedback methods for the respondents

Questionnaires on CC Scenarios

in Developing Countries

Questionnaire for Cloud Service Customers (14 questions)

Topics	Nb. of Questions	Overview
General Questions	4	Line of Business, internet connection type, motivations to migrate to the CC, ...
Cloud Computing Usage	3	Criteria for CSP selection, used CC services, CC costs, ...
Standardization Requirements	5	SLA benchmarks for CC, CC issues that could be addressed with standards, ...
Opportunities and Challenges for CC Deployment	2	Bottlenecks and weaknesses, scenarios that can encourage the use of cloud services in developing countries,...

Questionnaires on CC Scenarios

in Developing Countries

Questionnaire for Cloud Service Providers (28 questions)

Topics	Nb. of Questions	Overview
General Questions	6	Line of Business, internet connection type, motivations, types of customers, ...
Cloud Computing Deployment	8	Deployment models, promising CC services, infrastructure needs, ...
Standardization Requirements	10	Areas of standardization, SLA, service management, contract management, ...
Opportunities and Challenges for CC Deployment	4	Internal and external barriers to CC adoption, bottlenecks and weaknesses, scenarios that can encourage the adoption of cloud services in developing countries,...



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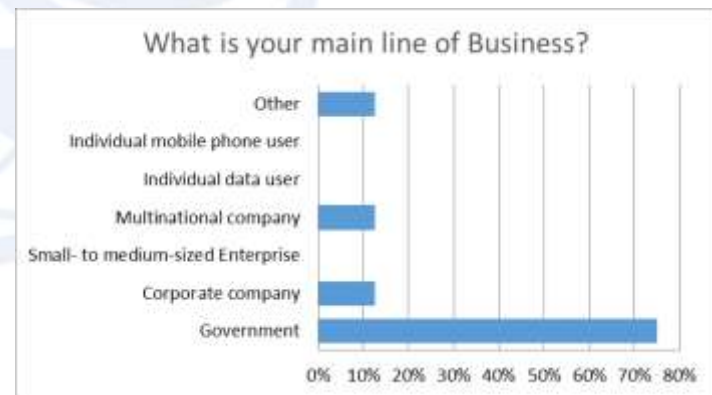
Respondents to the Questionnaires

Questionnaire for Cloud Service Customers

Number Of respondents: 8	Countries (7)	Submission
	<ul style="list-style-type: none"> • Africa (6): Ghana, Zambia, Zimbabwe, Sudan, Uganda, Malawi • America (1): Trinidad and Tobago 	<ul style="list-style-type: none"> • By Email (5) • Online (3)

❑ The majority of respondents represent the **Government (75%)**

⊕ respondents from a corporate company, a multinational company and an ICT regulator

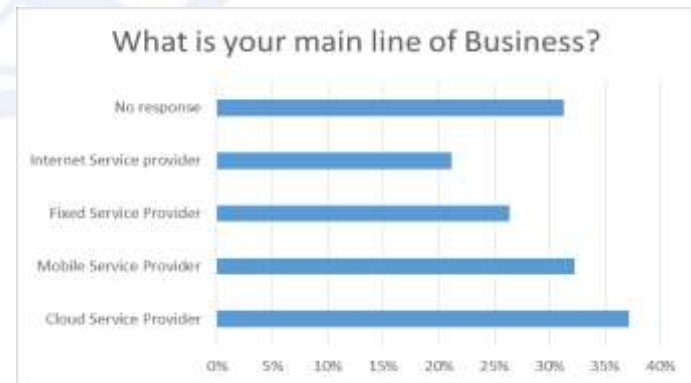


Respondents to the Questionnaires

Questionnaire for Cloud Service Providers

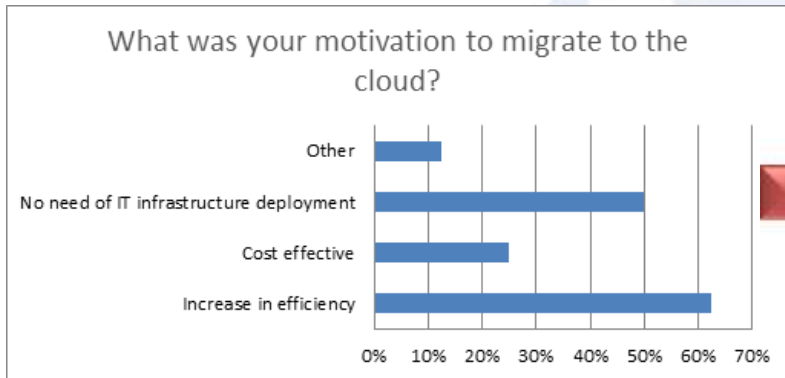
Number Of respondents: 18	Countries (15)	Submission
	<ul style="list-style-type: none"> • Africa (13): Burkina Faso, Senegal, Zambia, Côte d'Ivoire, Zimbabwe, Algeria, Tunisia, Sudan, Nigeria, Malawi, Gambia, Ghana, Botswana • Asia (1): Afghanistan • Europe (1): Bosnia and Herzegovina 	<ul style="list-style-type: none"> • By Email (10) • Online (8)

- ❑ The respondents are diverse (Cloud, Mobile, Fixed, and Internet Service Providers)



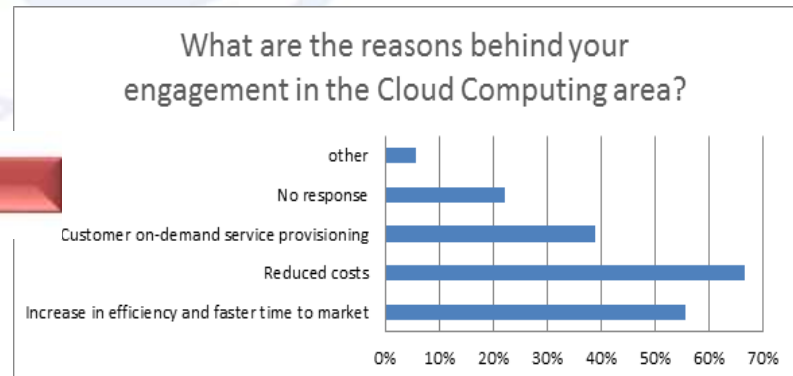
Some Findings from the Questionnaires

Motivations for Cloud Adoption/Provision



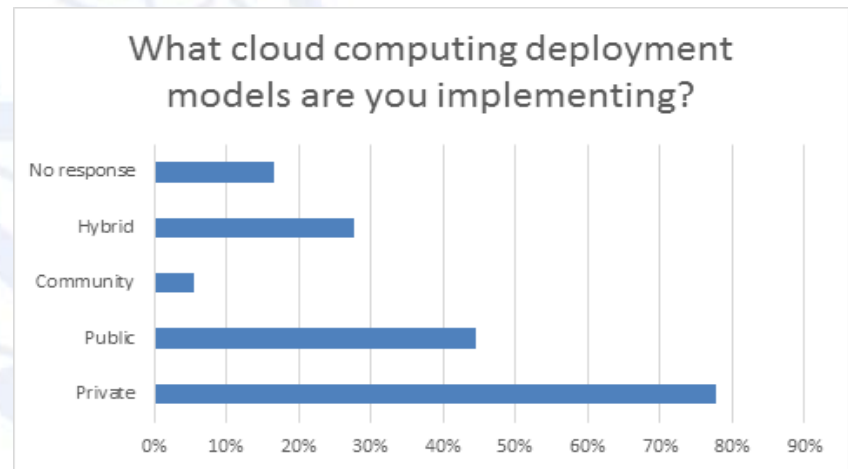
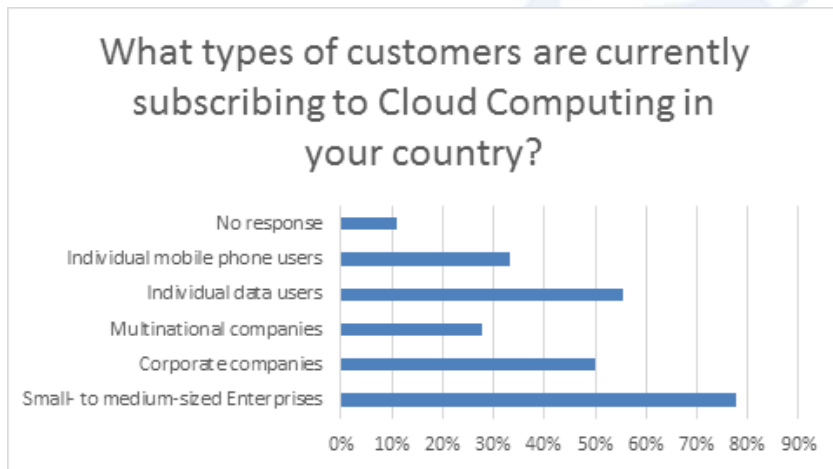
Main motivations for most CSCs to migrate to the cloud: increase operational efficiency + no need to acquire expensive hardware and deploy IT infrastructure, consequently ensuring cost optimization

Main motivations for most CSPs to engage in the CC area: provide customers with affordable solutions which minimize the infrastructure investment costs + faster time-to-market



Some Findings from the Questionnaires

CC Customers & Deployment Models



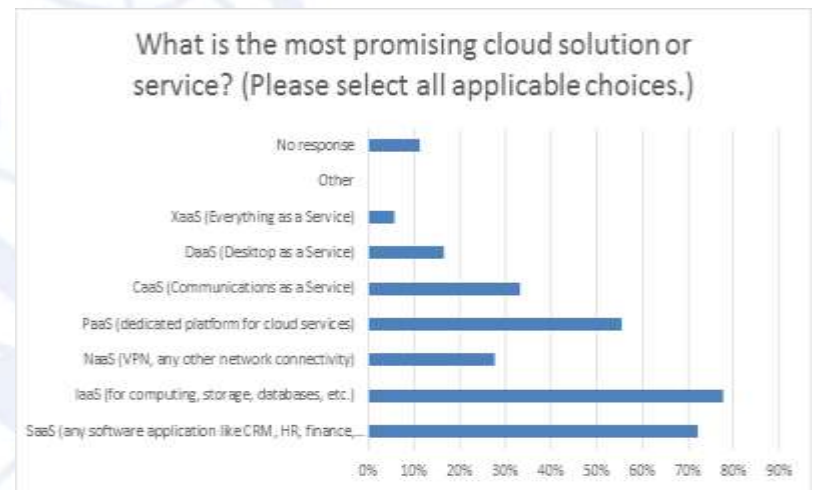
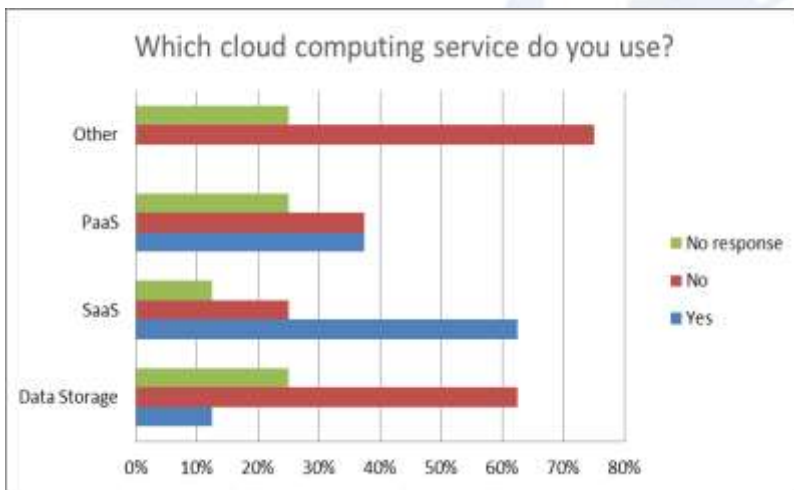
The target market for most providers is mainly **the small-to-medium sized enterprises** as they may have interest to reduce infrastructure costs or outsource the data management services



The majority of respondents implements **Private and Public cloud models** while hybrid cloud is not yet widely implemented

Some Findings from the Questionnaires

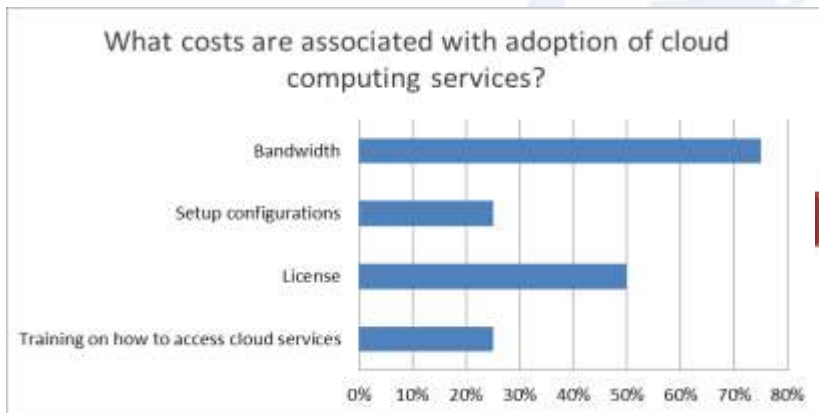
Cloud Services



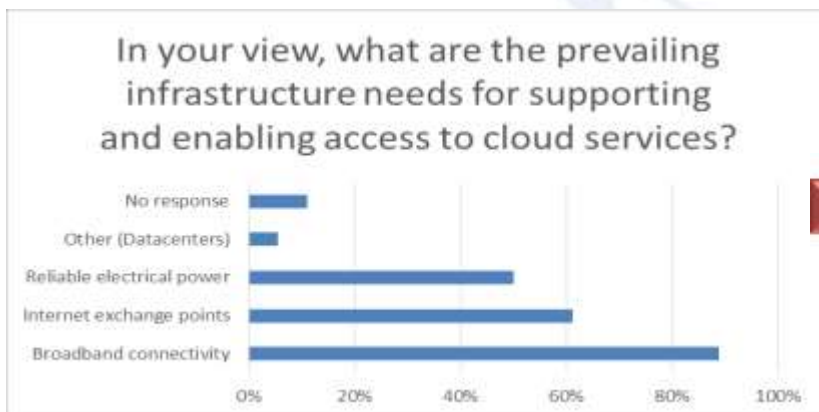
The most used Cloud Service is SaaS, while IaaS is considered as the most promising cloud service

Some Findings from the Questionnaires

Cloud-related Costs & Infrastructure



Costs associated with CC adoption include mainly **Bandwidth and license fees**

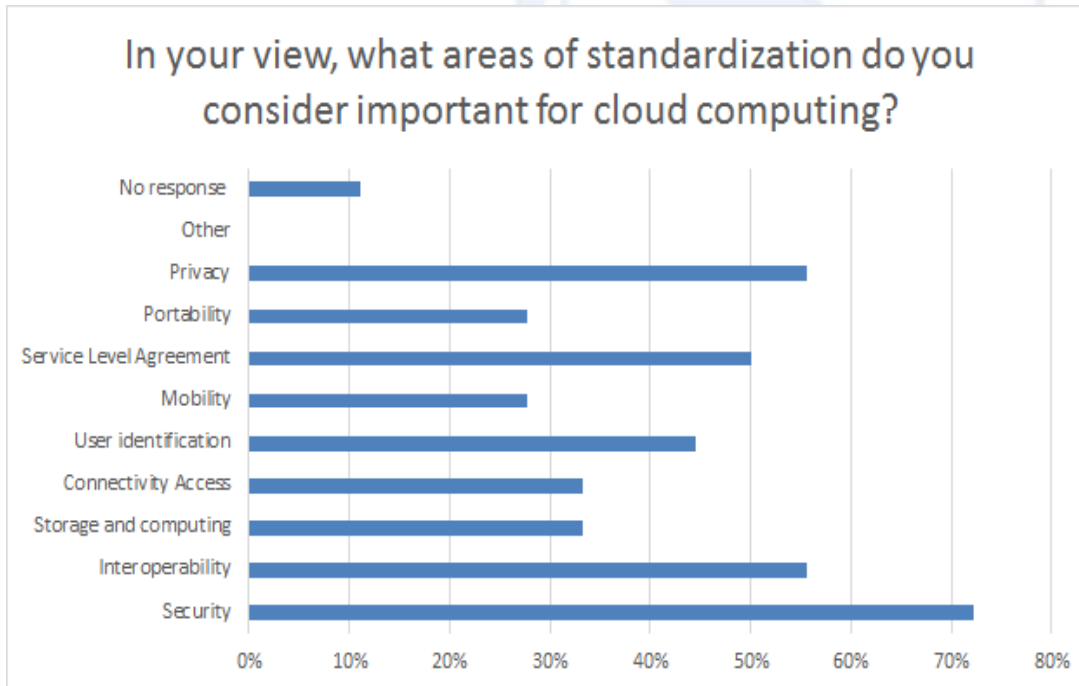


Broadband connectivity is the prominent infrastructure requirement that will support access to CC services.

The availability of **reliable electrical power** is also needed

Some Findings from the Questionnaires

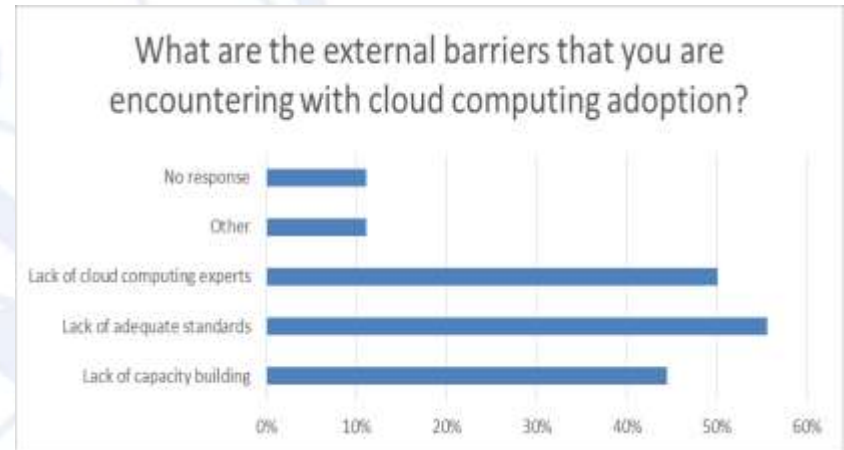
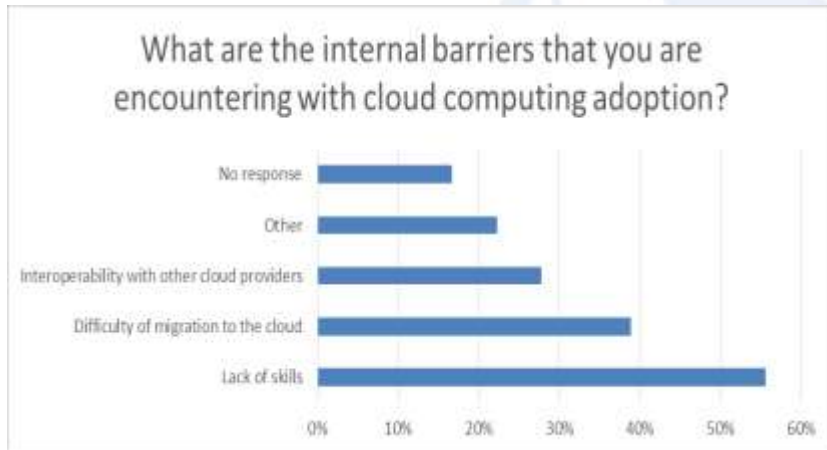
Standardization Requirements




- ❑ **Security, Privacy and Interoperability** are the most CC areas that needs standards
- ❑ **Service Level Agreements (SLA)** should also be standardized

Some Findings from the Questionnaires

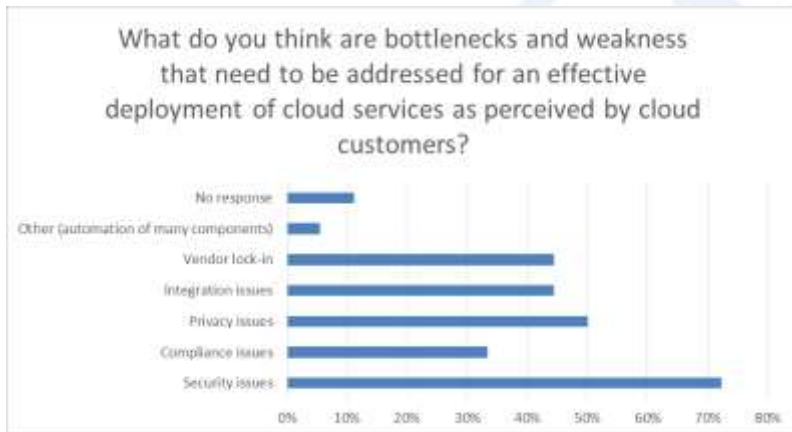
Barriers to the Cloud Adoption



 **Internal barriers to CC adoption** are mostly the lack of skills and the difficulty to migrate to CC, while **the external barriers** include the lack of adequate standards and the lack of experts and capacity building

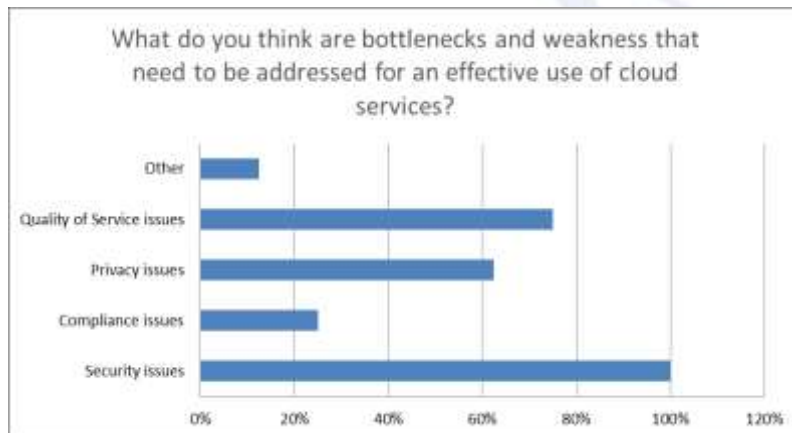
Some Findings from the Questionnaires

Bottlenecks & Weaknesses



The main challenges that have affected the adoption of cloud computing in developing countries include:

- Security and Privacy Concerns
- Infrastructure needs
- Capacity Building
- Quality of Service
- Compliance Limitations





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Structure of the Supplement 1

1. Scope
2. References
3. Definitions
4. Abbreviations
5. Conventions
6. Overview of Cloud Computing
7. Questionnaires Findings



7.1. Introduction

7.2. Deployment of Cloud Computing in Developing Countries

7.3. Applications and Services: *Data Storage, IaaS, SaaS, others*

7.4. Financial Analysis of Cloud Computing Scenarios: *Cost associated with cloud computing adoption, pricing models, economic implications of CC implementation for developing countries*

Structure of the Supplement ²

8. Cloud Computing Scenarios in Developing Countries

9. Cloud Computing Requirements in Developing Countries

9.1 **Standardization Requirements:** *Green Standards, Cybersecurity, Interoperability and Portability, SLA, Other Standards*

9.2. **Human Resources**

9.3. **Infrastructure requirements:** *Data Centres, Electrical Power, Network Infrastructure*

9.4. **Trust**


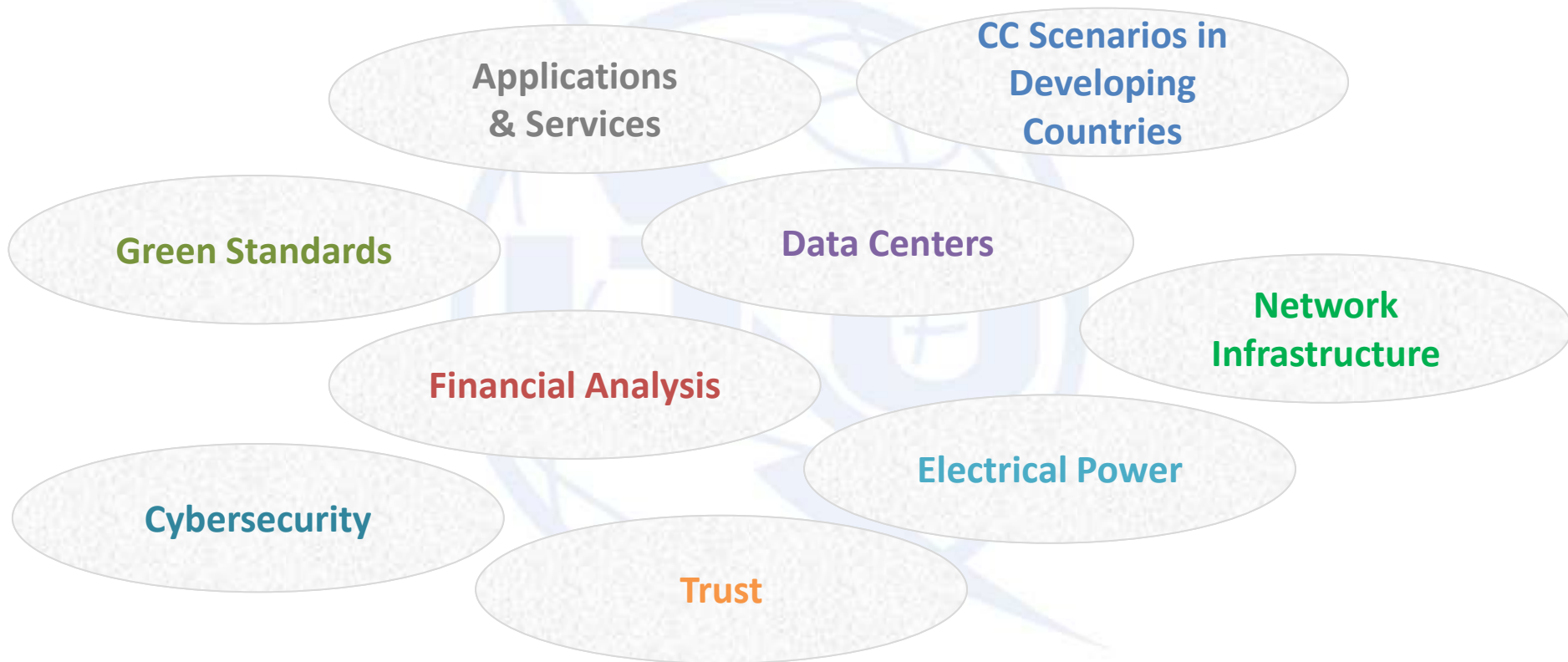
10. **Challenges of Cloud Computing Adoption:** *Security & Privacy Concerns, Infrastructure needs, Capacity Building, Quality of Service, Compliance Limitations*

11. **Opportunities for Cloud Computing Adoption**

Appendix

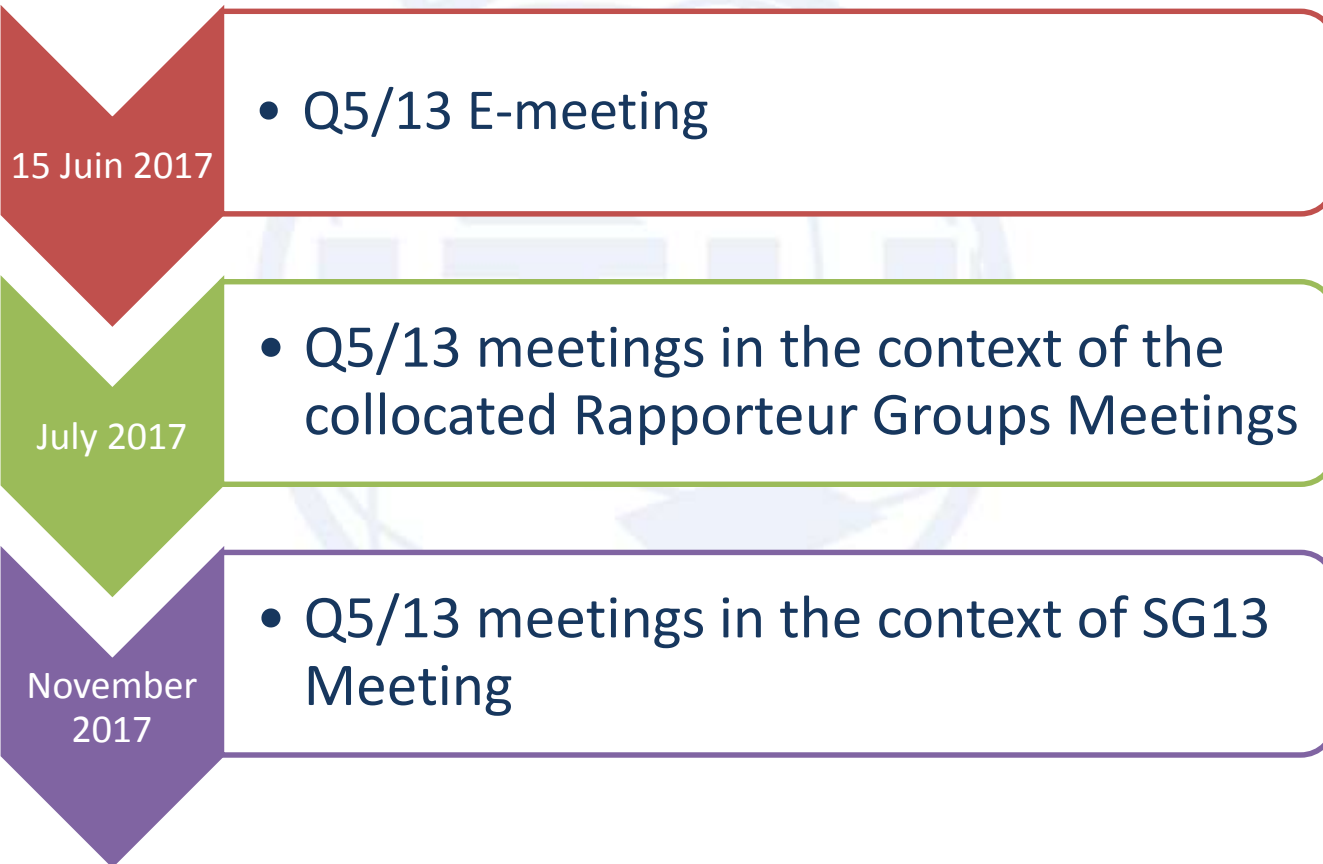


Parts That Needs Further Inputs



ITU-T members from Developing Countries are invited to submit contributions to Q5/13 on these topics, including some case studies and statistics in order to enrich the supplement

Next Steps





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Conclusion

- ❑ Cloud Computing, with its interesting characteristics, is offering plenty of opportunities for enterprises, governments and end-users especially in the developing countries
- ❑ However, many challenges should be addressed in order to facilitate and accelerate the adoption of CC services in these countries
- ❑ SG 13 is deploying serious efforts in developing standards that encloses many Cloud Computing-related aspects since 2013, and Q5/13 is currently developing a supplement on “*Scenarios and Requirements Regarding Consumption and Provision of Cloud Computing Services in Developing Countries*” based on the results of two questionnaires for CSCs and CSPs
- ❑ Due to the insufficient number of responses to the questionnaires, contributions from developing countries are still needed to enrich this supplement



Recommendations

1

ITU-T members from Developing Countries from ALL REGIONS are invited to submit contributions in order to help in the development of the supplement

2

Contributions may focus on the topics of the supplement and could include some case studies, best practices and statistics regarding the consumption and provision of CC in developing countries

3

ITU-T members from Developing Countries are invited to submit contributions to the upcoming Q5/13 meetings regarding possible new work items in the topics of SG13, mainly Big Data, IMT-2020 and Trust in ICT infrastructure, in the objective to develop recommendations, supplements, handbooks and/or technical reports taking into account the requirements of Developing Countries

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Thank you for your Attention



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