Review on
Towards 1 Gbps/UE in Cellular Systems: Understanding Ultra-Dense Small Cell Deployments

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III. The Problem

It is estimated that by 2020 at least 100 folds network capasity should be increase to meet the oncoming demand. Currenty vendor and operators are implementing different techniques to improve the network capasity. To improve the network capcity, all the tools can be calssified into three categories as show in figure - 1

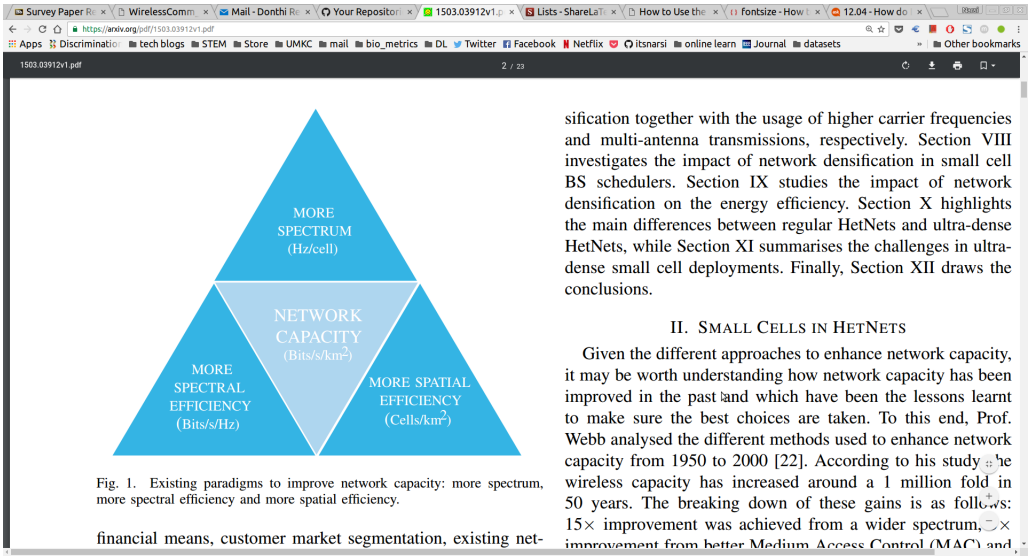

Fig. 1. Existing paradigms to improve network capacity: more spectrum, more spectral efficiency and more spatial efficiency.

financial means, customer market segmentation, existing net-

sification together with the usage of higher carrier frequencies and multi-antenna transmissions, respectively. Section VIII investigates the impact of network densification in small cell BS schedulers. Section IX studies the impact of network densification on the energy efficiency. Section X highlights the main differences between regular HetNets and ultra-dense HetNets, while Section XI summarises the challenges in ultra-dense small cell deployments. Finally, Section XII draws the conclusions.

II. Small Cells in HetNets

Given the different approaches to enhance network capacity, it may be worth understanding how network capacity has been improved in the past and which have been the lessons learnt to make sure the best choices are taken. To this end, Prof. Webb analysed the different methods used to enhance network capacity from 1950 to 2000 [22]. According to his study the wireless capacity has increased around a 1 million fold in 50 years. The breaking down of these gains is as follows: 15× improvement was achieved from a wider spectrum, ×

Fig. 1. Three categories of existing tools to improve Network capacity.

In the early days of wireless communication systems, voice service is the most popular service which requires only tens of Kbps per user equipment (UE). However, these days video steaming is the most popular service requiring tens of Mbps per UE. In future, these demands will go up dude to increase in usage of more internet of things (IOT) applications, with rapid advancements in virtual reality and augmented reality, autonomus driving systems and higher resolution multimedia services (example 4k, 8k resolutions) etc., Which require networks capable of handeling more number of UE's and high data transfer rates at higher energy efficiency.

IV. The Application

V. The Categories

VI. The Future

VII. What We Learn?

VIII. Five Most Important Points

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