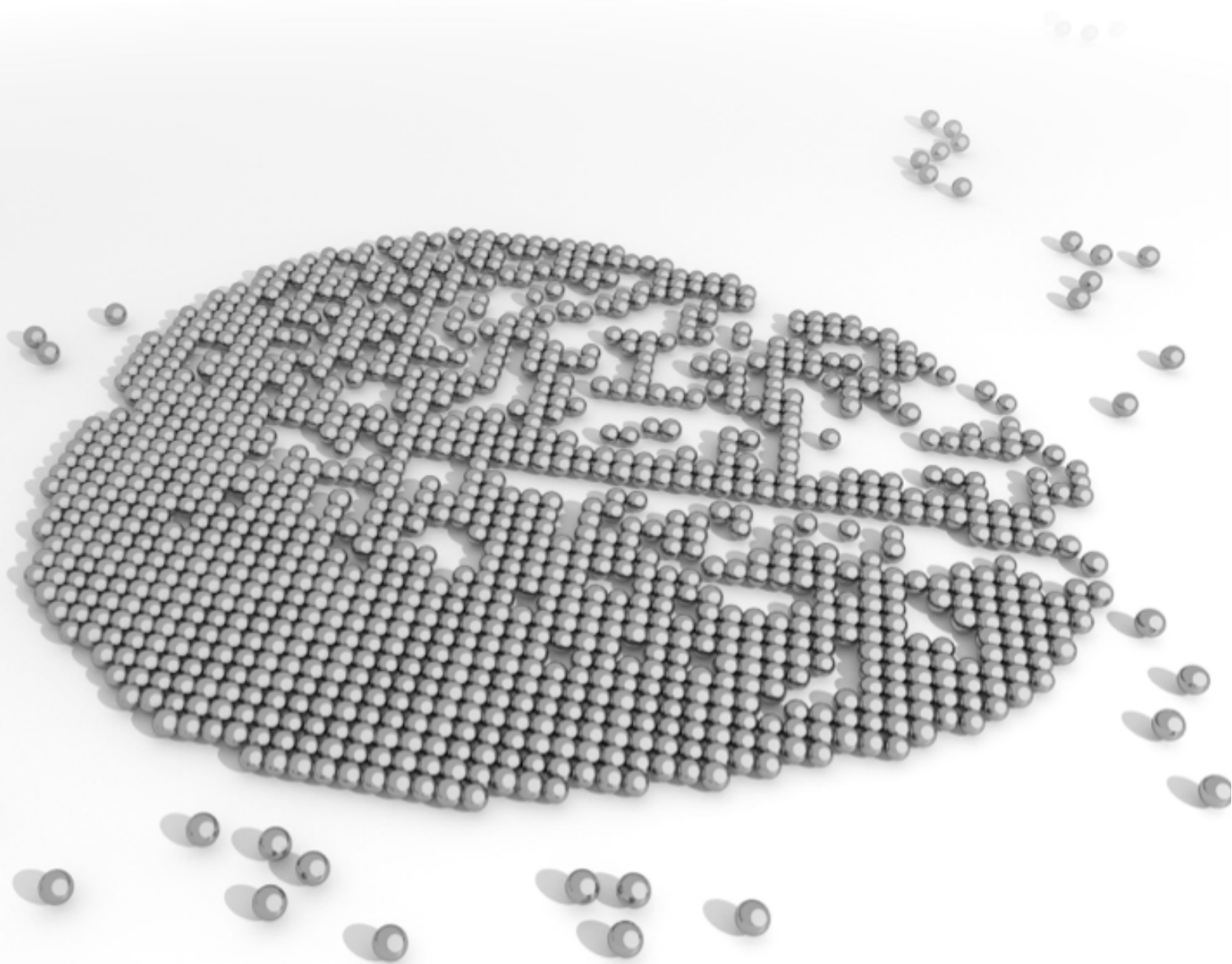


Small Cells

New Order



A global status report on the roll-out and planning of 3G, 4G and Wi-Fi small cells

Small Cells, New Order

The continued surge in mobile data demand, combined with the finite supply of spectrum resources, and the desire to provide customers with the highest quality voice and data services has created a conundrum for mobile network operators all over the world. In response, several operators have turned to small cell technology as one solution to address these challenges.

It's been commonly recognized for several years that small cells are going to create new challenges in mobile networks, as they're able to increase spatial reuse of existing licensed spectrum. While the concept isn't new, the need for the technology has become evident with growth in mobile data traffic.

We have surveyed some of the leading mobile operators in the world to understand their strategies for the implementation of small cell networks. The results make intriguing reading including answers to the questions:

- What type of heterogeneous networks meet operators' operational expectations?
- What do operators see as the challenges holding up small cell deployments?
- What type of small cells will be deployed?
- What operators see as their primary small cell backhaul and how they rank the different solutions?
- Which vendors are operators considering for each backhaul technology?

Why buy this report?

For operators it gives you additional insight and inputs to your business case for small cells. Learn from the experiences of first-mover operators. Gain insight to what technology innovations have been tested and are being considered for first deployments. Learn which vendors are leading the innovation race!

For Vendors it gives you insight into what are the issues operators are still trying to resolve. Learn which vendors are getting traction and what the timing for the next wave of small cell deployments is looking like now.

Small Cells, New Order provides real insight to what small cell deployment issues are keeping mobile operators awake at night from our survey data and interviews – and what they have decided to do to resolve them!

CONTENTS

Table of Contents

1	Small Cells New Order.....	6
2	Classification of Small Cells	7
3	The Background To Our Small Cell Operator Survey.....	9
3.1	Deployment Use Cases.....	9
3.2	Deployment Timelines	10
3.3	Challenges to Small Cell Deployments	12
4	Small Cell Backhaul	14
4.1	Wireless Backhaul Options.....	15
4.1.1	Category 1: LOS Systems	16
4.1.2	Category 2: NLOS Systems	18
4.2	Evolution of Small Cell Wireless Backhaul.....	21
4.2.1	The Small Cell Business Case.....	24
5	Results & Analysis	25
5.1	Methodology and Data Analysis	25
5.2	Operators' Profiles	25
5.3	Small Cell - Network.....	26
5.4	General Backhaul Issues.....	33
5.5	Backhaul Requirements	37
6	Acronyms	41

Table of Figures

Figure 1: Future mobile networks will include small cells of all types (Source: Small Cell Forum)	8
Figure 2: Classification of small cell base stations (Source: Xona Partners)	8
Figure 3: Wireless performance degrades with distance from the cell center (Source: Xona Partners).....	10
Figure 4: Range imbalance reduces the performance benefits of small cells (Source: Xona Partners).....	13
Figure 5: Classification of wireless backhaul options for small cell applications (Source: Xona Partners)	15
Figure 6: Positioning of wireless backhaul options (Source: Xona Partners).....	16
Figure 7: Specific attenuation due to atmospheric gases (Source: ITU-R P.676-7)	17
Figure 8: Band plan and specifications for V-Band spectrum (Source: Xona Partners)	18
Figure 9: Representative spectrum pricing in sub-6 GHz frequency bands (Source: Xona Partners)	19
Figure 10: LOS and NLOS backhaul are opposed on the performance-reach continuum (Source: Xona Partners)	22
Figure 11: Backhaul capacity requirements for LTE small cells (Source: NGMN)	24
Figure 12: Surveyed global operators' profiles	25
Figure 13: Small cell deployment timelines.....	26
Figure 14: Small cell deployment factors by priority	29
Figure 15: Operators decisions on small cell spectrum	30
Figure 17: Access mode requirements combinations.....	32
Figure 18: Backhaul technologies for small cells	33
Figure 19: Technology toolbox	34
Figure 20: Fiber availability for network operators	35
Figure 21: Wireless backhaul technologies selected by operators for trials	35
Figure 22: Frequency bands for small cell LOS backhaul	36

Figure 23: Operators PTP positioning 37

Figure 24: Type of backhaul capacity for small cell 37

Figure 25: Latency requirements 38

Figure 26: Link availability 39

SELECTED KEY FINDINGS

- Over 50% of the surveyed operators say they want to deploy small cells in 2014.
- Cost is the fundamental challenge to small cell deployments. Half of the surveyed operators have not yet fully ascertained the value proposition for small cells and are still working on the cost model for small cell deployments.
- Operators are keeping an open mind to solving the small cell backhaul challenge with many solutions in trials. The report compares the backhaul technologies and identifies the leading vendors in each category.
- Operators are asking overwhelmingly (over 50% of cases) for multimode LTE, 3G, and Wi-Fi outdoor small cells. This puts tremendous pressure on the backhaul network capacity.

Pricing:

The report is available for purchase immediately. Price is US\$2200

Sales Contact:

Elias Aravantinos, Lead Analyst
earavantinos@exelixisnet.com

Report inquiries, contact ExelixisNet: <http://exelixisnet.com/research-reports>