

In-Building Market, Small Cells and DAS

Motivations



40% of the workforce
will be freelancers, temps,
independent contractors
and solopreneurs by
2020

39% of millennials say
they interact more with
their smartphones than they
do with their significant others,
parents, friends, children
or co-workers

By the end of 2017,
around **14,000**
co-working spaces
will be in operation
worldwide

67%
of people around
the world use a
personal device at
work to some degree

More and more buildings are suffering with poor indoor coverage

Opencell in the UK have secured contracts for over 70 sites and 1,700 small cells

We have now successfully delivered multi-operator service to 55 sites

Over 1,300 cells monitored and under our service management

Enterprises recognise the benefit of investing in mobile coverage and Operators gain coverage and capacity in buildings where the building construction make them difficult to cover from macro site

Our Customer List includes:

Hilton Hotels, Sheraton Hotels, Village Hotels, Maybourne Hotels, Mandarin Hotels, Derby Conference Centre, Wework, Workspace Group, Regus, The Office Group, Fora, Gentings, Gala Bingo, Mace Group, AECOM, Gorkana, Cripps, All England Tennis Club, PTS, Southampton University, FLRS Spectrum, Mandrake Hotels, The Police & Crime Commissioner Sussex, UK Accreditation Service Staines, Brighton FC, Curtis Wright

Co-Working and Shared Working Space

- A Revolution is taking place Globally
- The growth in serviced offices and co-working space is phenomenal
- No longer run down, shoddy buildings but now fantastic office environments
- The customer needs are critical, must have:-
 - Fast Internet, Wifi, Coffee, Great Environment and **Mobile Phone coverage**

The Old



The New

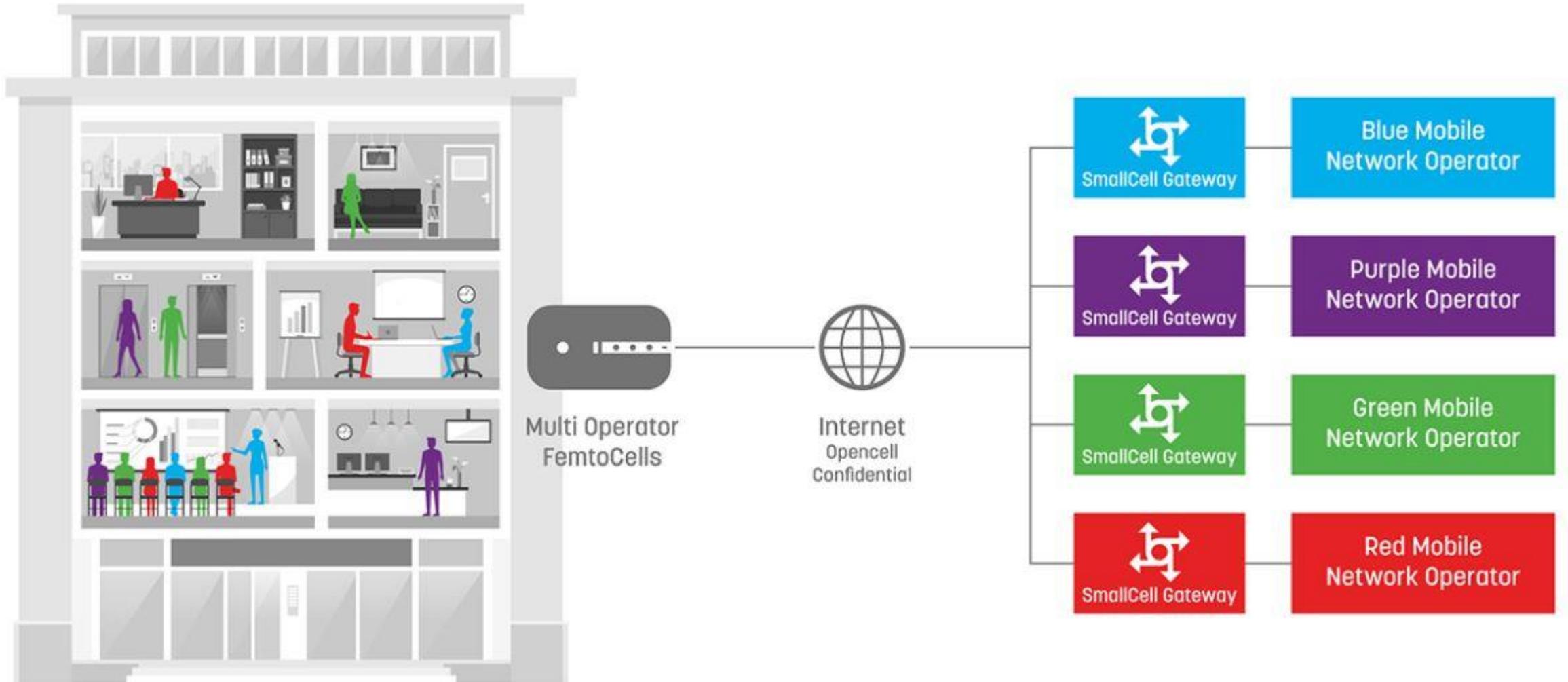


Example case study is WeWork Moor Place providing small businesses, startups, and freelancers with the workspace, community, and services they need to make a life, not just a living. As a collaborative workspace, they offer weekly events, personalized support, flexibility, and access to more than 40,000 members around the globe.

The largest of their 70+ locations worldwide, WeWork Moorgate faced challenges with cell service and in September turned to OpenCell to help boost member satisfaction. The full roll out of OpenCell's service was completed by early November, including the installation of the backhaul connections.

Other's include Regus (Spaces brand), Workspace Group, Fora, The Office Group, Smaller boutique offices, London Executive Offices and many more.

Opencell Solution



So, Small Cells or DAS?



Benefits Table	Small Cells	DAS
Costs	Small Cells in average and normal/large size office blocks, hotels and other buildings are up to 75% lower cost than JOTs/DAS. Equipment, cabling, design, installation, connectivity and connection to Operators are all lower cost.	DAS where already installed can offer a lower priced solution for extremely large buildings (e.g. Airports, large Hospitals).
Backhaul	Small Cells can share backhaul and use the building owners WAN saving significant cost .	DAS requires a dedicated backhaul per Operator resulting in additional costs and significantly much higher running costs

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Benefits Table	Small Cells	DAS
Multi-Operator	Operators retain control of the cells and the frequency design and interworking, each Operators network is part of that Operators network provision multi-operator is much simpler and more assured	DAS requires Operators to provide a dedicated BTS which is difficult to get approved. This means building owners funded a DAS system and still are unable to get Operators to connect . Of several hundred DAS systems in the UK you can count on your fingers the number that are all Operator.
3G/4G	The small cell solution is provided over shared IP and backhaul and can easily be upgraded using the same cabling and connectivity once 3G/4G product is available and if required. Spidercloud is now working well (albiet more expensive). Huawei and Ericsson have products but lack 3G with many handsets in the network still requiring this functionality.	DAS if a future proofed design will be technology compliant although expensive for high band 4G as extra radio units required. DAS is in theory easier to upgrade to latest technology but in practice can be more difficult if the original DAS was not designed with upgrade in mind.

So, Small Cells or DAS?



Benefits Table	Small Cell	DAS
Cabling	<p>Small Cells use standard Cat5e or Cat6 cabling using fully shared IP and Backhaul saving significant cost and minimising disruption to the building.</p>	<p>DAS still requires more difficult and tailored cabling (coax or dedicated optical fibre cabling). JOTs/DAS requires dedicated backhaul per Operator base station significantly increasing running costs.</p>
Capacity and Service	<p>Small Cells have more than sufficient capacity for voice and text services and data in office environments. 4G cells required for event locations incl the newer Onecell, Lampsite or DOT type products.</p> <p>It is important to be able to monitor and maintain the service this can be done for both Small Cells and DAS.</p>	<p>For large high footfall public areas DAS is able to deliver capacity more evenly from Operator high capacity base stations. The newer 4G small cell products now negate that benefit.</p> <p>It is important to be able to monitor and maintain the service this can be done for both Small Cells and DAS.</p>
Equipment Aesthetics	<p>Small Cells with a cell per Operator mean 4 boxes per radio point. For 99% of buildings this is not a problem as they are part of the modern building design or can be hidden from view.</p>	<p>DAS requires 1 unit which is simpler and easier to design into the building layout. This is often offset by a more difficult and complicated cabling requirement. Small advantage for DAS on number of units per radio point.</p>

Summary



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- In small and medium size buildings Small Cells are lower cost and easier to connect than DAS having a significant and clear advantage.
 - In large residential, office, hotel and conference centre type buildings small cells will be lower cost with Operators retaining control of their radio network.
 - On outdoor major sports stadiums and major events arena DAS or the new baseband 4G products from many tier 1 vendors and smaller suppliers are better for distributing capacity from on site baseband or high capacity base stations.



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