White Paper Proposal – Stuart Jack, Nordicity Group Limited

Application of agent-based models to forecast integrated bandwidth demand for IoT, mobile data, etc. and correspondingly, communications infrastructure needs in the combined in-building/network infrastructure.

Nordicity proposes to work with CABA members and partners to develop an agent-based optimization model for planning optimal, integrated (in-building and backbone), IP- network solutions required to handle the converged demand of next generation usage and users: IoT, Smart Cities, everywhere mobile broadband, etc.

Current communications network planning has tended to offer solutions that are adaptive, incremental, partial and non-optimal:

- Incremental – current planning responds to specific network demands / issues (blockages, network quality, etc.) and uses hybrid legacy and new infrastructure solutions to provide step function increases in capacity;
- Partial – in-building and network backbone (wireline and wireless) solutions are largely developed in isolation and thus doesn't fully utilize the capacity of those assets;
- Non-optimal – current planning can't evaluate the demands of multiple types of users / usage in light of critical performance parameters: RoI, criticality, etc. nor provide an optimal technical and financial solution.

To take the example of in-building interconnected, smart technologies, current planning is only at the front-end of mapping the combined demands of various usage / users: systems lighting, security, HVAC, etc. and integrating these into a single optimization model. While critical applications require data feedback from sensors in real-time, the efficient management of others only require feedback on a periodic and/or critical change basis.

Agent-based modelling has the ability to provide integrated, efficient and financially optimal solutions based on its ability to distinguish the technical requirements and behaviour of usage / users: overall and peak data usage, periodicity, reliability/criticality, etc. under various scenarios: capacity, pricing, next best alternative, etc.

The agent-based optimization model would be used to attract partners and funding for further development. Potential partners include network operators (TELUS, Rogers, Bell), building owners, government innovation funds (NSERC, etc.), system developers (Cisco, etc.) and academic researchers (Canada Research Chair in Next Generation networks at Western University).

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