

Microsoft is exploring data centers powered by fuel cells

November 15 2013, by Nancy Owano



(Phys.org) —Fuel cell powered data centers may not be ready today but Microsoft is exploring the idea in a vision of data centers that one day can get out from under reliance on the electricity grid. Microsoft has released a paper discussing the fuel cell-based data center power distribution system. "No More Electrical Infrastructure: Towards Fuel Cell Powered Data Centers" is authored by Ana Carolina Riekstin, Sean James, Aman Kansal, Jie Liu, and Eric Peterson. The authors said that "If the FCs are placed close to power consumption units, at the servers or racks, we can completely eliminate the power distribution system in the data center, including the power backup generation system. So, no data center wide electrical infrastructure is required."

Sean James, one of the authors, blogged earlier this week about the paper and Microsoft's overall initiative. "Based on our models detailed in the paper," he said, "we show how integrating a small generator with the IT hardware significantly cuts complexity by eliminating all the electrical distribution in the grid and data center." James is senior research program manager, Global Foundation Services (the engine that powers Microsoft's cloud services). The paper, he said, describes "how we are taking an unconventional approach to power a data center entirely by fuel cells integrated directly into the server racks."

The study, he remarked, "explores how to collapse the entire energy supply chain, from the power plant to the server motherboard, into the confines of a server single cabinet." James cited key advantages of fuel cells, saying they are clean, reliable and well suited for small form-factor applications. While there is still a CO₂ waste stream, the output is significantly lower and cleaner than other power generation technologies, he added. "In the new datacenter design approach outlined in our paper, chemical energy is first converted to direct current electrochemically and sent a few feet to the server power supply."

James also noted that the cost of fuel cells will drop as the [fuel cell](#) industry matures, especially small form factor fuel cells for automotive and IT applications.

At this stage, however, he recognizes that such an initiative is not without challenges. "Deep technical issues remain, such as thermal cycling, fuel distribution systems, cell conductivity, power management, and safety training that needs to be further researched and solutions developed. But we are excited about working to resolve these challenges. This is only the early stages in our exploration of this concept."

More information: [www.globalfoundationservices.c ... the-server-rack.aspx](http://www.globalfoundationservices.com/the-server-rack.aspx)

research.microsoft.com/pubs/203898/FCDC.pdf

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Citation: Microsoft is exploring data centers powered by fuel cells (2013, November 15)
retrieved 27 April 2024 from

<https://phys.org/news/2013-11-microsoft-exploring-centers-powered-fuel.html>

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