Title: A vision for sustainable cloud computing

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The demand for increased computing power is incessant. As more becomes available we create more data which in turn requires more power to process which feeds a vicious cycle of demand. Their needs are so great it is impractical for many organisations to supply sufficient computing resources to quench their thirst; consequently Amazon, Microsoft, and Google have made their data centres available to others. Data centres that make up “the cloud” consume vast amounts of energy.

Our vision for the future of cloud computing is far more distributed than today, using networks of autonomous, self-configuring, self-powering personal clouds located where they are needed. We want to put computers by their users and under more direct control of their users, not just sited where large-scale energy production is inexpensive and run by potentially untrustworthy third parties. We believe that we can meet the software and hardware challenges to make this new form of cloud computing work.

We have designed a computer built using very low energy consumption, very high-throughput ARM processors that is a precursor to a distributed, autonomous cloud. We believe that this will be as powerful as modern servers while consuming substantially less energy than is produced by a small, domestic solar panel. It is the combination of solar power, low-energy computing and new management software that will allow us to fulfil the vision that we will present.