

The cloud within us

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The first tentative steps towards a peer-to-peer approach to cloud computing that enables users and removes the risks and costs of relying on industry giants to offer services are being taken by an international team of researchers.

Cloud computing is gradually becoming more and more pervasive as accessibility to broadband internet connections and always-on mobile devices rise. As a system, cloud computing takes on to remote and often distributed computers - the cloud - the software applications and data files that would normally be held on one's personal computer. Major players in the computing industry including, Microsoft, IBM and Oracle/Sun have finally weighed in on the cloud, while the Internet giants, including [Google](#) and Amazon, have been offering cloud services for email, web hosting, data storage, online [office applications](#) and much more for several years. The issue from the users' point of view is that one might become entirely reliant on services that may not persist indefinitely or that may come at a rising cost.

Hajar Mousannif of Cadi Ayyad University, in Marrakech, Morocco working with Ismail Khalil and Gabriele Kotsis at [Johannes Kepler University](#), Linz, Austria, explain that cloud computing relies on various services and systems. Software-as-a-Service (SaaS) is the online applications, such as web-based email among well-known examples are GoogleApps and Salesforce.com. There is then the Platform-as-a-Service (PaaS), which includes the likes of Microsoft Windows Azure and Amazon Web Services. PaaS allows users to deploy their own applications. Finally, there is Infrastructure-as-a-Service (IaaS), this

offers access to [processing power](#) and/or [storage space](#) in the cloud and examples include Rackspace, [Nimbus](#), and Eucalyptus.

"With [cloud computing](#), users can access the services based on their requirements regardless of where the services are hosted or how they are delivered," the team says. "Moreover, clients only pay for the quantity of the rented resources ([data storage](#), computation, etc.) they consume." But, they then ask, "Why even pay when you can simply cooperate to get the services you need?"

The collaborators are now introducing a new Peer-to-Peer (P2P) cloud architecture, which they call Cooperation as a Service (CaaS). The system, they say, provides participants with all the necessary infrastructure, platform and software services in the cloud by taking advantage of cooperation among different peers in the system rather than relying on corporate third-party systems.

The proposed CaaS cloud architecture enables computers to share information and other resources with peers on the network in large-scale distributed computing environments. The team explains that the principle relies on a "you scratch my back, I'll scratch yours" approach of mutual assistance. This, they explain, fuels spontaneous participation among the peers, if they don't assist each other, then their own services will not function. Several challenges remain, such as creating a large enough network to sustain a CaaS and to ensure security and privacy are maintained at the level required by each user.

More information: "The cloud is not 'there', we are the cloud!" in *Int. J. Web and Grid Services*, 2013, 9, 1-17.

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