Eco4Cloud: Consolidate virtual machines to accumulate datacenter savings

Analyst: Andrew Donoghue

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Startup Eco4Cloud (E4C) is a spinoff from the Institute for High Performance Computing and Networking (ICAR) of Italy's National Research Council (CNR) and the University of Calabria. The company has developed software designed to deal with virtual machine (VM) sprawl and low server-utilization rates. E4C's software effectively automates the real-time consolidation of VMs onto the minimum number of physical servers. The remaining servers, with a low number of VMs or none at all, can be power-managed dynamically based on workload variations, or even retired. E4C has received early stage funding from two external investors, and is looking to attract new investment and partners in 2014.

The 451 Take

E4C is not the first supplier to recognize the shortcomings of virtualization and the energy-efficiency benefits of consolidating VMs. Some similar tools already exist, and established suppliers are adding VM and workload management to datacenter infrastructure management (DCIM) and IT systems management (ITSM) tools. E4C has already partnered with some of these suppliers, and hopes to eventually be acquired by one. In the near term, it will need to establish more partners up the software stack (ITSM), as well as down into IT hardware and physical infrastructure (power and cooling). But the real benefit of its technology may be in helping datacenters to reduce capital rather than operating costs. The concept of in-cloud resiliency – where resiliency is provided by the virtualization layer rather than the datacenter infrastructure – could be more enticing to customers, especially in the US, where energy costs are lower.

Context

Server virtualization was heralded as a way to make it easier to quickly provision IT capacity, as well as improve the utilization rates of servers, which can often be below 10%. Better utilization should mean that fewer servers are required to carry out the same amount of IT work – with obvious capital and operational cost savings for datacenter operators. The reality, however, is that the ease of deployment means that, without close management, virtualization can often lead to VM sprawl with little improvement to utilization rates. Suppliers such as Microsoft, Citrix and VMware have developed sophisticated virtualization management platforms, but these tools were not originally designed with energy and cost management in mind (although some have now begun to add these capabilities).

E4C was founded in 2011, and operated in stealth mode until Q1 2013. E4C's technology is based on research conducted by its founders, who include a number of researchers and computer scientists from Italy's CNR and the University of Calabria. Chief executive Roberto Mircoli, previously in business development at Cisco, was hired in March 2013 to help commercialize and productize the company's research and develop. E4C has eight fulltime employees and a number of consultant software developers.

Technology

E4C describes its technology as a 'virtual infrastructure optimization' tool. The software is capable of clustering the maximum number of VMs on the minimum number of servers while proactively managing service-level agreements (SLAs). Extraneous servers can then be put into low-power states, switched off or retired completely in some cases.

E4C says its software is platform-agnostic and, via standard APIs, can integrate with any of the commercially available virtualization management platforms, such as VMware vSphere, Microsoft Hyper-V, Citrix XenServer, Oracle VM Server, Red Hat Enterprise, HP Integrity Virtual Machines and OpenStack. Eco4Cloud is able to collect data on the performance of physical hosts and virtual machines, as well as control the migration of VMs and power-manage physical servers. The system can also use the Intelligent Platform Management Interface (IPMI) industry protocol to power-manage servers directly.

The company says its approach to VM management is based on the research carried out by CNR, Politecnico di Torino and the University of Calabria. It is based on a form of biologically inspired

behavior it refers to as 'swarm intelligence'; an example from nature is the highly complex anthills that are the product of the specific behavior of individual ants. Rather than strict top-down policies, E4C's technology allows individual servers to accept or reject incoming VMs based on available resources.

E4C says it is not a DCIM tool, but it can integrate with DCIM to provide what it believes are much needed intelligent IT workload management capabilities for monitoring and control.

Business model

E4C prices its software according to a customer's expected annual energy savings, which will vary based on a number of factors (e.g., class of servers, workload profiles, type of VMs/applications). This can be as much as 50% of the annual energy savings.

The company says its software is also capable of reducing datacenter capital costs by cutting the amount of IT required to support VMs, as well as the physical (power and cooling) infrastructure to support the IT. E4C has placed less emphasis on these benefits despite growing industry interest in a trend known as in-cloud resiliency, where datacenter operators can choose to build less physical (power and cooling) redundancy into facilities, with the knowledge that VMs, or workloads, can be shifted between facilities in the event of an outage.

E4C has already undergone two rounds of funding since December 2011. Italy-based VC Principia SGR and Luxembourg-based Digital Investments SCA SICAR now own approximately 25% of the company.

E4C is part of the Cisco Developer Network and Microsoft's BizSpark program, and is actively seeking additional partners. The company also says it has had discussions with a number of interested parties about a possible early stage acquisition. The company did not disclose names, but said it is in talks with a number of large suppliers, including systems management suppliers; E4C says its technology could be a sub-tool of an existing systems management suite. HP and others suppliers have carried out in-depth performance tests of E4C's software. E4C says it also has a number of proof-of-concept joint deployments with a number of suppliers.

Most of E4C's pipeline of potential future sales is in its home country of Italy and the UK, but it is looking to establish a network of resellers across Europe, as well as the US. Existing customers include Telecom Italia, announced in Q1 2014. The three-year product and services contract will see Telecom Italia deploy E4C at the company's datacenters in Italy and in Argentina and Brazil. The

companies have also signed a nonexclusive agreement for Telecom Italia to resell Eco4Cloud internationally (Italy, Argentina, Brazil) through its sales force, and to operate and support it through its technical operations as part of its TI Cloud service.

Competition

E4C has entered a nascent but fast growing market for virtual and physical server energy management. VMware already has a product in this area with some of the same functions – VMware Distributed Power Management (VMware DPM) – but, as with all tools of this type, adoption has been relatively low to date. (E4C says DPM is not as scalable as its product and does not have the same workload management functions.)

Vancouver-based TSO Logic has also developed workload-aware datacenter energy management tools. Its technology can detect incoming workloads from network load balancers, measure server performance, and identify where power is being used and for what applications. Santa Clara, California-based Power Assure has also developed software that can manage and move IT workloads to where power reliability, availability and cost are optimal.

Other competitors include Atlanta-based energy management supplier JouleX, which was acquired by Cisco for $107m in 2013. JouleX Energy Manager is capable of monitoring and managing a range of IT equipment, including desktop PCs, as well as datacenter IT, but has less workload management capabilities.

IBM was granted a patent for a cloud management tool in Q4 2013 that appears to include some of the capabilities of E4C's technology. The patent is for 'Cloud Service Cost-Optimal Data Center Assignment,' but the technology is still at a very early stage.

The European Commission has also funded a number of research projects in the area of datacenter energy management, with a focus on the role of workloads and applications. 451 Research is involved in a number of these projects (in an advisory capacity), including CoolEmAll, which is developing tools capable of simulating the impact of applications and workloads on datacenter efficiency. The EC's Project RenewIT has a similar scope, but is focused on developing workload management tools for datacenters powered largely by renewable energy.

SWOT Analysis

Strengths	Weaknesses

E4C has a strong technical pedigree and appears to be courting some of the right potential partners and acquirers.

E4C currently has less capability than some rivals for managing physical servers and other datacenter IT equipment.

Opportunities

E4C should benefit from growing interest in software-driven datacenters and the touch points between ITSM and DCIM.

Threats

Other more established suppliers are waking up to the importance of VM and workload management, and may develop their own tools.