SUSTAINABLE FAA IT

Prepared by: Brian Deal (URP), Gale Fulton (LA), Dianne Philippe (URP), William Ryan (CITES), and John Stallmeyer (ARCH)

Background

We believe that The College of Fine and Applied Arts (FAA) should take a leadership role in creating a sustainable campus community. Furthermore, we believe that information technology (IT) can lead the way to this sustainable future and make the first moves toward an energy-independent College of Fine and Applied Arts. To this end we envision an FAA-wide culture shift that not only improves service to users, but also cuts end-user energy consumption significantly, and improves overall FAA IT sustainability.

Toward this vision we have set two goals: to provide robust IT services for faculty and staff throughout FAA; and to configure, consolidate and integrate an IT network that produces these services in the most energy efficient way.

In addition to these FAA-specific goals, we also hope that this vision for sustainable IT in the College of Fine and Applied Arts will serve as a model for other units on campus.

Approach

Producing a sustainable FAA IT service will require us to leverage and improve IT in the following areas: on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service. To begin this process we have identified the following targets for 2009-2010:

1. Implement desktop virtualization for 100 machines across FAA.
2. Purchase and install Verdiem Surveyor energy saving software on all studio and laboratory computers as well as faculty desktop machines.
3. Consolidate departmental and/or college-wide servers into data centers at strategic locations.
4. Consolidate and/or share teaching laboratories and studio spaces.
5. Work to provide the energy required to power shared computing needs with renewable resources and ultimately offset all end-user computing energy demands.

T1. *Desktop virtualization for 100 FAA administrative machines*. This task involves removing personal desktop computers from all FAA departments (including college-level admin) and replacing them with a client-server computing model. At this point we estimate there will be 100 such machines, which will conserve up to 80% of the energy needed to operate the current computing system.

T2. *Installing Verdiem Surveyor energy software on studio and laboratory computers*. This software will be purchased college-wide and installed on all existing and new machines. This would allow for central administration of power management settings for networked PCs. Intelligent policies maximize energy savings by placing machines into lower power states without interfering with end-user productivity, desktop maintenance, or upgrades. We estimate that we can reduce energy consumption by at least 30% on our studio and laboratory computers.

T3. *FAA Data Centers*. We would cluster our current dispersed departmental servers into three FAA computing clusters. This will consolidate activity, improve the possibility of sharing and force the removal of old, slow, out of date and less energy inefficient servers. We anticipate removing approximately 15 old servers and their related energy use as part of this consolidation. We also anticipate making approximately XXX sq. ft. available for reuse and other activity (reducing cooling loads along the way!).

T4. *Share teaching lab space consolidation*. This task involves the consolidation of several computing laboratories in FAA. It will mean a reduction in the physical number of computers operated, provide additional space for reuse, and reduce cooling energy requirements.

T5. *Data Center consolidation makes possible the removal of data centers from grid power requirements.* We plan to pilot one such example. Building a solar array on the roof of KCPA capable of offsetting the power requirements needed to operate a KCPA based FAA IT Data Center.

Benefits

The cumulative benefit of these strategies is the conservation of nearly 127,825kWh/year of electrical power usage and 68,642Kg CO2. This breaks down as follows:

T1. Typical 75-100 watt desktop machines will be replaced with 13 watt thin client desktops. If the typical PC consumes approximately 500Wh/year, our new setup will consume only 65kWh/year, conserving 80-85% or 435kWh/yr/computer. Replacing 100 machines will conserve 43,500kWh/yr or approximately 23,359 Kg CO2. Thin clients also have a longer hardware lifecycle since they have no moving parts. Longer lifecyles lead to less energy being consumed from purchasing replacement computers. Less heat is generated from thin clients resulting in lower building cooling requirements.
T2. A typical PC consumes 500kWh of electricity per year; this software will conserve 30% or 150kWh/year/computer. We anticipate installing this software on 150 machines college-wide. This will conserve 22,500kWh/yr or approximately 12,082 Kg CO2. Preliminary testing resulted in a 45%-50% energy reduction in both our lab and staff test groups.
T3. Servers can consume 375W each or up to 3,285kWh/yr. If through consolidation we can remove 15 such computers, we can conserve approximately 49,275kWh/yr or approximately 26,460 Kg CO2.
T4. Removing 25 lab computers due to consolidation will conserve 12,500kWh/yr or approximately 6,712 Kg CO2.
T5. Consolidation of serves at KCPA will require approximately 14,000kWh of electrical power generation per year. This will require an array of XXXX.

Costs

The cost for the conversion of FAA to Sustainable IT is estimated to be approximately $79,500 (with the solar array another $80k). We anticipate a cost share of approximately $30,000 coming from FAA and FAA departments for T1-4 and a cost share of 50% ($40k) from DCEO or other grants for T5. These costs are estimated as follows:

T1. We estimate the cost of replacing 100 desktop machines to thin client services to be $65,000. This includes two servers, 100 thin clients and software licensing.
T2. We estimate the Verdiem Surveyor software to cost approximately $2,500 to purchase and install.
T3. We anticipate Data Center consolidation to cost - $10,000.
T4. We anticipate lab consolidation to cost - $2,000.
T5. We anticipate the necessary solar array to cost approximately $80,000 for a 9kW system.

Total grant request: T1-T4 $49,500.00;
T5 $40,000.00

Total: $89,500.00

Total cost share: T1 $30,000.00
T5 $40,000.00

Total: $70,000.00