



*The Gateway to Up-To-Date Information  
on Integrated 'Whole Building' Design  
Techniques and Technologies*

Last updated: 08-13-2009

## **Integrate Technological Tools**

by the WBDG Productive Committee

[http://www.wbdg.org/design/integrate\\_tools.php](http://www.wbdg.org/design/integrate_tools.php)

### **Overview**

Integration of information technology and building architecture calls for a robust, global, and secure infrastructure that will support the growing and evolving demands of business and government in the 21st century.

To stay in business, organizations have to stay current, purchasing the appropriate server, database, media, router, and other technologies that sustain their work. They must leverage these evolving information technologies to match the specifications of their stakeholders.

Interoperability across building systems—including power, HVAC, lighting, security, and fire alarm—should enable whole building control and performance optimization. Assuring flexibility to accommodate the dynamic nature of telecommunications systems starts first and foremost with properly designed pathways and spaces.

Demands on the building's data pathways will be heavy, and the market will be strong for high performing buildings having:

- Power supply systems that provide flexible service; reliable, clean power; and can adjust power delivery to building occupation patterns;
- Wire management systems that enable quick and low-cost reconfiguration;
- Integration of wireless products as they become commercially viable; and
- Distributed computing environments that have reliable cooling compatible with human comfort.

### **Recommendations**

#### **Provide Distributed Data, Power, Security, Voice, Video, and Environmental Services for Central Communications and Continuity of Operations**

Desktop video conferencing  
(Courtesy of [MDL Corp.](#))

- Assure that technological solutions respond to the changing nature of work. (See also WBDG [Changing Nature of Organizations, Work, and Workplace](#)).
- Consider wireless and mobile technologies to support the changing nature of work, including both internal and external ability.
- Provide distributed Uninterrupted Power Supply (UPS) for clean and reliable power.
- Merge all low voltage systems, including data and voice, through distributed Ethernet-IP networks with centralized backup.

- Monitor work environmental conditions with central systems, but maximize local control by occupants.
- Consider desktop video and Internet-based conferencing to provide on-going contact for dispersed work groups.
- See also WBDG [Productive—Assure Reliable Systems and Spaces](#).

### **Design Accessible, Modifiable, Vertical Power, and Telecom Cores**

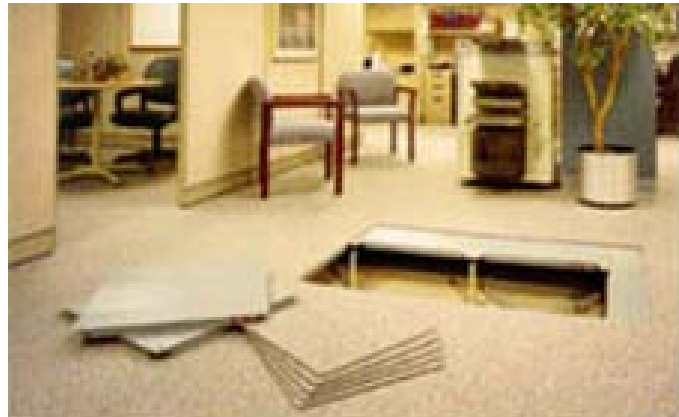
- Provide modular power panels with appropriate open riser space.
- Consider emerging technologies to provide secure, high-speed access to the desktop for data, voice, security, and environmental information (e.g., fiber optics, wireless, copper).

### **Employ Distributed Modular Cabinets with Plug and Play Interfaces**

- Provide modular racks and plug-in hardware within office suites versus closets and hard wiring.
- Design service neighborhoods to meet or exceed current standards.
- Manage wiring under floor or vertically through patch panels.
- House servers, bridges, etc. in environmentally controlled modular cabinets.

### **Provide Re-Configurable Plenum Systems**

Under floor air distribution system installed in a renovated facility.



- Consider overhead cable trays and/or underfloor wire baskets for increased flexibility and accessibility.
- Optimize plenum real estate. Conduct a multidiscipline "charrette" with structural, fire, networking, HVAC, interiors to integrate systems. Consider the need to maintain air seal of underfloor air plenums as power and communications wiring changes are made over the life of the facility.
- Use 3D modeling and BIM technologies to facilitate integration.
- Simplify the ease of relocating modular boxes in relation to ceiling, floor, and carpet tiles.

### **Design Kit-of-Parts for Efficient, Modifiable Services**

- Base capacities on maximum occupancies, but distribute and deliver as needed.
- Select terminal units that provide services—data, power, and voice (and environment where possible)—in reconfigurable boxes for just-in-time modifications.
  - Provide relocatable modular outlet boxes with flex connectors to respond to changing densities.
  - Bring services to the desktop as required by users.
- Select systems to be compatible with Internet-based applications.

### **Select IT System and Components for Energy and Material Conservation**

- Design for longevity (expandability, disassembly, recyclability), maintainability, and [energy](#) and [material efficiency](#).

- Consider sub-metering of power to address customer requirements for tracking energy usage.