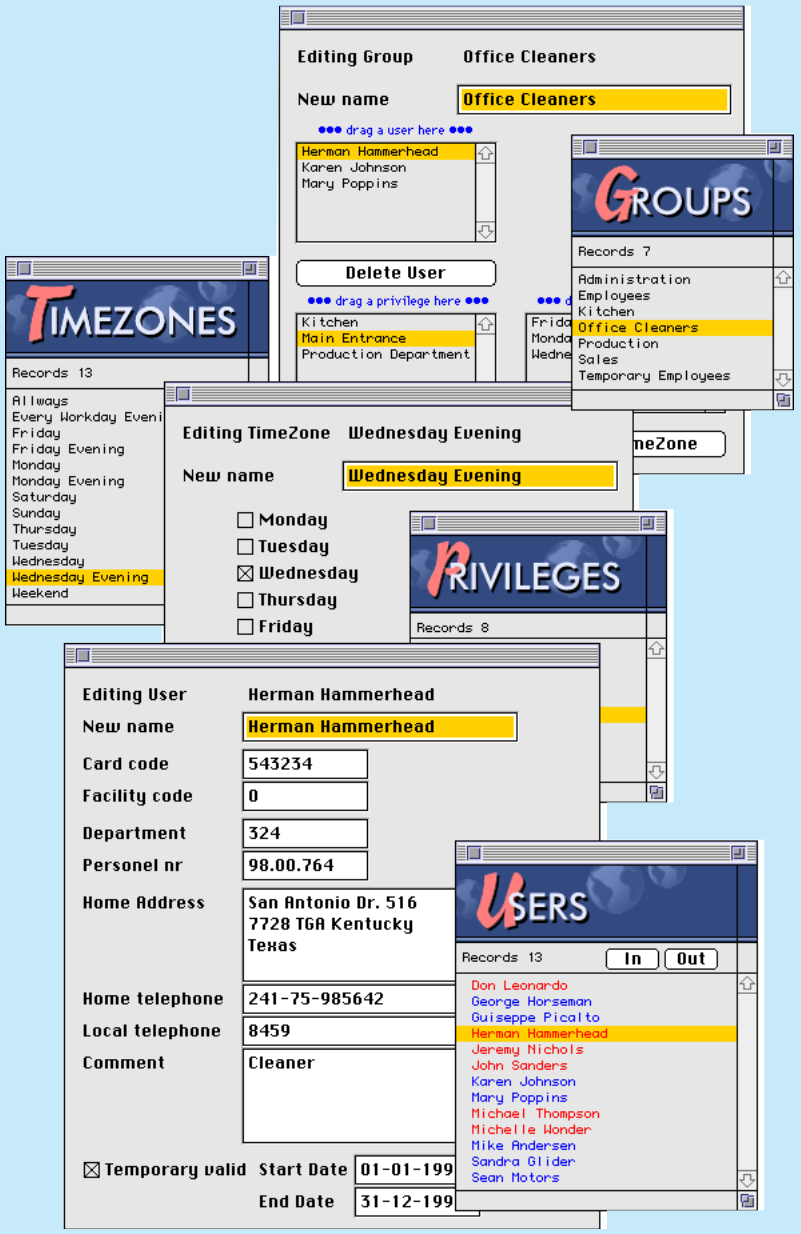
Amazing!
CONTROLS



AmazingWorld!

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Welcome

Modern technologies of the 20th century have opened up lots of new possibilities in any kind of field. Think about what happened to personal computing, multimedia, consumer electronics and space enterprises the last ten years. Now these techniques are also available to make the environment in which you live or work smarter.

Smart Buildings

Conventional buildings are passive entities with no possibilities to act on changing circumstances or even better to assist you making life easier and more secure. With the latest technologies it is possible to give buildings some sense of what is going on, to react on the wishes of individual users and to react on management. In other words: Buildings can be made smarter.

They can be smart in assisting disabled persons to live a more private and undependable life. They can assist a facility manager in securing building access. They can make life more comfortable for the users, controlling light, temperature and other environmental parameters in the way they want. They are even able to tell a user where to find a colleague he or she's looking for.

Amazing Controls! is one of the world's leading companies in smart building design. They developed a system named AmazingWorld!, consisting of hardware, software and infrastructures, able to convert passive building designs to real Smart Buildings.

Please read the following sections to learn how buildings can become smarter and provide your organization with more efficiency, security and comfort.

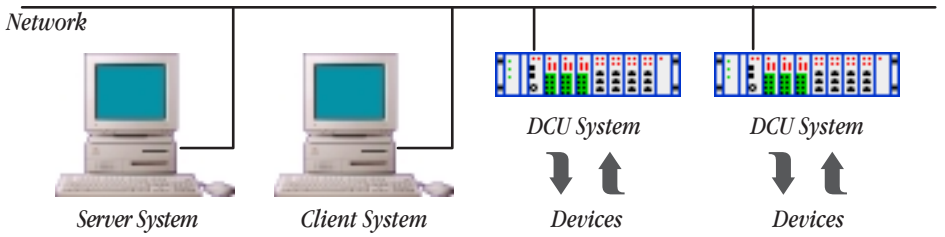
AmazingWorld!

Easy to manage

The AmazingWorld! system is initially designed to provide support for facility managers responsible for access control, energy savings, comfort control etc. One of the main goals for Amazing Controls! was to design a system that was so easy to understand that people using the system (managers and users) would actually start liking the system instead of feeling offended by it (as normally in building control systems). The system assists people and is flexible enough to follow up on changing conditions or organisatory circumstances.

A client/server model based on an AppleTalk network topology is used for building AmazingWorld!. The data management and user interfaces are running on Apple Macintosh computers. Apple's technologies for user-interfacing and communication capabilities are recognized as front braking and the AmazingWorld! systems uses them extensively.

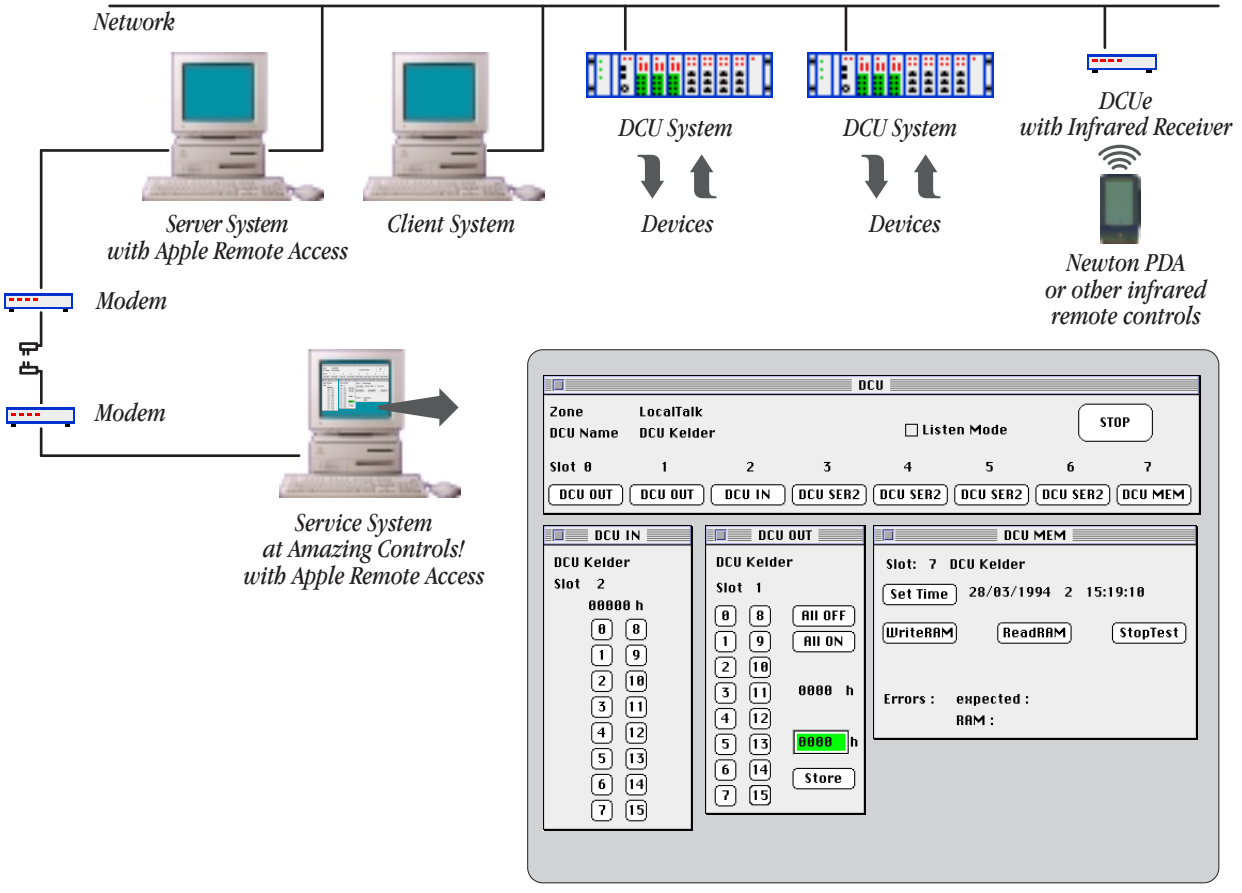
For the interfacing to technical devices like doorlocks, badgereaders, lightswitches and so on, the AmazingWorld! system contains one or more Decentral Control Units (DCUs). The DCU is an expandable industrial control system (standard eurorack format) and is developed by Amazing Controls!.



Responsible people are able to master the system from any place, enabling them to act fast and flexible when necessary. This can be done by hooking up an Apple Macintosh computer or Apple Newton (Personal Digital Assistant) up to any AppleTalk network zone somehow connected to the AmazingWorld! Server. This includes the possibility of using remote connections over telephone lines (Apple Remote Access) or even wireless communications. Of course the system is multi-user so several people, possibly with different responsibilities, are able to carry out their tasks concurrently.

Easy to maintain

The same resources also provide ways in which the facility management can make use of instant support from Amazing Controls! or their approved partners. They can assist facility operators on-line with the configuration, management and testing of the AmazingWorld! system or with maintenance (for example update installation) on the system. This allows for very fast problem response and almost continuous up time. The AmazingWorld! system is built up in a modular way so the system configuration is understandable and easy to maintain and service. For the service personnel a tool called SmartCheck! is included with the system enabling them to check a DCU with it's connected devices totally independent of the software running on that DCU using any type of Macintosh (for example a Powerbook). Inherently also this application can be used to service DCUs over remote connections like telephone lines.



Benefits for all users

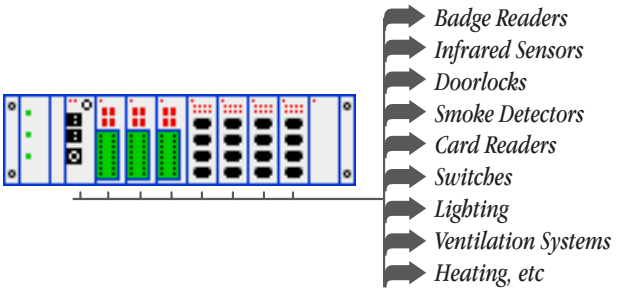
As said before the AmazingWorld! system is designed to assist and cooperate with people, not to offend them. This has to result in a building providing the means to be a more efficient organization, have more satisfied users and gain better security at the same time.

An example: Because the server actually "knows" all the ins and outs of the building it literally knows which people are on what place. A small client application, which can be installed on any workplace connected somehow to the building's network, can provide any user with information on where to find the person he's looking for on his own desk, as long as this person is somewhere in the building. So calling the reception desk, walking down the hallways, phoning to every department trying to find a needed person is abandoned. Think about the imposed increase of efficiency in your organization.

Other examples: The system is able to switch off forgotten lights, close left open doors, switch on burglary protection systems forgotten to activate, switch on hallway lighting at the first entrance of someone in the morning etc.

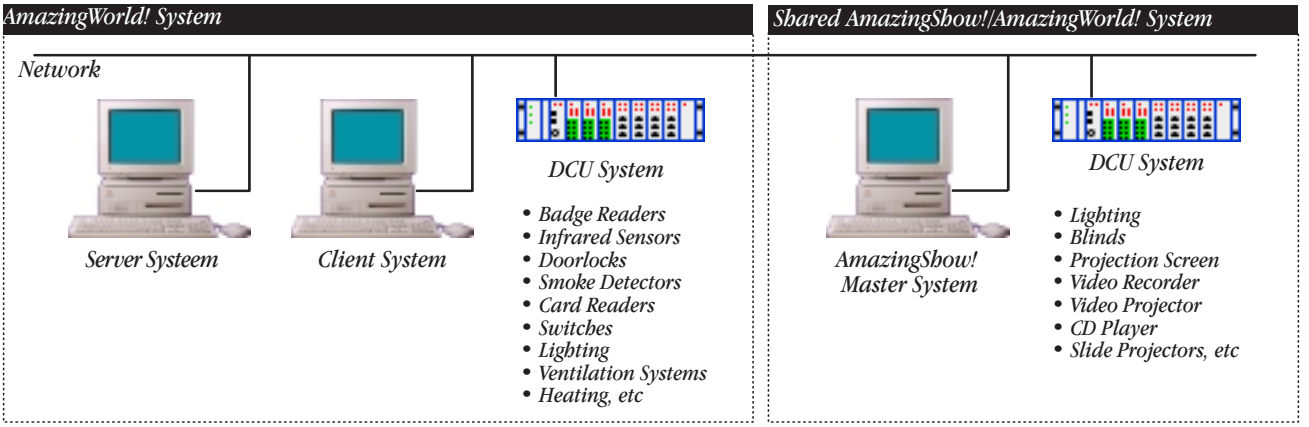
Flexibility

The AmazingWorld! system is based on the AppleTalk network architecture. A minimum system could be made up from one Macintosh and one DCU. Obviously this can be expanded by adding as many DCUs as needed, to control the needed amount of devices and/or by adding Macintosh systems to increase the amount of users (clients) working with- or on the AmazingWorld! system. Both DCUs and Macintosh systems can be spread over several network zones or even remote connections.



Each DCU contains eight slots in which interface boards can be installed to measure, control and guard external devices like badge readers, infrared sensors, doorlocks, smoke detectors, card readers, switches, lighting, ventilation systems, heating etc. So theoretically there is no limit to the number of devices controlled by the AmazingWorld! system.

Amazing Controls! not only offers building control systems but also uses the same technology to control industrial production lines and high-end presentation systems. For high-end presentation systems Amazing Controls! developed the AmazingShow! system able to control lighting, blinds, projection screens, professional video recorders, video projectors, CD-players, mixing devices, slide projectors and so on in the same user friendly way as AmazingWorld! and also based on the same technology. This gives us the possibility to integrate both systems. For example you can have a presentation room which listens to the AmazingShow! Master application during a multivision show or interactive presentation. When the presentation is finished the AmazingWorld! Master regains control, which will open the blinds and enable normal light switches to work again. The light switches were blocked during the presentation (you don't want anyone to fool around with the light switches while your presentation is running).



Speed

As mentioned before the AmazingWorld! system is made up of Apple Macintosh systems and DCUs. The total system can be seen as a distributed processing system. The processor is a DCU is a combined RISC/68030 kernel which guarantees high-speed processing of the technical controls. Amazing Controls! has developed a special software module for client/server based data management on the Macintosh at screaming speeds. This was necessary to implement the Access Control part of AmazingWorld!.

Procedure

When a card or badge is read in by the DCU, it's information is unpacked and checked by the DCU, then forwarded to the AmazingWorld! server which has to cross-check up to 6 databases before it can respond with a reaction ('granted' or 'denied'). Then the server sends it's response back to the requesting DCU which in turn has to act appropriately (opening a door, switching some device). This process is done so fast it's almost not noticeable for the user. That is very important for the user experience. Waiting two seconds will for sure result in irritation (door doesn't open immediately). The same goes for retrieving trivial information or putting a lost badge on the blacklist by the facility manager. The system has to respond instantly and most commands have to be executed in real time and not in batch processing.

AmazingWorld! acts immediately due to it's well structured architecture and high-tech sophisticated controlling systems, so your users will really experience the system as cooperative and responding to their requests!

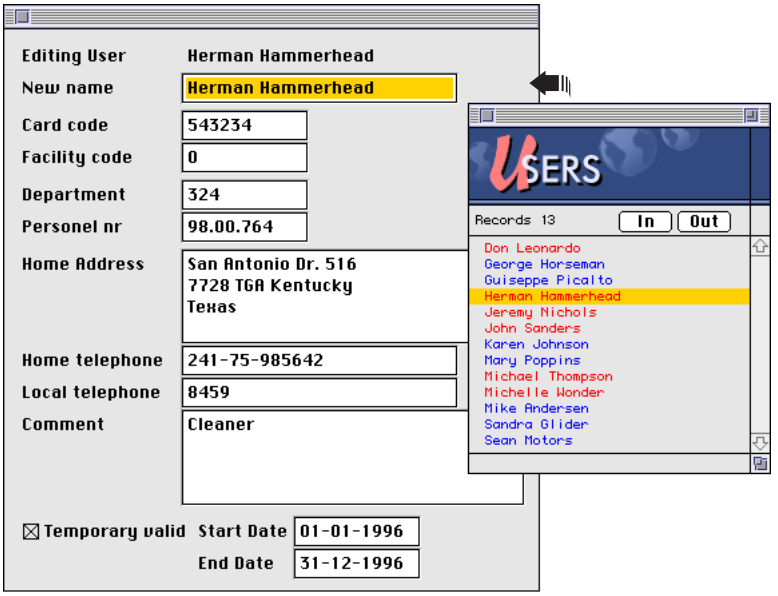
AmazingWorld! Components

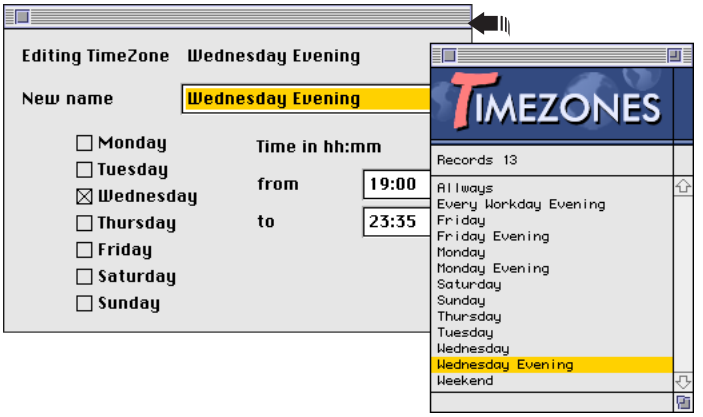
Access Controls

The Access Control component of AmazingWorld! enables the facility manager to control and check who is going in and out of a building or is using what kind of facilities in the building.

The **Privileges** database in the AmazingWorld! system contains all facilities or resources that are known and controlled by the DCUs, some of these facilities could be designated to be only accessible over the Access Control component.

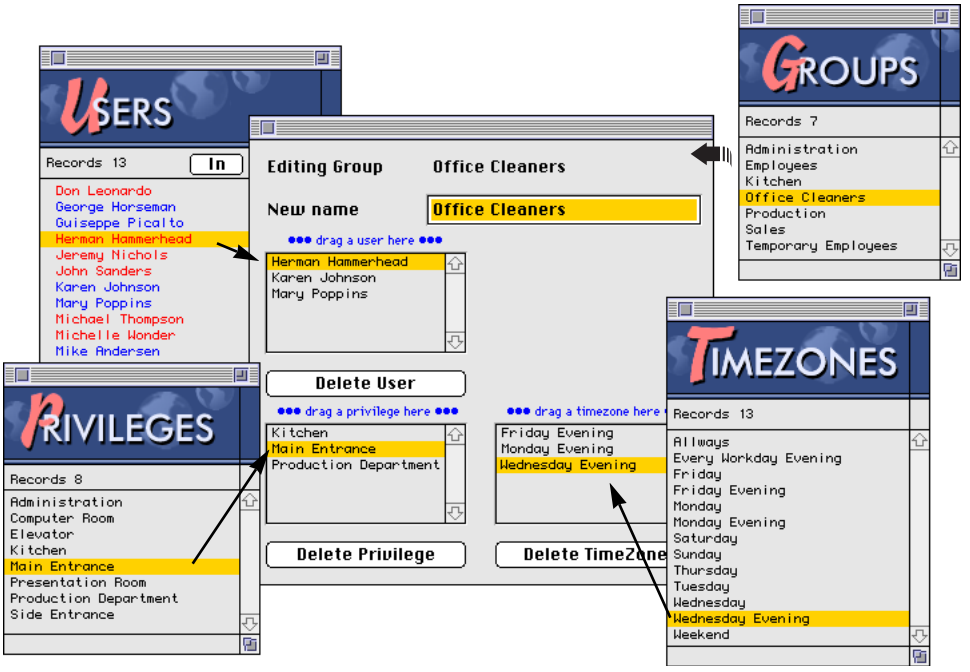
The **Users** database contains all the users that could use or get access to these privileges, of course supplemented with some background information (department, home address, telephone nr. etc).





The **TimeZones** database contains all timezones specified by the facility management for use in a week span. For example: you could store a timezone called "All Wednesday Evenings", specifying every Wednesday from 19.00 till 23.35h. Or "Normal Workdays" specifying Monday till Friday from 7.30 till 18.00h.

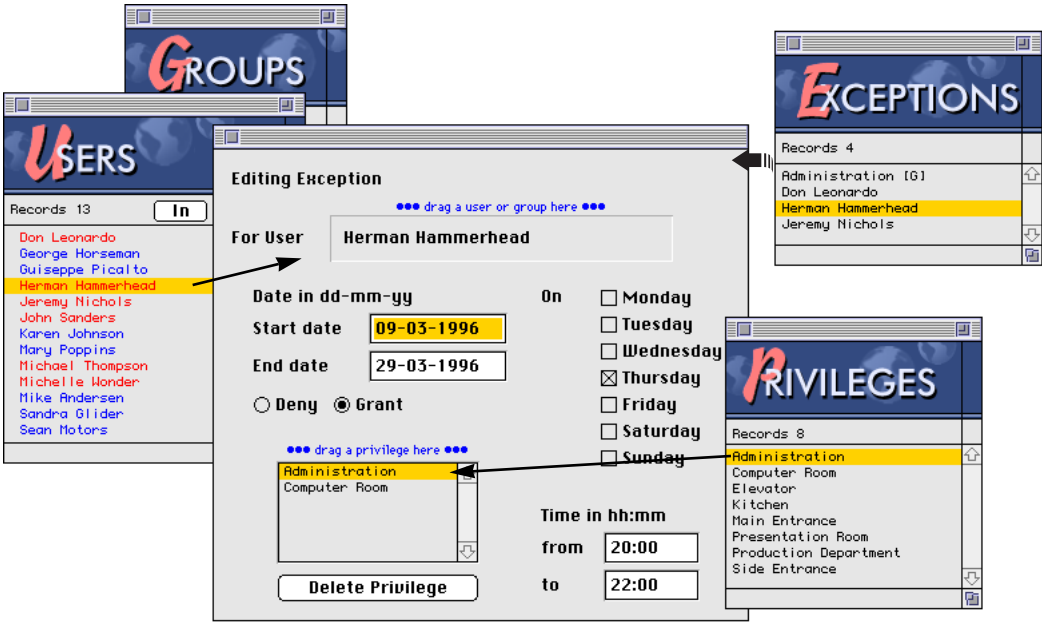
The **Groups** database is the glue in which the normal functionality of the building is specified by the facility management. The operator can specify a group containing a list of users which can use or access a list of facilities (privileges). For each facility they can specify an appropriate list of timezones. All this information is stored in a single group but a user can be a member of several groups (having different privileges), also the same privileges can be assigned to several groups. And of course the same timezones can be assigned to several privileges.



An example: The group “Office Cleaners” is specified to be containing the users “Karen Johnson”, “Mary Poppins” and “Herman Hammerhead”, is allowed to enter the privilege “Main Entrance” at timezone “Wednesday Evening”, also allowed to enter “Kitchen” at timezones “Monday Evening”, “Wednesday Evening” and “Friday Evening”, furthermore allowed to enter “Production Department” at timezone “Friday Evening”.

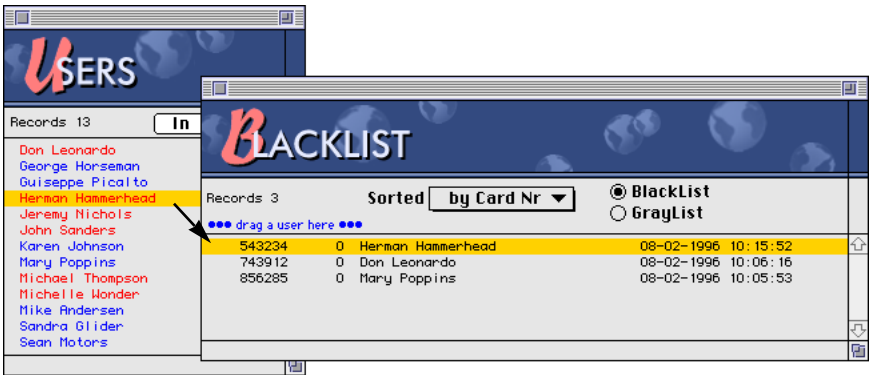
Based on this information AmazingWorld! is able to judge their badge request any time for normal circumstances. If “Karen Johnson” tries to enter “Kitchen” on Wednesday afternoon, she won’t get access and the system will record every request for a privilege granted or denied.

To provide a way to define exceptions on the normal rules regarding the use of privileges there is an **Exceptions** database. Exceptions can be specified for any group or user and can consist of an exceptional grant or denial of a list of privileges. A timezone for a weekspan can be entered within the exception record together with an active period specified as a start and end date. More than one exception can be entered for the same user or group.



An example: “Herman Hammerhead” is granted access to “Administration” and “Computer Room” each Thursday from 20.00 till 22.00 over the period starting March 9 1996 till March 29 1996. For the same period the group “Office Cleaners” is denied access to “President’s Office” at Friday from 18.00 till 23.59. These exceptions override the normal rules specified in the group database but only for the period specified in the exceptions.

The last databases having to do specifically with Access Control is the **BlackList** database and the optional **GreyList** database. A user put on the blacklist is immediately locked out from getting access to any privilege requested on that card or badge number. This to ensure security in case of a lost card or badge. The facility manager will be alerted immediately when AmazingWorld! detects someone trying to use the card or badge. It is possible to issue a new card to the user after putting his record on the blacklist. The user will instantly regain access to all privileges specified by the rules in the several databases but only on his new cardcode. The old cardcode will remain on the blacklist. The optional greylist database provides almost the same possibilities as the blacklist database differing only the handling of a cardcode put into the list. While a cardcode on the blacklist gets locked out of all privileges, a cardcode on the greylist will still get access on the old rules but the facility manager will be warned immediately (same way as for the blacklist). So he can take action appropriately and the offender will get trapped (having no way to know that the security violation is detected by the system and the facility manager is informed and able to follow his actions).



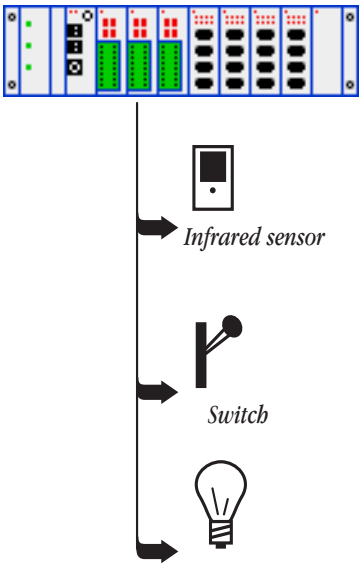
Another database important for overall management and registration is the **Event** database. Every relevant detection done by the system, decision taken by the system, change made by any user is put in a record, timestamped and added to this database. In this way facility management is able to keep track of what is going on in AmazingWorld!.

A logged message could be: “02-03-1994 22:00:05 Access Control: Access granted to ‘Karen Johnson” for “Sales Department”. Or: “02-03-1994 11:25:13 Access Control: Access denied to ‘Karen Johnson’ for ‘Sales Department’ because of wrong timezone”

Lighting Controls

Because the lighting devices are fully controlled directly by DCUs as is the case with the access control devices, all lighting functionality is available in AmazingWorld!.The lighting system can be controlled in four ways. AmazingWorld! can take actions on the lighting fully automatically, the lighting could be under control of its direct users by reacting on switches or commands from their Macintosh workstations or it could remain under the access control system so users have to be authorized to switch the lighting system. Of course the lighting system can also function in any combination of these possibilities.

An example: When “Karen Johnson” gets access to the “Main Entrance” on “Wednesday Evening” the system knows she probably needs light in the hallways so it will automatically switch them on (assisting the user). She directly goes to the “Sales Department” where normally the lighting is switched by hand from within the office during workdays. In this case it is dark so the system (knowing that) will automatically switch on the lights in the office when she gets access to that room. When she leaves the room she could switch off the lights by hand or rely on the system doing it for her because it detects the room is no longer in use (for example using the burglary protection sensors or being mastered by a timing schedule or a guard).



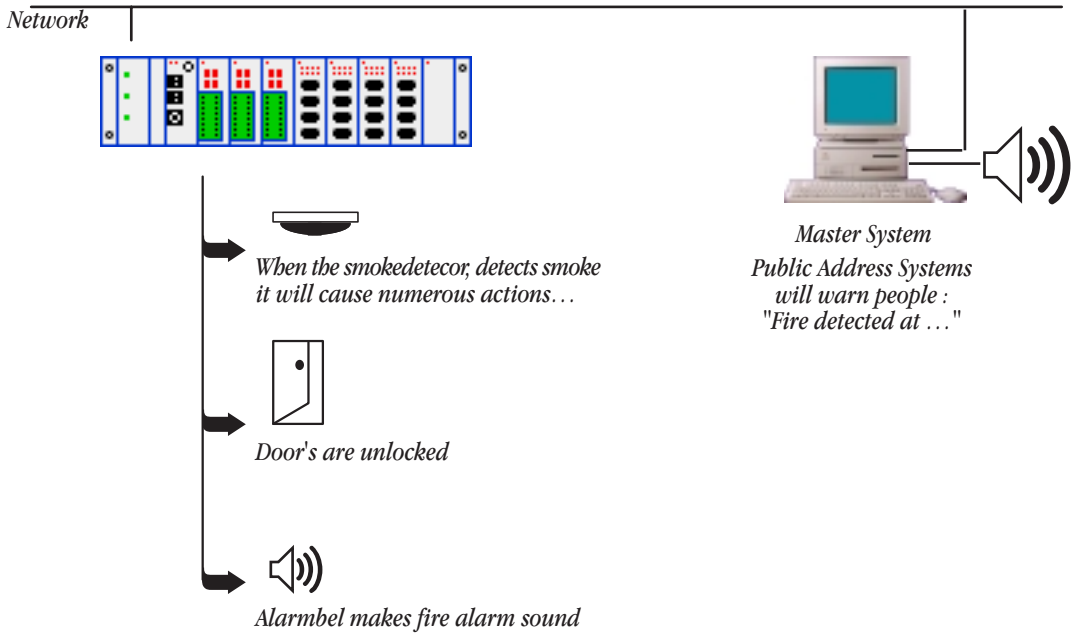
Light can be switched by the DCU, this can be done because someone gains access to the room this light is in, or someone uses the switch. The DCU can also swicth the light off when the alarm is switched on or when it doesn't see movement for 30 minutes.

Burglary Protection

As with the previously explained systems, the burglary protection devices are directly connected to the nearest DCU. One of the big advantages of the AmazingWorld! system is the way it combines the resources it controls to act smarter and more reliable. A DCU has the power to draw it's own conclusions and act in the best way using all of it's devices in combination. During day time it can use it's burglary protection sensors for other purposes so they remain functional (normally they are only functional in a secured state during the night). They can be used to save energy, switch off lights when no one is using the room for example. In a secured state the DCU is able to learn from the behavior of a sensor. If the sensor is "a bit nervous" causing false alarms once and a while it could combine the detection with information from other sensors or count repetitions to check if the situation is a serious one. If so it would inform the AmazingWorld! system with the exact place where the offender is going, lock all doors, switch on all lights where is no movement and block all lighting switches where the offender is detected. AmazingWorld! will inform the security guards immediately (within the building or remotely over telephone lines).

Fire Detection

For fire detection the story is pretty much the same as for the burglary protection system. The sensors are connected to the nearest DCU. Because this makes them an integral part of AmazingWorld!, the behavior of the total system will adjust to a situation detected on one sensor.



An example: A smoke generator detects heavy smoke development, the connected DCU broadcasts a message to any AmazingWorld! device on the network including the server. This causes an unlock on all doors, a warning sent to any security guard and an audible emergency message literally put out over the public address system, calling: "A fire has been detected at the Sales Department, please leave the building immediately!". You can clearly see the advantages of combined technologies over commonly fire detection systems.

Climate Controls

Due to the well structured system architecture also climate controls are relatively easy to implement. Because DCUs are already installed to control other functionalities it's is no big deal to connect an extra temperature sensor or a control valve. This means a climate control system is made up by distributed inputs and outputs on different DCUs. So no long star wiring is needed to construct a climate control system. A temperature sensor could be connected to a DCU in the sales department while the controlling process for the heater is on a dedicated DCU near the heater. The system functions by exchanging it's related information on the network. Because climate controls are integrated in AmazingWorld! they can be configured using the TimeZone database or directly by facility management.

...and Many More

Reading all this it is easy to understand the flexibility of the system in almost unlimited possibilities to implement specific wishes of the management into AmazingWorld!. Although AmazingWorld! is made up of standard soft- and hardware modules, it is relatively easy to add specific adaptation. So don't hesitate to really think over what your wishes are, they could be integrated easier than you think.

Shared Resources and Smart Buildings

In a AmazingWorld! system all devices are hooked up to the system in the same way. Everything can be controlled using the same infrastructure (networks) and has the same user-interface to manage it's behavior. This imposes a more efficient and better use of all installed devices and will allow a building to become really smart and assisting.

System Integrity and Reliability

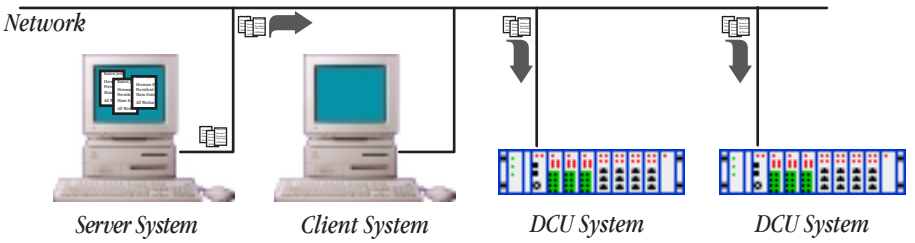
In a system like AmazingWorld! reliability is extremely crucial to ensure safety and the experience of the users. If the access control systems fails now and then, the users will start to dislike the system because it doesn't cooperate but leaves them standing for closed doors ("all the time …"). That is why Amazing Controls! has put a lot of effort in developing a fail safe system.

Almost all devices are connected to the DCUs over isolated interfacing. So blowing up a certain device doesn't put a whole DCU down. If the DCU detects a problem with it's devices it will report that immediately to the facility management.

More crucial even, is the reliability of the backbone network which connects the DCUs to the AmazingWorld! server. This will always be a separate network zone where no user is able to hook up his workstation (except for service personnel for testing purposes). There can be an internet router anywhere to make this zone visible on the buildings main network where all the users are. This will ensure nobody is able to get that network zone down. Of course there could be other reasons why the AmazingWorld! backbone goes down, for example there could be a power failure on the server. In this case the DCUs will detect the loss of the server within a few seconds and switch over to a serverless mode where they try to keep up the normal services as good as possible.

Because the DCUs are very fast and powerful themselves they are able to maintain the access control system, even without server, using exactly the same rules!! How is that possible?

In a normal situation the server automatically downloads all relevant information in it's databases in a compressed form into the DCU's battery backed up memory bank (up to one megabyte of information) every 24 hours. So each DCU has all relevant information in it's own memory. Now as soon as the DCU detects loss of connection with the server it will use it's own databases to keep on acting like nothing happened. So normal users won't even see the difference.



Of course facility management is immediately warned directly or remotely by the system and clients are not able to get into the system to get their normal information. But the main behaviors of the building are still functional. All access control rules, all security rules, all lighting controls etc will keep on working normally. Also the DCUs can still communicate to each other. Although the system keeps the databases in the DCUs updated automatically, facility management is able to force an immediate download at any time for example after crucial reconfigurations in the database.

Another concern is the loss of an individual DCU on the network. When one of the DCUs unexpectedly goes down, the server will detect that in a few seconds and immediately warn the facility management. If this is due to a temporary reason and the DCU reboots, it will automatically reconnect and start running it's normal program in a few seconds without any interference of anyone. A sudden reboot can be caused by a short power failure but also by an internal failure detection in the DCU. The DCU continuously guards it's own functionality. If it detects problems in for example it's hardware, a watchdog will automatically reboot the system after registrating the cause. After the renewed connection with the server, the DCU immediately sends over the cause of the reboot (power failure, interface failure, programming error etc).

As you can see, anything possible is done to make the AmazingWorld! system reliable. It contains very fault tolerant software modules and is full of survival escapes to ensure maintained functionality as long as possible.

Economical Issues

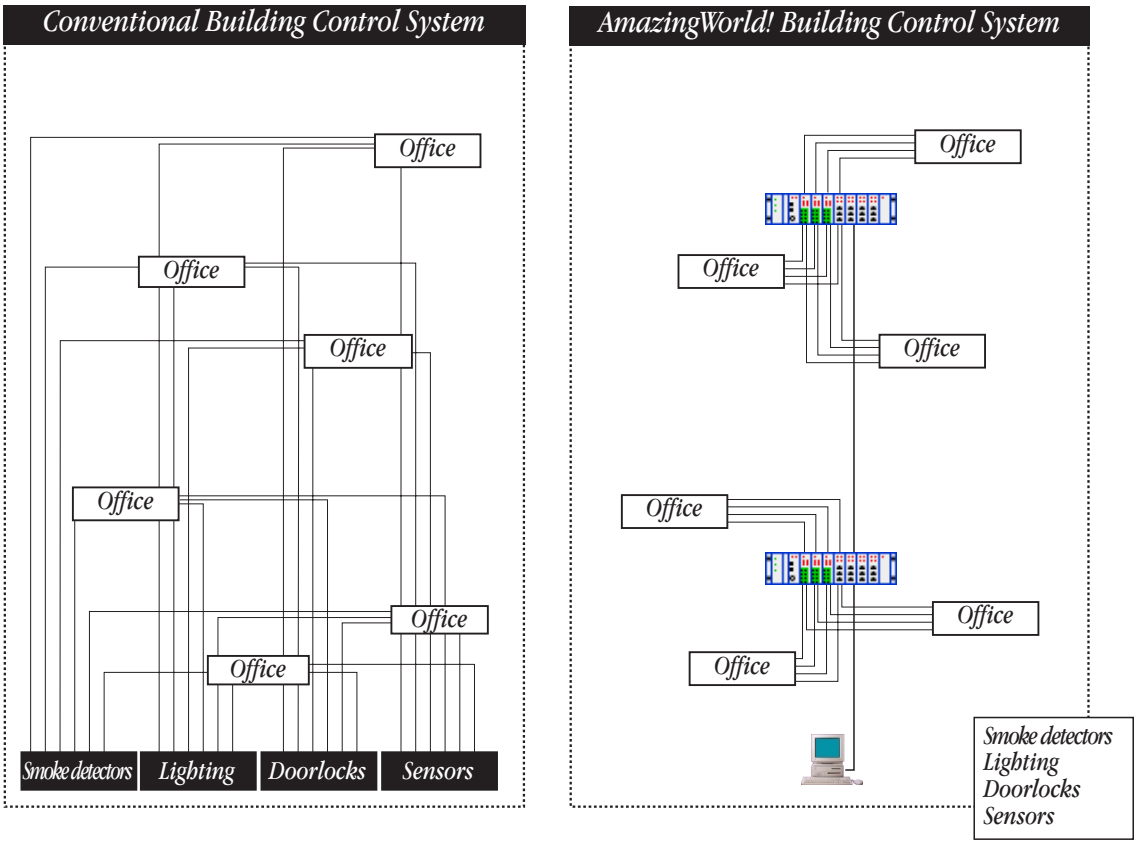
So what are the economical implications? First of all please note that the system is completely modular in hard- and software. This means you don't have to install everything discussed above. A minimum system could consist of one DCU and one Apple Macintosh connected over a direct LocalTalk network link, but goes up to lots of DCUs and lots of Macintoshes connected over several network zones including EtherNet, LocalTalk, Token Ring, Apple Remote Access etc (we don't know the practical limits yet, theoretically none). So systems could contain only a small access control system up to full blown corporate building control systems.

Because of it's open structure it makes no sense to mention prices here. If you are seriously interested please ask Amazing Controls! or one of its authorized partners to make an offer projected for your specific configuration.

Here are some remarks you have to keep in mind. The project implementation price goes up in steps with the addition of DCU systems and/or Macintosh workstations. For software it goes up with the addition of functionality modules. The software modules are not limited in the amount of DCUs or devices they can handle. Of course there is a limited number of devices connected to one DCU, going over that limit you have to purchase another DCU.

But because all kinds of functionality can be combined in a single DCU, they can be configured very efficiently. On the other hand big amounts of money can be saved in the infrastructure. Wiring of the devices is only as long as to the nearest DCU.

The DCUs are connected over a single backbone network. This saves a lot of wiring in your building especially when compared to a building with a conventional access control system, fire detection system, burglary protection system, lighting system and climate control system, which are normally totally unaware of each other.



Another advantage of a building made smarter with AmazingWorld! is the savings of energy which can make investment in this system worthwhile alone. Because the system is smart enough to combine detections of access control, burglary protection, use of facilities, it can save energy by actively managing those facilities. It will automatically turn off facilities that are not in use for some time and have been forgotten to be switched off. It will switch heating systems to standby automatically at the appropriate time, it will switch off lighting that is not necessary, and so on.

Don't forget to think about the man hours that will be earned back because people are no longer walking up and down the building or phoning around to find someone. Facility management will have an instant overview of what's going on in the building and is able to keep everything under control from a single workstation. Security is at a very high level preventing loss of valuable goods.

Although it's is not possible to give a rule of thumb here, anyone can see that lots of money will return on investments made in AmazingWorld! especially when functionalities are combined. Of course everything depends on your individual situation and how much efficiency your building allows for.

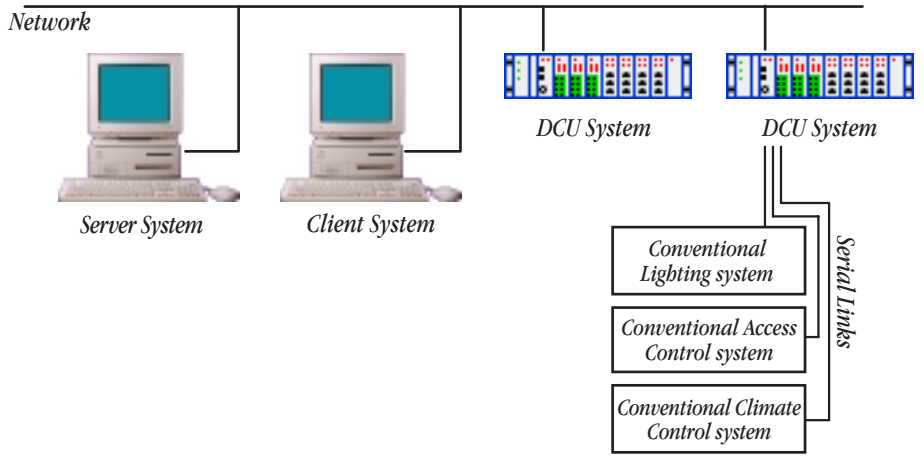
Building Smarter Buildings

with AmazingWorld!

In the Architectural (Planning) Phase

When you are in the planning phase of a new building you have the opportunity to make the most out of your investments in AmazingWorld!. In this phase you are able to implement a totally new infrastructure saving you lots of wiring. Moreover you are able to implement combined functionality at any level without the additional costs of bending over a preinstalled system. You don't have to spend lots of money on conventional systems unaware of eachother anyhow. In this phase you can design a configuration as efficient as possible in your building plans yet keeping the possibilities for major changes in the future totally open. This requires a complete different approach in building design as far as infrastructure is concerned.

The most crucial needs are a reliable power source at places where you plan DCUs and a separate backbone network to connect the DCUs with the AmazingWorld! server at a secure place in the building. Furthermore you need some way to make a secure outside connection possible for the server (for example a separate telephone and/or ISDN connection).

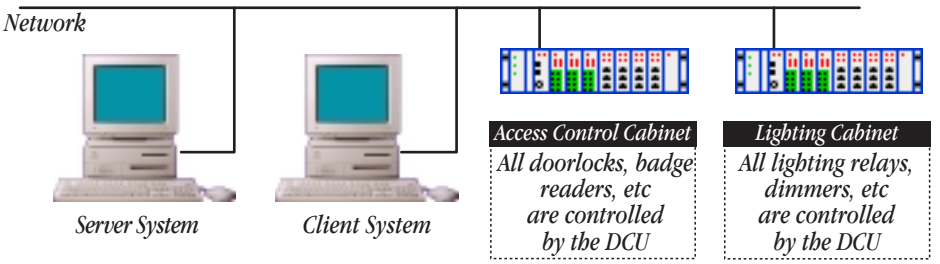


Not Too Late (Conventional Infrastructure)

When a new building is already planned and the construction is in progress, conventional systems may already have been installed. They may give you a hard time managing them all as separate systems being totally unaware of the users wishes. Most of the time it is possible to replace one or more of these facilities with AmazingWorld! components at once or phased. If there are systems installed requiring high investments it could be possible to interface them to the AmazingWorld! system. This may not bring you AmazingWorld!'s flexibility but at least provide you with AmazingWorld!'s possibilities of having a unified overview and control over the building's systems.

Upgrading Finished Buildings

For finished buildings the situation is pretty much the same as for conventional building projects in progress. There may be ready installed systems not build with this wide view of future possibilities. They may all be centralized instead of decentralized. Fortunately it is absolutely possible to build centralized systems with AmazingWorld! components and integrate conventional systems as well. Although this will not be the most optimal solution it will still give you a lot of the mentioned advantages of the AmazingWorld! system. So don't think AmazingWorld! is only designed to suit new buildings since the system has been installed mostly on already finished buildings.



How to Start...

Amazing Controls! Partners

So where do you get such a system and how are you sure your system is implemented successfully? First of all contact Amazing Controls! or one of their authorized partners (listed below). They can help you or one of your technical responsible people to check your existing configuration, define your exact needs, setup a AmazingWorld! configuration. They will help you in the most efficient way using their knowledge of AmazingWorld! and their long experience in designing building control systems. All partners have specialists with in-depth knowledge of the AmazingWorld! components, telematics and possible solutions for your project. They also have the ability to provide fast and accurate after-sales service, which is very important for the acceptance of the system in your organization (we know that too!).

Amazing Controls! and their partners are able to provide assistance anyway you want. You can decide to do all the installation work in house or using you own contractors or have Amazing Controls! or it's partners organize that for you. You can setup the whole configuration yourself or have us to help you with it. Amazing Controls! and their partners handle every project on an individual basis to make sure it's handled in the best possible way.

For more information on how to make your building smart with AmazingWorld! please call:

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