GAN-MVL Overall Architecture
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As explained in the previous talks, GANMVL is planned as a toolset to support maintenance, measurements and trouble shooting from a remote site. Access to the control system, audio/video communication, integration of instruments for special measurements, access to documentation and optional high resolution video will be provided by the MVL. All parts are foreseen to be easily accessible from a Web page with the required user assistance. Granting access to the systems by login procedures for read-only or read-write permissions will be integrated as well as the usage of secure protocols.

Accelerator control systems are quite different in various institutes since their requirements and also their construction ages differ a lot. Therefore the integration of controls in the GANMVL should be independent of the site specific control system. On the other hand a remote expert should be able to see all and to control a lot of parameters. Because of the differences of control system interfaces and architectures of the institutes an adoption of multiple systems would take a considerable effort and is by far not within the scope of this project. Therefore, a transport of the images to a remote display of the numerous applications will be provided. This approach is called ‘thin client’ and has the advantage that no software upgrades nor library mismatches can be a problem since the actual software of the site to be controlled is used directly.

The main advantages of the thin client solution are:
- All applications run on a server at the accelerator site
- A remote user uses the same programs as the operators
- No special program development is required
- Minimal installation on clients required
- Platform independence can be achieved
Furthermore it is necessary to provide a common user friendly interface to all parts of the GANMVL. Web technologies are best suited since they are well known and accepted. But, opening a control system to the Internet requires an effective authentication system that protects from unwanted access but also let the local operators be aware of who is touching the machine. And the permissions to control certain points in the system should be restricted to privileged users only. All connections from the outside should be linked through a single or a very small number of connections of a firewall. With a firewall one can restrict the access to a limited amount of IP addresses as a further protection. The connection via the Internet should be ‘tunnelled’ by Secure Socket protocols. The linking of the tunnelled links to the different applications is the task of a gateway in the GANMVL application server.

In addition to access the data of the control system it is required for a remote user to be well informed about the activities of the whole facility. This could be achieved by integrating an electronic logbook into the GANMVL or, for sites with an own logbook, to provide the access to this. E-Logbooks are used by the operators to protocol all activities, e.g. Measurements and bug reports, of the facility and to give hints to others and in some installations to supply the documentation also.

Architecture with GANMVL Web- and application server and a mobile MVL client

Several options to transport images or screens from the server to the remote client are freely available. Mainly X11 and VNC are the solutions to be provided. VNC is available as an independent application and as a JAVA client also that can be integrated into a Web browser. This would allow fitting the control system interface into the Web frame work. On the client only a Web browser has to be available. The JAVA applet is automatically installed from a server.