Northwestern University
Scope of BAS Contractor

The purpose of this document is to describe the Enterprise Level Server at Northwestern University, and the separation of roles between the System Integrator and the Building Automation System Contractor.

The Enterprise Server consists of the Honeywell Tridium WebsAX running on three Marathon redundant servers. Two servers are located on the Evanston Campus, and one server is located on the Chicago Campus. Both the JCI and Siemens head end servers currently reside on this Marathon redundant server. The long term plan is these two software packages are used for high level programming only, and will not be used for day to day operations of the JCI or Siemens BAS.

All new DDC system controllers, terminal device controllers, VFDs, and any other intelligent control device shall be BTL Certified and shall communicate using BACNET MS/TP. All network controllers shall communicate to lower level controllers using BACNET MS/TP. Network controllers shall communicate to each other, and BAS Servers, using BACNET/IP.

The control contractor shall provide a complete DDC system, which interfaces with both the control vendors "head end" server, and the Northwestern University Tridium Enterprise Server. The Owners' normal day to day interface will be with the Tridium Enterprise Server. The configuration of graphics for the Tridium Enterprise Server will be done by the Owner's System Integrator. The BAS contractor is responsible for coordinating with the System Integrator to verify all points are properly transmitted to the Enterprise Server including alarm values and links to trend files. Provide sufficient manpower to work with the System Integrator to do a point to point test of alarms, trending, setpoint overrides, etc.

Figure 1 shows a simple schematic of the Enterprise Network.

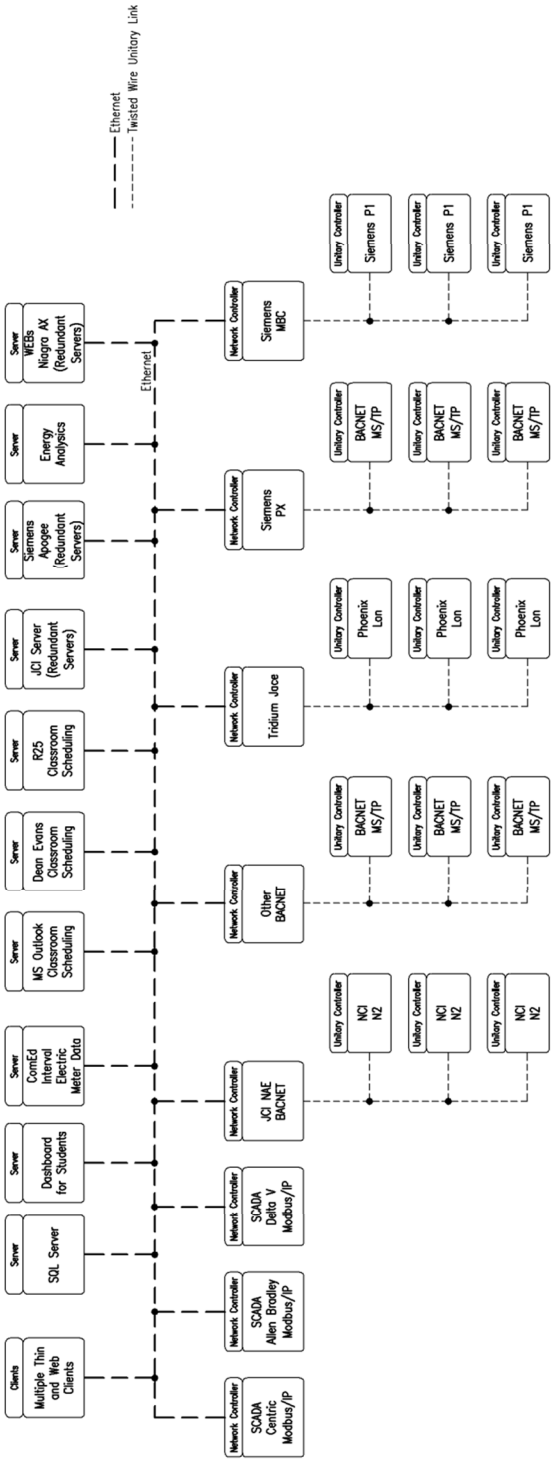

Figure 1: Simplified Riser Diagram

Role of the Building Automation System Contractor (BASC)

1. Provide the field devices and wiring including DDC controllers, relays, sensors, transducers, control devices, control panels, controller programming, controller programming software, controller input/output and power wiring and controller network wiring to provide a complete working system of the mechanical equipment.
2. Submittals: Provide an electronic copy of the specification sheets for the equipment and DDC controls being provided for the specific project. The drawings shall be drawn in Visio or AutoCAD, and shall include separate sections for the following: index page, a riser diagram, flow diagrams, panel detail, wiring schematics, termination of controllers, full points list including any global or virtual points, any valve schedules and damper schedules.
3. Use the Northwestern University DDC Standard document for point naming structure.
4. Provide as-built drawings and O&M Manuals in electronic form (Visio or MS Word or Adobe pdf format).
5. Provide Network Controllers as required for a project. Coordinate quantity and locations of new network controller with Owner and System Integrator. Acceptable network controllers are manufactured by Siemens, Tridium, Johnson Controls, Delta Controls, and Automated Logic Corporation.
6. Network Controllers:
    a. Johnson Controls:
        i. Provide most current Metasys controller compatible with the existing Johnson Controls campus infrastructure.
        ii. Communication to field control devices shall be through BACNET MS/TP, not JCI N2 unless approved by NU for specific applications.
    b. Siemens Controls:
        i. Provide most current Apogee controller compatible with the existing Siemens campus infrastructure. PXC Modular is preferred to PXC Compact.
        ii. Communications to field control devices shall be through BACNET MS/TP, not Siemens FLN unless approved by NU for specific applications.
    c. Honeywell Tridium:
        i. Northwestern University has standardized on the Honeywell WEB-600-O-US NiagaraAX™ Controller, to follow a consistent standard of design and operation supporting overall system conformance standards. Other branded NiagaraAX™ network controllers are unacceptable.
        ii. All network controller hardware products shall be "Made in the USA" or come through the Tridium Richmond, Virginia shipping facility.

iii. All network controllers shall include a lifetime license for free software upgrades.

iv. The network controllers shall be provided with no connectivity restrictions on which brand stations or tools can interact with the system. The station and tool **"NiCS"** would be as follows:

Property	Value
STATION COMPATIBILITY IN	ALL
STATION COMPATIBILITY OUT	ALL
TOOL COMPATIBILITY IN	ALL
TOOL COMPATIBILITY OUT	ALL

d. Delta Controls:

i. Northwestern University does not have a standard developed for Delta Controls at the time of publication.

e. Automated Logic

i. Provide most current controller compatible with existing ALC campus infrastructure.

ii. Communications to field control devices shall be through BACNET MS/TP.

7. Point to point checkout.

8. Verify all physical alarms.

9. Setup alarms in the network controller in accordance with the Northwestern University DDC Standards document. Coordinate with Owner on alarm distribution. Work with the SI to make sure the Enterprise Server is receiving the alarms.

10. Setup trends in the BASC's associated server in accordance with the Northwestern University DDC Standards document. Work with the SI to make sure the Enterprise Server is receiving the trends.

11. Accessing controllers via PCAnywhere, Telnet or similar software is not allowed. Remote access shall be through Northwestern's SSLVPN.

12. Any software required for controller configuration shall be included as a leave-behind tool with enough license capability to support the installation. Provide the appropriate quantity of legal copies of all software tools, configuration tools, management tools, and utilities used during system commissioning and installation. All tools shall be generally available in the market. No closed and/or unavailable tools will be permitted. Contractor shall convey all software tools and their legal licenses at project close out.

Role of the System Integrator (Separate Contract):

1. The System Integrator (SI), Engineer, Owner and selected Building Automation System Contractor (BASC) meet to review the project so that all programming, design standards and job specific requirements are consistent with the NU DDC Standards.
2. Coordinate with the BASC to ensure point discovery and integration is scheduled at appropriate times during construction.
3. The SI shall be responsible to build/create the graphic layout/background slides in conformance with the Northwestern University DDC Standards document. The graphics shall be resident on the Enterprise Server.
4. Maintain point naming structure. Verify BASC is adhering to the naming convention.
5. Coordinate with the BASC to verify proper alarm input to the Enterprise server, and display on the graphics.
6. Coordinate with the BASC to verify proper link to the trend files on the Enterprise server graphics.
7. Setup event log.
8. Merge project O&M documents, including the control drawings, into a common system O&M manual.
9. Work with the Owners IT Department to establish I/P network addresses with BACnet instance IDs and ensure the appropriate I/P addresses with BACnet instance IDs are used throughout the BAS Enterprise.
10. Maintain the Energy Analytics software on the Marathon redundant server, including all software upgrades.