

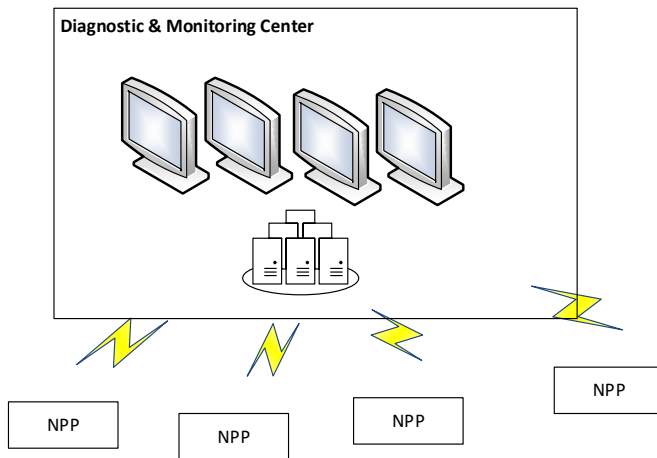


Wireless in nuclear applications – development in the USA

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Scope

- Wireless technology has traditionally not been used in nuclear applications, mainly due to restrictions in safety and security. One of the major concerns is the impact from electromagnetic compatibility (EMC) and the vulnerability to wireless transmission for safety functions. The development of wireless applications has however been very strong during the last years, and the technology is widely used in other industries. Nuclear Power Plants in the US have come quite far regarding implementing wireless solutions in different applications.
- The objective for this study has been to increase knowledge on opportunities and challenges regarding wireless installations by studying U.S. nuclear applications
- Following companies/organizations were visited:
EPRI, Duke Energy, AMS, Dominion and Exelon



Results

- Common for all was that the nuclear power plants need to reduce cost in order to be competitive at the market.
- A common denominator for all utilities is the digitalization and the use of wireless equipment. Prerequisite for digitalization is the infrastructure.
- There is no single solution that suites all NPPs, instead this need to be analysed case by case.
- There are challenges of addressing EMC and the use of exclusion zones is one way to handle this and is widely used in USA - But it can also limit wireless installations.
- The establishment of a Monitoring and Diagnostic centre, where all available plant/fleet data are collected and analysed, could improve the performance and plant efficiency.

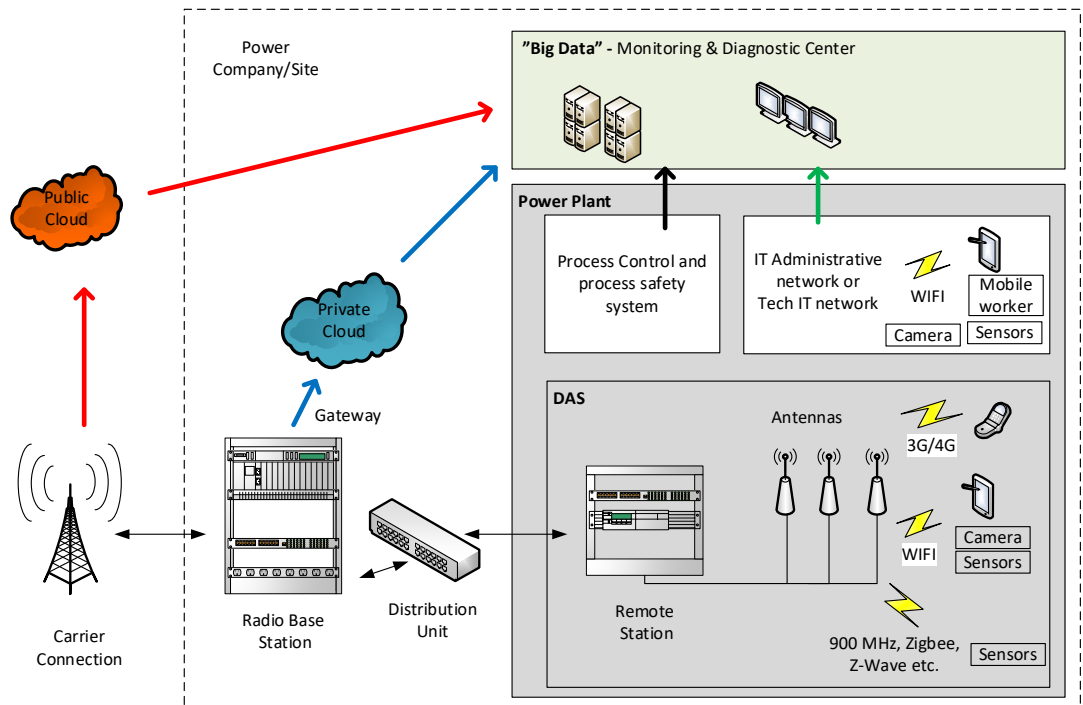
Results

Prerequisite for digitalization is the infrastructure the so-called enabler.

There are many different solutions for an infrastructure that supports Digitalization.

The figure illustrates different approaches and that data is collected at a Monitoring & Diagnostics Center.

- Wi-Fi used for administrative work like Electronic Work Packages and also for connecting cameras, sensors etc.
- DAS system for traditionally communication devices but also for connecting different kind of sensors and applications.





Summary and Conclusion

- Common for all visited company was that the nuclear power plants have to reduce cost in order to be competitive in the market. The common denominator for all utilities that were visited was the digitalization.
- More measurements and data will enable power plants to go from a time-based maintenance to maintenance based on condition instead.
- Electronic Workpackage was another goal for all/many of the powerplants.
- The establishment of a Monitoring and Diagnostic centre, where all available plant/fleet data is collected and analysed, could improve the performance and plant efficiency.
- Prerequisite for digitalization is the infrastructure the so-called enabler. There is not one kind of solution that suite all NPP's instead this need to be analysed case by case.
- Exclusion zones for wireless equipment are used in USA to solve the issue with EMC.