Sergey Gutkin, MBA
Executive Vice
President

Jason Whipple, CEM
Director of Business
Development

What is a Master System Integrator?

A Master Systems Integrator (MSI) fills a role beyond MEP consultants and a traditional control system integrator (SI). What makes them unique is that they have a strong and diverse field of expertise necessary to bring smart buildings to actualization. Some of these extra skillsets include, IT, cybersecurity, database engineering, and software development. These skill sets must be combined with a very strong knowledge in traditional building technology fields such as HVAC, energy management, lighting, access control, video, etc. as well as experience with non-traditional building technology fields like environmental quality, workplace performance, and occupant wellness. Lastly it is important that MSIs are collaboration experts and technology consultants able to bring together disparate systems and organizational silos to create turnkey solutions that fulfill the overall objectives for their clients. The MSI also acts in a consultive capacity and helps owners to create and execute their smart building strategies and technology roadmaps. In summary, they can be viewed as the primary contact for every building technology and the building technology expert for the building owner or occupant.

What's the difference between an MSI and an SI?

There is room for both MSIs and SI's in the smart building space. For this reason, a Master System Integrator does not compete with control system integrators as

each of them provide their own value and deliverables in the smart building industry. In fact, it is more about having a cohesive team with cooperation from both parties working together to fulfill the technology roadmap that allows for success. In recent days, building controls contractors and system integrators are starting to offer a wider selection of integration services. However, integrating a selection of systems should not be confused with the activities of an MSI. A systems integrator is not capable of addressing all the disparate components at all levels of a smart building. They do not build software and deliver on a client's master plan of shaping the solution to meet the specific objectives.

Technology Specialists

Most successful Master System Integrators have both OT and IT specialists that help design and implement the building technology network and software specialists who can perform complex API integrations that go above and beyond traditional building open communication protocols like BACnet or Modbus. In addition, strong MSIs have cybersecurity experience and in house database experts to manage 'Big-Data' databases as well as custom built analytics tool sets.

Master System Integrator Highlights

- Smart Building Consultation
- OT Infrastructure Commissioning Support
- Building Technology Roadmap Design and Execution
- OT Network Design and Implementation
- Non-Standard Communication & Complex Integration Support
- Infrastructure Life-Cycle Management
- Energy Management and Analysis Services
- Equipment Performance Monitoring
- Integrated Data Validation
- Data Normalization and Transformation
- Business Continuity & Workflow Optimization
- Custom Software Development
- Enterprise Integrated Smart Sequences of Operations
- OT Change Management Support

Master System Integrator Differentiators

The following case study examples are from IBIS's work from <u>just one client</u>. These examples are presented to demonstrate the necessary role that an MSI fills.

- **Smart Building Consultation**
  - Performed a thorough technical review and gap analysis of construction drawings. IBIS identified a list of corrections and missing drawings or documents and submitted a punch list back to the construction teams to resolve. Verified a final resolution after multiple iterations.

- **Workflow Optimization**
  - IBIS designed and implemented a sub metering strategy across multiple campus's that helped to separate loads by type and raise awareness of how energy is consumed. This information helped the client to improve energy star scores and optimize energy star certification workflows through the IBIS Platform energy star API Integration.

- **Custom Software Development**
  - IBIS learned that a local site PV provider upgraded their system interface from Flash to HTML5 and during the process, diminished some of the user interface features that the client found useful. IBIS reproduced the original PV reporting interface in the IBIS Platform and also provided enhancements that helped the client have a visual understanding of their PV Inverter equipment layout and the capacity used for each inverter.

- **Data Validation**
  - IBIS analytics identified defective occupancy sensors that were not changing state in the underlying lighting control system and submitted punch lists across various projects for lighting controls contractors to resolve the issues.
  - IBIS performed meter data to utility bill validation exercises and identified that the utility provider had incorrectly billed the client.

- **Data Transformation**
  - Through integration to the lighting controls system, IBIS applied programming and data transformation functions to provide actionable space utilization data to facilities and space planners.

- Through integration to various datacenter equipment on campus, IBIS was able to transform raw metering data to various KPIs per datacenter that helped the client's end users understand their IT loads, PUE scores, and how close they are to reaching capacity for each center. Through this process IBIS identified a handful of PDU's that were above their maximum electrical capacity and this information was provided back to the client for remediation and review.

- **OT Network Design and Implementation Support**
  - IBIS Identified device addressing issues in the lighting control system that prevented proper BACnet network communications and submitted a punch list and recommendations for corrections to the lighting control contractors to resolve.
  - IBIS identified network latency issues that were negatively impacting other subsystems such as the BMS. A root cause analysis performed by IBIS identified that the issues were caused by device addressing conflicts on the network and guided the lighting controls contractor to resolve the conflicts. Upon completion of the suggested resolution, IBIS verified that network latency issues were no longer present.
  - IBIS collected and documented all smart building network device asset information in a building technology network tracker and communicated requirements, device location, and LAN drop locations with subsystem vendors and project stakeholders.
  - The PV vendor's original communication plan to support the integration requirements did not work out due to technical issues that arose during the commissioning phase of the project. IBIS assisted the PV vendor to identify and document alternative connectivity options and finally to select the optimal solution. This quickly streamlined the process and resulted in a clear and concise outcome.

- **Enterprise Smart Sequences of Operations**
  - IBIS designed and implemented occupancy driven HVAC setback programming to help achieve energy savings for the client.

- **Non-Standard Communication Protocol Support**
  - Integrated data from the PV system API to obtain solar production data when no open data protocol was available.
  - Integrated to Itron's API to obtain water and electrical data when no open data protocol was available.

- **Underlying Subsystem Commissioning Support**
    - IBIS engineering services assisted to identify deficiencies or updates required in the underlying BMS system to reflect actual field conditions. This involved identifying incorrect or missing equipment tags, decommissioned equipment, and points reporting out of range values.
    - IBIS identified underlying issues in the BMS system on how electrical submeters were aggregated to report building total electrical usage for most of the buildings on campus. These discrepancies were presented and reviewed with the client's engineering team, and it was determined that IBIS metering calculations were more accurate and reliable. The client's engineering team decided to proceed with using IBIS as the primary source of energy data going forward.
    - IBIS identified room naming discrepancies in the underlying lighting controls system and then submitted an external punch list for the lighting controls vendor to resolve. This helped avoid confusion for building operators after the project completed.
    - IBIS assisted a Fire Alarm Vendor to identify proper BACnet connectivity settings to program for their respective system. IBIS assisted other contractors to resolve their system commissioning issues to provide the overall turnkey solution.
    - During an IBIS startup visit, an IBIS MSI tech identified wiring and configuration problems on various electrical submeters throughout the site that were performed by another contractor. To expedite the resolution, IBIS technicians resolved several issues and reported the additional items that could not be resolved to the electrical contractor for a timely resolution.

- **Utility Bill Validation**
    - IBIS performed several months of IBIS to Utility to PV data validation exercises to instill confidence that metering data is accurate and trustworthy.

- **Equipment Performance Monitoring**
    - Ongoing monitoring and analytical services identified miscellaneous HVAC equipment that were not following holiday schedules across multiple campuses in an enterprise.
    - Ongoing monitoring and analytical services by IBIS identified that equipment was running 24/7.

About IBIS: IBIS offers a full suite of products and services to support our clients at the single building or enterprise global portfolio scale. Our expertise and experience include occupant health and wellness, productive environments, space utilization, energy optimization, demand response, and critical system monitoring among many others with no preference to any hardware or software vendor. Our ability to integrate disparate digital systems as well as facilitate the collaboration across organizational silos, creates a strategy for a successful project that we see through personally from inception through to the extent of the system life.

About the authors: Sergey Gutkin a proven leader that specializes in business development and operations management. He has successfully structured and executed various strategic highly technical programs across many large enterprise portfolios. With over 15 years of industry experience and various academic degrees and certifications, he has been able to provide value for IBIS through his subject matter expertise in Smart Building technologies. Leveraging his experience in Operations Management, Computer Science, IoT, and Master System Integration, Sergey Gutkin continues to bridge the gap between technology and business requirements in order to continually exceed client expectations.

Jason Whipple has 20 years of experience with CRE systems engineering and managing integrated building solutions for Fortune Global 500 companies. Jason has worked on designing and building multi-discipline integrated eco-systems capable of meeting customer's short- and long-term needs and has practical experience delivering enterprise-level OT and IT convergent frameworks. Jason prides himself in developing creative ways of combining Edge and Cloud based solutions for optimum systems performance to result in tangible ROI, and architecting integration platforms that are able to quickly adapt to new technologies and ever-changing business needs.