About e-Magic

e-Magic Inc. specializes in providing expertise and software for design, development and integration of large scale Industrial IoT and Azure Digital Twins solutions globally.

Our solutions run on-premise as well as in the Microsoft Azure Cloud using Azure native services.

Applications include Centralized Operations, Smart Buildings, Facilities, Cities, Countries, Smart Manufacturing, Industrial Production and ML/AI for insights, predictions and optimization.

Software Developers & System Integrators

Established in 1998

Integrate IoT Systems Worldwide

Headquarters:
Toronto, ON, Canada

Locations:
Calgary, AB, Canada
Denver, CO, USA
Philadelphia, PA, USA
Georgetown, Guyana

Jersey City, NJ, USA
Savoy, MA, USA
New Delhi, India
London, UK
Key Challenges in Facilities Operations

- Aggregating real-time / historical data from multiple systems
- Preventing costly unplanned downtime and managing failures more efficiently
- Ensuring the health and comfort of facility occupants while controlling costs
The TwinWorX® Solution

Scalable, secure and high availability platform.

Integrates and normalizes all telemetry data from IoT devices into a single platform, resulting in increased operational visibility.

Provide real-time and historical data for visualization, command and control, alarming, trending, reporting, analytics, optimization, ML and AI, integration with work order and other business systems.
Visualize your facility and assets in 3D

Overlay and analyze telemetry data from IoT devices in your facility

Drill down on issues and apply procedures to resolve them

Monitor, Visualize, Control, and Optimize Assets
A “digital twin” is a virtual representation of physical environments (like a factory floor, a building, a campus, a city, or a country) that allows assets to be, operated, managed and optimized more efficiently at scale.

**Digital Twin**

/ dig-i-tal twin /

noun

1. A Digital Twin is a virtual representation of real-world entities and processes, synchronized at a specified **frequency** and **fidelity**.

Source: Digital Twin Consortium®
TwinWorX® Digital Twin Solution

Real-time monitoring, visualizing, controlling and optimizing of assets.

Capture real-world objects and their relationships.

Monitor
Visualization
Control
Optimization
Fault Detection & Diagnosis
Human Expertise, ML & AI
Simulation
Augmented Reality
Virtual Reality

Actionable Insights

IoT Telemetry
Mapping Data + Status Of Assets

Microsoft Azure

Digital Twin

Historian
Dashboards
Alarming
Trending
Reporting
Analytics

Learn from Behaviour
Digital Twins for Buildings, Facilities and Infrastructure

Single Pane of Glass...with interoperability between industries and subsystems

DIVERSE INDUSTRY EXPERTISE

- Building Automation
- Manufacturing
- Energy
- Water Treatment
- Electric Utilities

Multi-Subsystem Monitoring

- Temperature & Humidity Monitoring
- HVAC
- Occupancy Monitoring
- Air Quality Control
- Lighting
- Space Utilization
- Fire & Safety

Renewable Energy
- Oil, Gas, & Chemical
- Metals & Mining
- Food & Beverage
- Pulp & Paper

Structural Health Monitoring
- Access Control
- Smart Parking
- Asset Tracking
- Elevators
- Smart Washrooms
- Smart Waste

DISCOVER DIVERSE INDUSTRIAL SPECIALTIES

e-Magic
TwinWorX® Insights uses human expertise, configurable rules, ML and AI-based analytics to watch over your facilities.

Detect, Diagnose, Predict, Advise and Optimize
TwinWorX® Insights: Fault Detection and Diagnosis

**Single Pane of Glass**

- Streaming and historical data transformed into 3D Visual Insights

**Actionable Insights**

- Fault Detection and Diagnosis (FDD) across systems & equipment

**Equipment**

- Air Handler Units
- VAV Units
- Boilers
- Chillers

**Benefits**

- Prioritize faults based on costs
- Provide cause of faults
- Minimize downtime
- Increase safety
- Reduce operation costs
TwinWorX® Insights
Air Handling Unit – Fault Detection and Diagnosis
## TwinWorX® Insights
### Cost Saving Opportunities – Fault Detection and Diagnosis

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<th>Equipment</th>
<th>Fault Name</th>
<th>Total Count</th>
<th>Actual Duration (Hours)</th>
<th>Total Est. Lost Opportunity ($)</th>
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TwinWorX® Insights
Historian – Work Orders
TwinWorX® Insights
Use Case – Building Energy Consumption

Example Application: Building and Facilities

Advise
- Setpoint Changes
- Schedule Changes
- Equipment Maintenance
- Equipment Configuration

Predict
- Energy Use
- Equipment Failure

Optimize
- Close Loop & Autonomously Adjust
TwinWorX® Explore

3D graphic visualization and data modeling to effectively construct compatible views of the built world. It also applies augmented and virtual reality for operation insights.

Integrate to BIM / IFC from construction or as-built models
TwinWorX® Explore

Explore http://e-magic.ca/products/
TwinWorX® Explore

http://e-magic.ca/products/
Built on Microsoft and Azure Technologies
Aggregate, analyze and react in real-time

Integration to speed data into cloud
Storage to scale without latency
Visualization to surface insights
Analytics to predict and plan
Security to protect data
Devices modelled as digital twins
Monitor, Visualize, Control & Optimize Facilities

e-Magic TwinWorX® Reference Architecture

This solution brings together facilities, systems, asset and sensor information into a 3D visual model to improve operation and results.

Telemetry data is gathered using a library of over 500 connectors and processed at the edge before being sent to the cloud for analysis.

Microsoft’s Azure cloud provides a scalable, resilient, secure platform for your operational data and for our solution components.

Custom cloud modules apply analytics to the telemetry data, predict possible process outputs and integrate with other systems.

Your team gets a full 3D view of status and issues so they can change set points, create work orders and improve operational outcomes.
e-Magic TwinWorX®
Centralized Operations

University of Pennsylvania

University of Colorado

Temple University

Building Name: UPenn Biomedical Research Building
Building Code: 22
Gross Area (sq. ft.): 421,723
Year Built: 1999
Floors: 14

Location: University of Colorado, Boulder

Building Name: UPenn Huntsman Hall, Jon M.
Building Code: 617
Gross Area (sq. ft.): 340,669
Year Built: 2002
Floors: 9

Location: Niagara Falls, Canada

Building Name: Temple Uni. Pharmacy Allied Health Building
Gross Area (sq. ft.): 194,00
Year Built: 1974
Floors: 7

Location: Toronto, Canada

Building Name: East District Energy Plant
Year Built: 2014

Location: University of Colorado, Boulder

Building Name: Temple Uni. Pharmacy Allied Health Building
Gross Area (sq. ft.): 194,00
Year Built: 1974
Floors: 7

Location: Toronto, Canada

Building Name: East District Energy Plant
Year Built: 2014

Location: Rabat, Morocco

Building Name: Canadian Embassy
Gross Area (sq. ft.): 32,000
Year Built: 2012
Floors: 3

Location: Rabat, Morocco

Building Name: Canadian Embassy
Gross Area (sq. ft.): 32,000
Year Built: 2012
Floors: 3

Location: Montreal, Canada

Building Name: Bay/Adelaide North
Gross Area (sq. ft.): 820,000
Year Built: In Progress
Floors: 32

Location: Montreal, Canada

Building Name: Bay/Adelaide North
Gross Area (sq. ft.): 820,000
Year Built: In Progress
Floors: 32

Location: Calgary, Canada

Building Name: Calgary City Centre
Gross Area (sq. ft.): 853,000
Year Built: 2016
Floors: 36

Location: Calgary, Canada

Building Name: Calgary City Centre
Gross Area (sq. ft.): 853,000
Year Built: 2016
Floors: 36

Location: Rabat, Morocco

Building Name: Canadian Embassy
Gross Area (sq. ft.): 32,000
Year Built: 2012
Floors: 3

Location: Rabat, Morocco

Building Name: Canadian Embassy
Gross Area (sq. ft.): 32,000
Year Built: 2012
Floors: 3

Location: La Tour Deloitte
Gross Area (sq. ft.): 495,000
Year Built: 2015
Floors: 26

Location: Montreal, Canada

Building Name: La Tour Deloitte
Gross Area (sq. ft.): 495,000
Year Built: 2015
Floors: 26
Bryan Birosak, University of Colorado, Boulder

e-Magic’s excellent team and great leadership have been tremendous in supporting the CU Boulder objective to provide excellent utility services by helping us navigate through the age of big data management and process control system implementations with clear and concise consulting and technical expertise that has resulted in incredibly beneficial financial and operational outcomes for the university.
Start improving your operation with IoT and Azure Digital Twins

LEARN MORE

www.e-magic.ca

GET STARTED

Microsoft Azure Marketplace
Search: TwinWorX

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