COMMISSIONING

USING

CLOUD BASED TECHNOLOGY
<table>
<thead>
<tr>
<th></th>
<th>Content</th>
<th>Mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Commissioning</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>- Aspects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Issues</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Commissioning Tool</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>- C2O</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Benefits &amp; Advantages</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Q &amp; A</td>
<td>5</td>
</tr>
</tbody>
</table>
SECTION 1 – INTRODUCTION
Eutech Profile

- Established in 1994 and headquartered in Singapore
- Regional offices in Australia, UAE and Malaysia & development centres in Sri Lanka and India
- Core business is in developing smart systems/applications for the building industry
- 9 international patents of which 5 has been awarded.
- Flagship product under the iVivaCloud umbrella.

iVivaCloud Smart City Solution Framework

- Smart City Solutions
  - Smart City Infrastructure
  - Smart Building
  - Smart Workplace
  - Smart Retail
  - Smart FM
  - Smart Airports
  - Smart Healthcare
2.1 - Eutech

## Eutech In The Limelight

<table>
<thead>
<tr>
<th>Gartner 2014 Cool Vendor</th>
<th>Ovum</th>
<th>Avaya DevConnect Technology Partner</th>
</tr>
</thead>
</table>

- "Cool Vendors in Smart City Applications and Solutions, 2014 Report" ~ Gartner Inc.
- "A disruptive player emerging in the intelligent building management space."
- "This first-of-its-kind solution targets reduction of operational costs, and provides the ability to track and deliver services to employees and customers based on their availability and physical location."

- "A platform that provides managers and planners with an integrated view of IT and operational technology (OT) elements that facilitates decision making and provides security and visualization capabilities."
- "iVivaCloud allows managers to make effective use of information gathered through building utilization and environmental systems to support efficiency and productivity improvement activities."
### Technology Ecosystem

<table>
<thead>
<tr>
<th>Category</th>
<th>Brands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Analytics and Visualization*</td>
<td>SAP HANA, SAP Crystal Reports</td>
</tr>
<tr>
<td>Mapping and GIS^</td>
<td>esri, ineni Realtime</td>
</tr>
<tr>
<td>Database and OS</td>
<td>SQL Server, Windows Server</td>
</tr>
<tr>
<td>Cloud Hosting</td>
<td>orange Business Services, Amazon Web Services</td>
</tr>
<tr>
<td>Gateway and Security</td>
<td>intel, McAfee</td>
</tr>
<tr>
<td>Smart Devices and Communications</td>
<td>orange Business Services, AVAYA</td>
</tr>
</tbody>
</table>
Our Partners

- Our partners are an integral part of our growth and value proposition
- Unified strengths and expertise
- Tailor-made solutions for your business situation
- Global ecosystem of partners comprising hardware and smart device manufacturers, IT integrators, Telecom companies and managed services companies.
About iVivaCloud

• Our Flagship product

• Game-changing IoE platform that redefines the way Smart Cities are designed, built, commissioned and operated.

• It is more that a Integration Layer

• Focused on enabling **Business Outcomes** and **User Journeys**

• 2014 Gartner Cool Vendor for Smart Cities.
## iVivaCloud Solution Map

<table>
<thead>
<tr>
<th>Smart Mall</th>
<th>Shop Directory</th>
<th>Way-finding</th>
<th>Parking Management</th>
<th>Location Based Services</th>
<th>Advertising</th>
<th>Tenant Services</th>
<th>Concierge Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Buildings</td>
<td>BMS (FCU, AHU, Chillers, HVAC, Elevators, lighting)</td>
<td>Fire Control</td>
<td>Lighting Control</td>
<td>Incident Management</td>
<td>Real-time Monitoring and Control</td>
<td>Energy Monitoring</td>
<td></td>
</tr>
<tr>
<td>Smart FM</td>
<td>Asset Management with QR codes</td>
<td>Maintenance Management</td>
<td>Asset Commissioning</td>
<td>Procurement and Stock Management</td>
<td>Incident Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smart Workplace</td>
<td>Visitor Management</td>
<td>Facility Booking</td>
<td>User On-Boarding</td>
<td>Digital Kiosk</td>
<td>Digital Signage</td>
<td>Sensors for Space Utilization</td>
<td></td>
</tr>
</tbody>
</table>

### Platform

<table>
<thead>
<tr>
<th>Operational Intelligence*</th>
<th>Complex Event Processing</th>
<th>Real-Time decision support</th>
<th>Dynamic Dashboards</th>
<th>Dynamic Team Formation</th>
<th>User-Journey Analysis and Visualization</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPM and User-Journeys</td>
<td>Business Process Modelling</td>
<td>User-Journey Modelling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metadata Management</td>
<td>Extract Metadata</td>
<td>Model &amp; Abstract Metadata</td>
<td>Visualize</td>
<td>Share</td>
<td></td>
</tr>
<tr>
<td>Commissioning</td>
<td>BIM Integration*</td>
<td>Document Management</td>
<td>Commission Assets, Devices and Systems</td>
<td>Dashboards</td>
<td>Predict Outcomes</td>
</tr>
<tr>
<td>Integration Manager</td>
<td>BMS</td>
<td>CCTV</td>
<td>Access Control</td>
<td>BIM</td>
<td>Lighting</td>
</tr>
</tbody>
</table>
Growing Global Footprint

Deployments in over 20 Counties

6 Smart City implementations
How is Commissioning Done Today?

- Design & Build
  - BIM
  - BMS
  - Lighting
  - Security and Access
  - ELV systems

- Commission & Handover
  - HVAC Management
  - Lighting Management
  - Access Management
  - Lift Management
  - Asset Management

- Operate
  - Facility Management
  - Security and Surveillance
  - Tenant Services Management
  - Health and Safety
  - IT Systems Management
What are the Problems in Commissioning?
## Traditional Buildings are Built and Operated in Silos

<table>
<thead>
<tr>
<th>Designed and built in Silos</th>
<th>Manual Commissioning</th>
<th>Multiple Systems in Silos</th>
<th>Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIM</strong></td>
<td>Lack of visibility and management</td>
<td><strong>HVAC Management</strong></td>
<td><strong>Complexity and data inconsistencies</strong></td>
</tr>
<tr>
<td><strong>BMS</strong></td>
<td>Incomplete testing &amp; commissioning</td>
<td><strong>Lighting Management</strong></td>
<td><strong>Increased maintenance and operations cost</strong></td>
</tr>
<tr>
<td><strong>Lighting</strong></td>
<td>Leads of rework and delays</td>
<td><strong>Access Management</strong></td>
<td><strong>Energy Wastage</strong></td>
</tr>
<tr>
<td><strong>Security and Access</strong></td>
<td>Inconsistencies in data</td>
<td><strong>Lift Management</strong></td>
<td><strong>Poor Performance</strong></td>
</tr>
<tr>
<td><strong>ELV systems</strong></td>
<td>Lack of documentation</td>
<td><strong>Asset Management</strong></td>
<td><strong>Reduced transparency</strong></td>
</tr>
<tr>
<td><strong>Facility Management</strong></td>
<td></td>
<td><strong>Tenant Services Management</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Security and Surveillance</strong></td>
<td></td>
<td><strong>Health and Safety</strong></td>
<td></td>
</tr>
<tr>
<td><strong>IT Systems Management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
and More Importantly

Silos hold down

Organization agility

Business Outcomes

Potential of People
So How Can Commissioning be Improved?
C2O workflow is based on the ASHRAE TOLLGATE process workflow

- Tollgate process consists of 6 core submissions (tests) that each asset is recommended to complete in order to be considered commissioning completed

- Each submission is to be completed in an order

- Tollgate process dictates that if an asset has not passed a submission, it should not move to the next submission
C₂O is about the whole lifecycle of an asset. From pre-design stage, until the Operations/Occupancy stage.

C₂O starting point is OPR - Owner’s Project Requirements
6 Core commissioning tests are to be completed systematically, following the design and construction schedule of a project.
ASSET LIFE CYCLE

- Pre Design
- Design
- Construction
- Operations

iVivaCloud™
Owner's Project Requirement (OPR)
Project Details

Basic Details

Project ID
Green Refurbishment Project

Location
Australia

Agent
Aaron Tan

Owner Details

Owner Company
Not set

Owner Contact User
Not Set
Design Review

**Drawing Details**

**Drawing No:**
KLIA-2 / CD / PV03 / LIZ / AC / 021

**Description:**
AIR-CONDITIONING & MECHANICAL VENTILATION SYSTEM - HEAT EXCHANGER & PUMP ROOM DETAIL

**Drawings**

- 21-LCCT-ACMV-PLANTRM-P&amp;ID DIAGRAM.24.10.13.dwg
- KLIA-2/AB/PV03/SOYL/AC/21

2016/02/16 01:32 PM
AFST

- Eutech Cybernetic
Commissioning Plan

- Overview of Cx Process
- Roles & Responsibilities
- Schedule of Activities
- Communication Channels
- Quality Based Sampling Procedures
• A combination of submissions types may be selected depending on commissioning requirements

• Tollgate process is configured per Package. All assets added to that Package must then go through the configured process
Toll Gates Selection

Basic Details
Package ID
Green refurbishment-project/AHU/1
Asset Category
Air Handling Unit

Submissions
- Submittal Verification
- Installation
- Model Verification
- Point to Point
- Pre-Functional
- Functional

Contractors
- Carillion

Consultants
- Adriane Pandeli

System
Central Air Conditioning System
Asset Category
Air Handling Unit

Activities
### Submission Forms

<table>
<thead>
<tr>
<th>Fan Design</th>
<th>Return Air [L/s]</th>
<th>30</th>
<th>23</th>
<th>Consultant Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Design</td>
<td>Suction Pressure [Pa]</td>
<td>20</td>
<td>20</td>
<td>✓ x</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Discharge Pressure [Pa]</td>
<td>50</td>
<td>50</td>
<td>✓ x</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Total Static Pressure [Pa]</td>
<td>20</td>
<td>20</td>
<td>✓ x</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Fan Speed [rps]</td>
<td>30</td>
<td>30</td>
<td>✓ x</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Motor Current [Amps]</td>
<td>20</td>
<td>20</td>
<td>✓ x</td>
</tr>
<tr>
<td>Water Balancing</td>
<td>Flow [L/s]</td>
<td>20</td>
<td>20</td>
<td>✓ x</td>
</tr>
<tr>
<td>Water Balancing</td>
<td>Valve Type</td>
<td>25</td>
<td>25</td>
<td>✓ x</td>
</tr>
<tr>
<td>Water Balancing</td>
<td>Valve Size</td>
<td>30</td>
<td>30</td>
<td>✓ x</td>
</tr>
<tr>
<td>Water Balancing</td>
<td>Valve Turns</td>
<td>20</td>
<td>25</td>
<td>✓ x</td>
</tr>
<tr>
<td>Unit/Fan Information</td>
<td>Make</td>
<td>Liebert</td>
<td>Liebert</td>
<td>✓ x</td>
</tr>
<tr>
<td>Unit/Fan Information</td>
<td>Model</td>
<td>DX Air Handler</td>
<td>DX Air H₂</td>
<td>✓ x</td>
</tr>
<tr>
<td>Unit/Fan Information</td>
<td>Fan Make</td>
<td>Liebert</td>
<td>Liebert</td>
<td>✓ x</td>
</tr>
<tr>
<td>Unit/Fan Information</td>
<td>Type</td>
<td>XYZ</td>
<td>XYZ</td>
<td>✓ x</td>
</tr>
<tr>
<td>Unit/Fan Information</td>
<td>Diameter [mm]</td>
<td>200</td>
<td>200</td>
<td>✓ x</td>
</tr>
</tbody>
</table>
### Air Handling Unit (AHU) Installation Verification Form - Approved

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Done?</th>
<th>Comments</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHU</td>
<td>Equipment received as ordered</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>AHU</td>
<td>Unit checked for damage to interior and exterior</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>AHU</td>
<td>Unit installed on flat and level surface, Outdoor unit mounted within roof slope limitations where applicable</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>AHU</td>
<td>Terminal screws and wiring connections secure in control, electric and Air modulator panels</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>AHU</td>
<td>Air hoods installed properly</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>AHU</td>
<td>Condensate drain properly trapped</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>AHU</td>
<td>All wiring and tubing connections made at shipping splits</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>AHU</td>
<td>All field piping connections complete</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

---

**Installation Verification Testing**

**Submission Forms**

- Air Handling Unit (AHU) Installation Verification Form - Approved
  - Melbourne/Building/1/AHU/1
  - Australia.Melbourne/Building/1
  - Approved

- Air Handling Unit (AHU) Installation Verification Form - Approved
  - Melbourne/Building/1/AHU/2
  - Australia.Melbourne/Building/1
  - Approved
Point to Point Verification Testing
Pre-Functional Verification Testing

### Submission Forms

#### Air Handling Unit Submittal Verification Form-Fan Design - Approved

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>DV</th>
<th>BOQV</th>
<th>AV</th>
<th>Comments</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Design</td>
<td>Air Volume</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Outside Air</td>
<td>30</td>
<td>30</td>
<td>22</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Return Air</td>
<td>30</td>
<td>23</td>
<td>25</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Suction Pressure</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Discharge Pressure</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Total Static Pressure</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Fan Speed</td>
<td>30</td>
<td>30</td>
<td>35</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Motor Current</td>
<td>20</td>
<td>20</td>
<td>18</td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

#### Air Handling Unit Submittal Verification Form-Fan Design - Approved

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>DV</th>
<th>BOQV</th>
<th>AV</th>
<th>Comments</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Design</td>
<td>Air Volume</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Fan Design</td>
<td>Outside Air</td>
<td>30</td>
<td>30</td>
<td>35</td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>
## Functional Verification Testing

### Submission Forms

#### Air Handling Unit (AHU) Functional Verification Form - Approved Melbourne/Building/1/AHU/2

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>ExV</th>
<th>AV</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Design</td>
<td>Total Air Volume</td>
<td>8</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Fan Design</td>
<td>Total Static Pressure</td>
<td>400</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Chilled Water Coil</td>
<td>Total Cooling</td>
<td>79.7</td>
<td>78.5</td>
<td></td>
</tr>
<tr>
<td>Sequences</td>
<td>When Economizer enabled valve feedback</td>
<td>20</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Sequences</td>
<td>In a fire, time taken to switched off the supply fan</td>
<td>10</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>Sequences</td>
<td>When temp difference&lt;5 valve feedback</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

#### Air Handling Unit (AHU) Functional Verification Form - Approved Melbourne/Building/1/AHU/1

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>ExV</th>
<th>AV</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan Design</td>
<td>Total Air Volume</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Fan Design</td>
<td>Total Static Pressure</td>
<td>400</td>
<td>390</td>
<td></td>
</tr>
<tr>
<td>Chilled Water Coil</td>
<td>Total Cooling</td>
<td>79.7</td>
<td>77.5</td>
<td></td>
</tr>
<tr>
<td>Sequences</td>
<td>When Economizer enabled valve feedback</td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>
## Selected Toll Gates

### Submittal Verification
- **AHU1_Submittal Verification**
  - 1/1
  - **Construction Drawings**
  - 2015/1/9 2015/1/10
  - [Approved](#)

### Installation Verification
- **AHU1_Installation Verification**
  - 2/2
  - **Statement**
  - 2015/1/17 2015/1/18
  - [Approved](#)

### Model Verification
- **AHU_Model Verification**
  - 2/2
  - 2015/1/18 2015/1/19
  - [Approved](#)

### Point to Point
- **AHU1_Point to Point Submission**
  - 2/2
  - 2015/1/19 2015/1/20
  - [Approved](#)

### Pre Functional Testing
- **AHU1_Pre-Functional Testing**
  - 2/2
  - 2015/1/19 2015/1/20
  - [Approved](#)

### Functional Testing
- **AHU_Functional Testing**
  - 2/2
  - 2015/1/19 2015/1/20
  - [Approved](#)
## SOP Tests

### Tests

#### Test

- **AHU Economizer**

<table>
<thead>
<tr>
<th>Asset</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢 Melbourne/Building/1/AHU/1</td>
<td>View Signature</td>
</tr>
<tr>
<td>🔴 Melbourne/Building/1/AHU/2</td>
<td>No signature</td>
</tr>
</tbody>
</table>

---

### Test cases

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Asset</th>
<th>Parameter</th>
<th>Set Value</th>
<th>Read Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Outside Temperature</td>
<td>Not Set</td>
<td>Outside Air Temperature</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>
Automated Testing

<table>
<thead>
<tr>
<th>Tests</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHU Economizer</td>
<td>View Signature</td>
</tr>
<tr>
<td>Melbourne/Building/1/AHU/1</td>
<td>No signature</td>
</tr>
<tr>
<td>Melbourne/Building/1/AHU/2</td>
<td>No signature</td>
</tr>
</tbody>
</table>

Signature:
```
["Result": "Economizer enabled and outside air dampers open 20s", "Status": "1"]
```
Pre Design  |  Design  |  Construction  |  Operations  

ASSET LIFE CYCLE
Commissioning to Operate Methodology

**Managed Services**
- Analytics
- Tenant Services
- Advertising
- Value-Added Services
- PaaS/SaaS

**Vertical Solutions for Cost Reduction, Productivity and Efficiency**
- Smart Infrastructure
- Smart Buildings
- Smart FM
- Smart Workplace
- Smart Retail

**Tools and Capabilities**
- Operational Intelligence
- BPM
- User Journey Management
- Metadata Management
- Continuous Commissioning

1. **Subsystem Design and Installation**
   - Data Dictionary
   - BMS Systems
   - Fire Alarms
   - Lighting
   - IP Phones
   - Access Control
   - CCTV

2. **Integrate**
   Light Weight Metadata Integration

3. **Digitize**
   Unified Metadata Model of the Physical World

4. **Commission**
   Integration Commissioning to reduce project delays, risk and cost

*Image credit: iVivaCloud™*
Projects Commissioned Utilising C2O

Project: Barangaroo South Development  
Location: Sydney Australia  
Developer/Builder: Lend Lease

Project: BHP Billiton Headquarters  
Location: Melbourne, Australia  
Builder: Brookfields Multiplex
COMPREHENSIVE DASHBOARDS
“C2O LIVE” - ACTUAL PROJECT
Design Review

**Drawing Details**

**Drawing No:**
KLIA-2 / CD / PV03 / LIZ / AC / 021

**Description:**
AIR-CONDITIONING & MECHANICAL VENTILATION SYSTEM - HEAT EXCHANGER & PUMP ROOM DETAIL

**Drawings**

21-LCCT-ACMV-PLANTRM-P8/D DIAGRAM.24.10.1.3.dwg

**Cx5's Comments**

Please check with GDC how many by-passes are required at the primary chilled water return and the corresponding by-pass pipe sizes.

Added on 2016/02/16 01:30 PM AEST   Eutech Cybernetic

The metering room details show piping impeding door access. To ensure gradual pump discharge piping connection to distribution manifold with minimum losses to enhance energy efficiency.

Added on 2016/02/16 01:29 PM AEST   Eutech Cybernetic

To specify straight pipe length requirement for the installation of chilled water meter in accordance with the manufacturer’s specification. To specify chilled water flushing in accordance.

Added on 2016/02/16 01:30 PM AEST   Eutech Cybernetic
Toll Gates

1. Toll Gates

**Submittal Verification**

- **FAF Submittal Verification**
  - 11/11
  - Construction Drawings
  - 30/03/2016
  - 30/12/2016
  - ✔ Approved

**Installation Verification**

- **FAF Installation Verification**
  - 0/11
  - Method Statement
  - 30/03/2016
  - 29/12/2016
  - Pending Approval

**Pre Functional Testing**

- No submissions

**Functional Testing**

- No submissions

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**Submission Forms**

**Air Handling Unit Submittal Verification Form - Approved**

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<th>BOQ Value</th>
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Assuming the use of Cloud during the Operations phase, the following benefits are felt during the transition phase:

1. Access to C₂O and commissioning data
2. Manuals, user guides and other documentation are linked to relevant assets and are easy to find
3. On-going defects can be tracked and closed
4. Data configuration is reduced due to data import during the Construction and Commissioning phase
   - Asset data
   - IBMS Data
   - Location Data
WHY $C_2O$ ?

1. Cloud Based, Internet browser based. Data available all the time.
2. All parties can access it, work on 1 platform and 1 data depository.
3. Must be completed in order, ensures that the entire commissioning process is complete, assets/package won’t be missed out
4. Data integrity, data loss prevention
5. Point in Time vs Continuous. Real time.
6. Reference for asset operations, maintenance and recommissioning
7. Faster recommissioning & retro commissioning
8. Can be stand alone, can be integrated with BMSs and BIM
9. Aligned with LEED (Enhanced Commissioning), Green Mark, Green Star.

More efficient, fewer resources required, more accurate, clear responsibilities, data integrity, ease of audit, commissioning completed faster.
THANK YOU

stephen.ho@ecyber.com