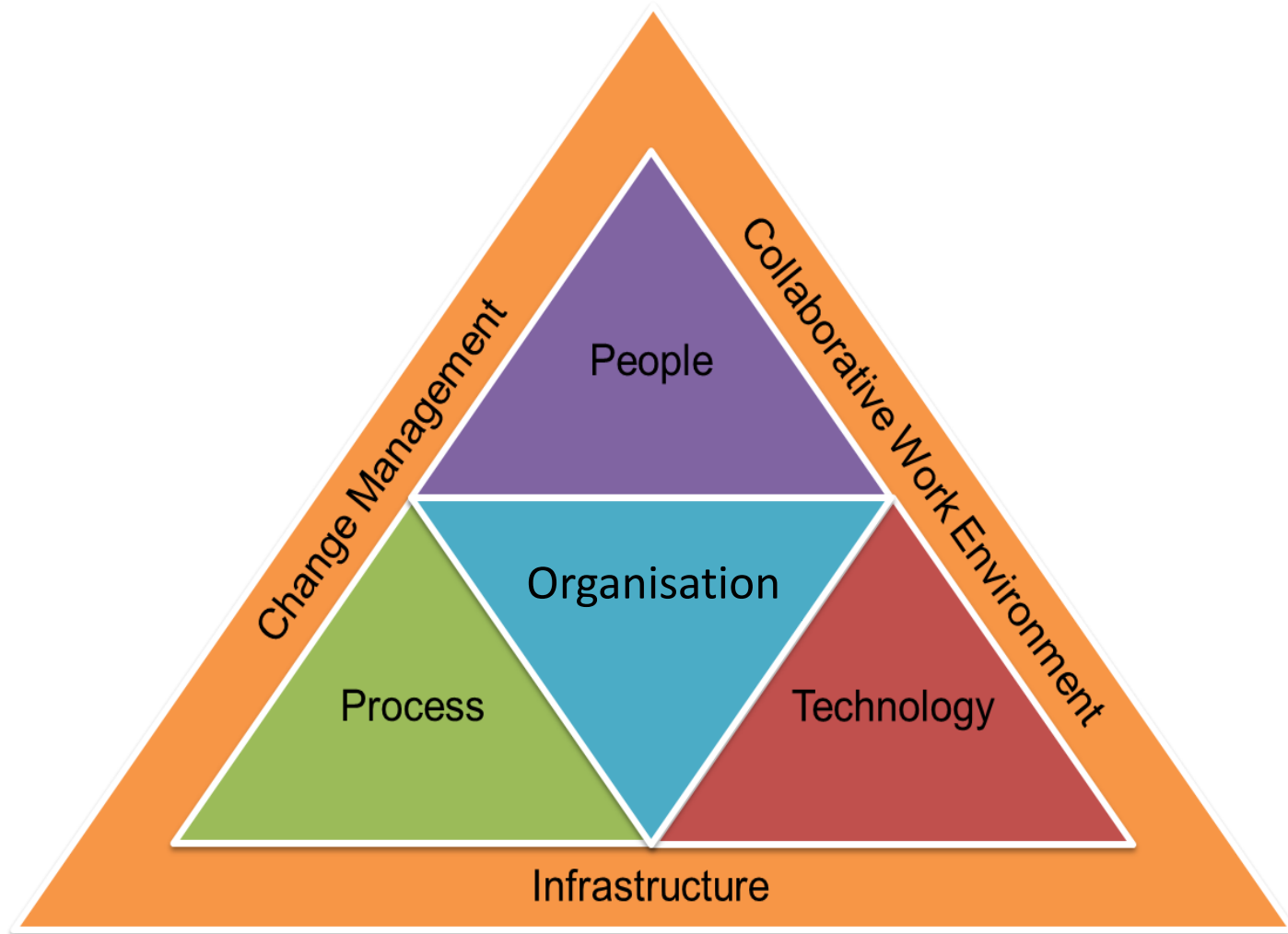# IO ARCHITECTURE

Fadhli Wong Mohd Hasan Wong
Head Program Office, Integrated Operations,
Operational Excellence, Petroleum Production & Development
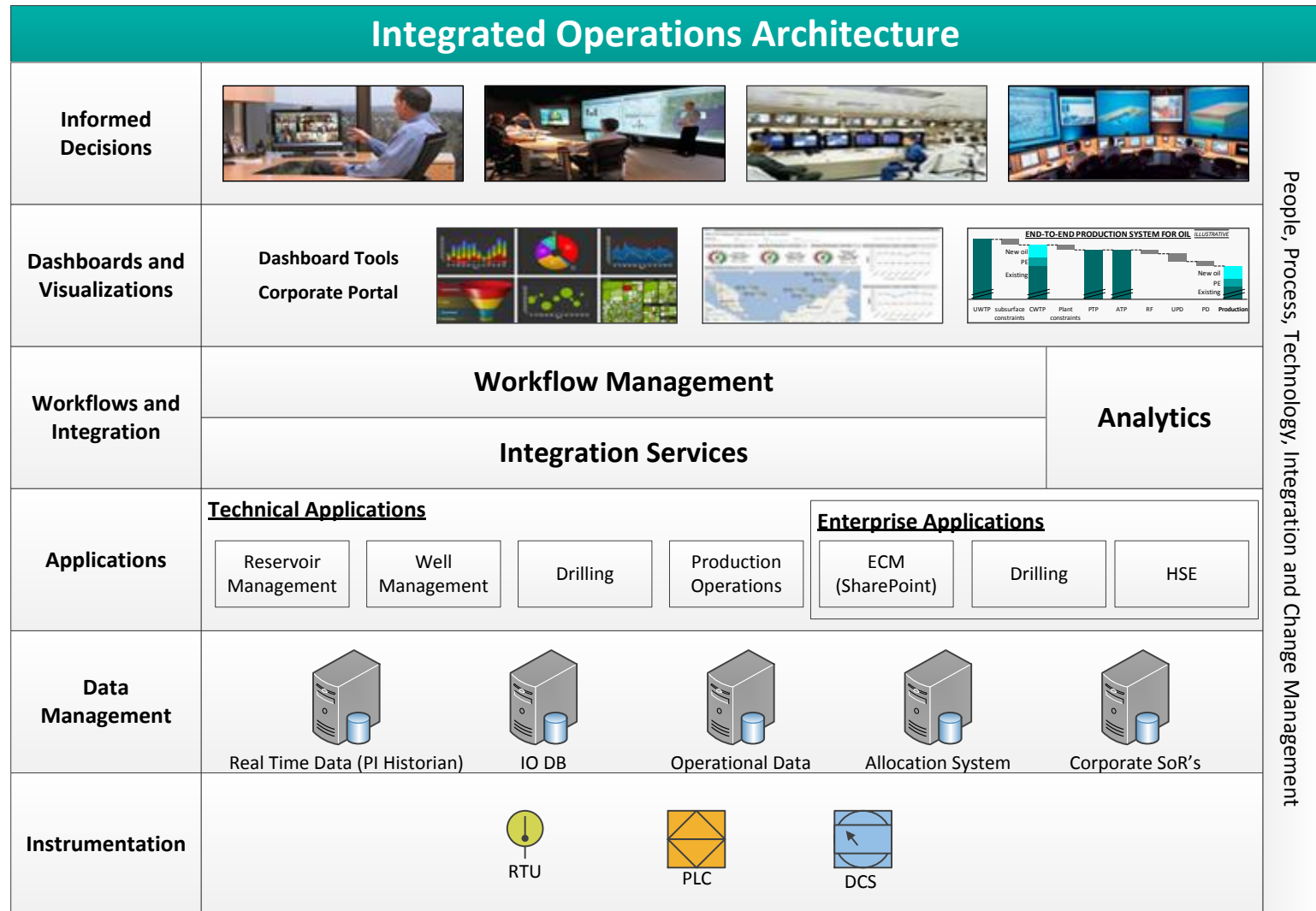Digital Energy Forum
8-9th October 2013, Kuala Lumpur

Integrated Operations Architecture

Integrated Operations Architecture

Informed Decisions		
Dashboards and Visualizations	**Dashboard Tools** **Corporate Portal**	
Workflows and Integration	**Workflow Management** / **Integration Services**	**Analytics**
Applications	**Technical Applications**: Reservoir Management, Well Management, Drilling, Production Operations — **Enterprise Applications**: ECM (SharePoint), Drilling, HSE	
Data Management	Real Time Data (PI Historian), IO DB, Operational Data, Allocation System, Corporate SoR's	
Instrumentation	RTU, PLC, DCS	

People, Process, Technology, Integration and Change Management

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Instrumentations & Prerequisites

| Surveillance Activities	Current Water & Gas Inj. Surveillance Program		New WAG EOR Surveillance Program	
	Testing	**Frequency**	**Testing / IO Tools**	**Frequency**
Injection Pump Performance Monitoring	Condition Based Monitoring (CBM)	Offline Routine Survey & Analysis	Condition & Performance Based Monitoring (CPBM) System for injection pump & gas compressor	**Real Time Monitoring**
Injection P&T, Flow Rates Recording	P&T Transmitters & Flow Meters	Monthly	P&T & Flow Transmitters (connected to DCS at all WAG injectors)	**Real Time**
Tubing Integrity Assessment & Monitoring	Caliper Survey	As Required	Caliper Survey	**As Required** *(Active injectors & producers, priority should be given to injectors completed with normal carbon steel - low alloy & producers with High Risk Sand Production, High Water Cut or H2S or CO2 present in the gas phase)*
Pressure & Temperature Recording (at producers)	Nil	Nil	Permanent Downhole Gauge (PDG) & Distributed Temperature Sensor (DTS)	**Real Time** *(For key wells only)*
	Static Bottom Hole Pressure Survey (SBHP or SGS)	Annually for the First 2 Years *(50% of the total active producers in each reservoir)* Quarterly *(For subsequent survey: 25% of active producers in each reservoir)*	Static Bottom Hole Pressure Survey (SBHP or SGS)	**Annually for the First 2 Years** *(40% of the total active producers in each reservoir)* **Quarterly** *(For subsequent survey: 15% of active producers in each reservoir, priority should be given to key wells)*
P&T Recording (at producers)	P&T Gauges	Monthly	P&T transmitters (connected to DCS at all producers)	**Real Time**
Gas lift injection pressure & rate, casing head pressure recording	Pressure & Flow Reading at compressor & gas lift headers	Monthly	P&T & Flow Transmitters (connected to DCS at all gas lift headers & producers)	**Real Time**
Sand detection and monitoring	Nil	Nil	Sand Monitoring Device *(at test header or MPFM inlet)*	**Monthly** *(Conduct sand monitoring during Production Test)*

Translation of requirements:-
- Business/Operations
- EOR Strategy
- Terminals
- RMP
- Monitoring & Surveillance Program

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Instrumentations & Prerequisites
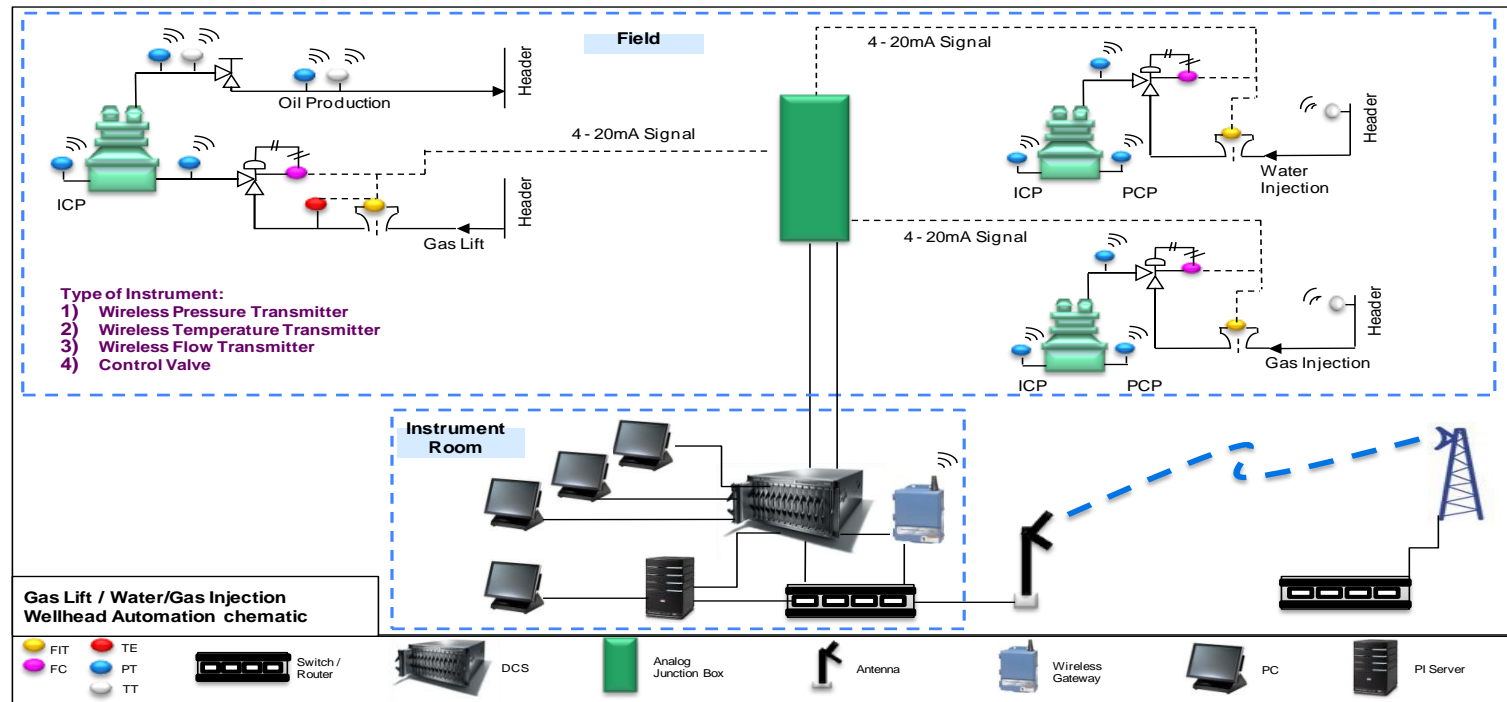
The requirements for the instrumentation come mainly from the RMP, Monitoring & Surveillance Guidelines
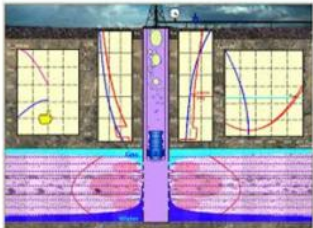
Data Management
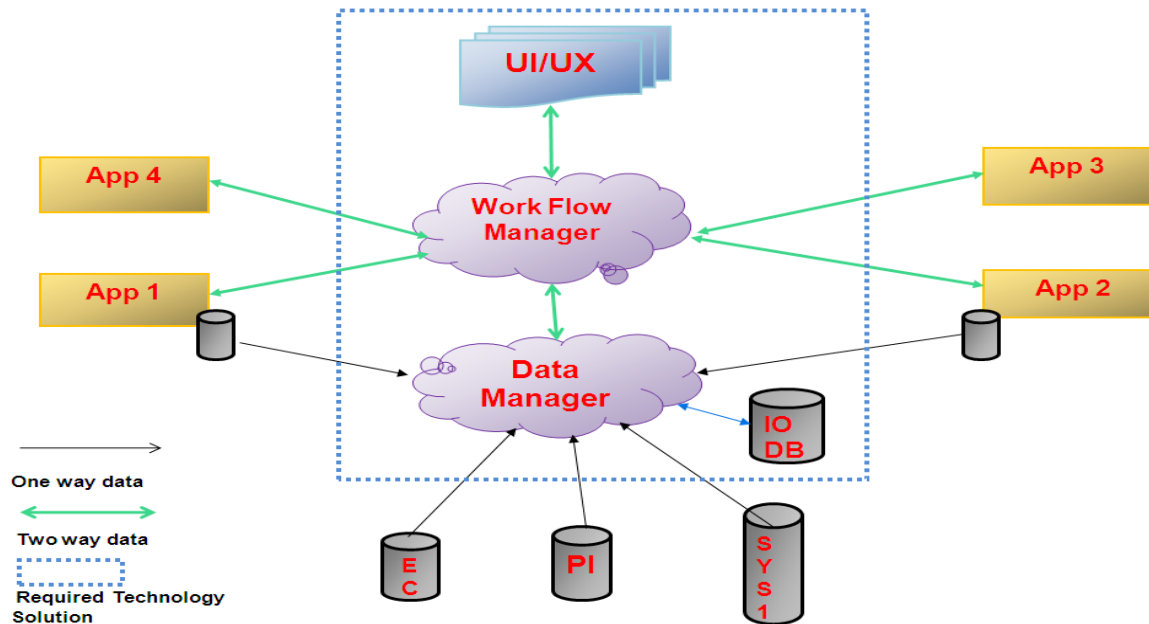
Manages the data interaction between applications and layers, establish a single point of truth, foster the re-use of data which avoids redundancy and duplication

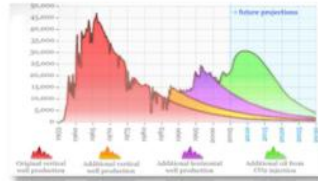Data reconditioning, cleansing, validation and aggregation

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Applications

Tools to facilitate the current day- to- day routine in managing organisation's resources
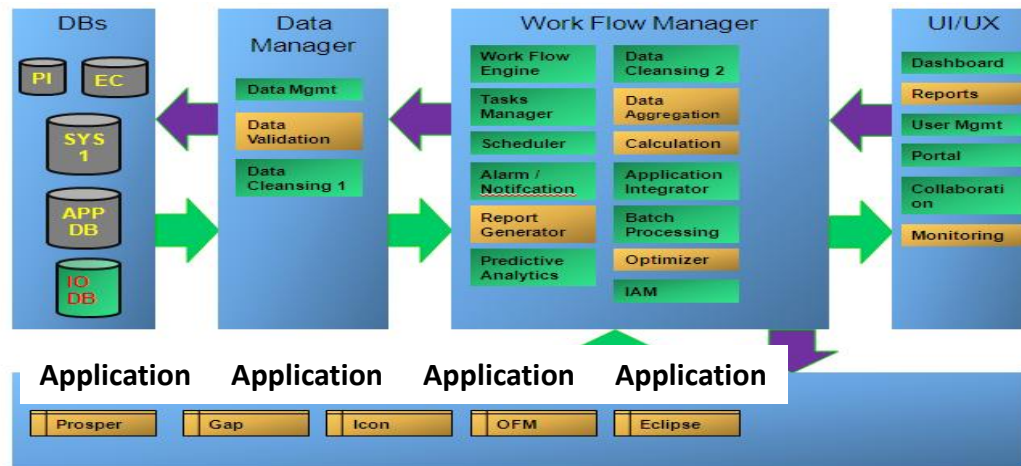

Optimse Production

Optimize Production | Increase Recovery | Improve Efficiency | Advance HSE

DBs: PI, EC, SYS 1, APP DB, IO DB

Data Manager: Data Mgmt, Data Validation, Data Cleansing 1

Work Flow Manager: Work Flow Engine, Tasks Manager, Scheduler, Alarm / Notifcation, Report Generator, Predictive Analytics, Data Cleansing 2, Data Aggregation, Calculation, Application Integrator, Batch Processing, Optimizer, IAM

UI/UX: Dashboard, Reports, User Mgmt, Portal, Collaboration, Monitoring

Application — Prosper
Application — Gap
Application — Icon
Application — OFM
Application — Eclipse
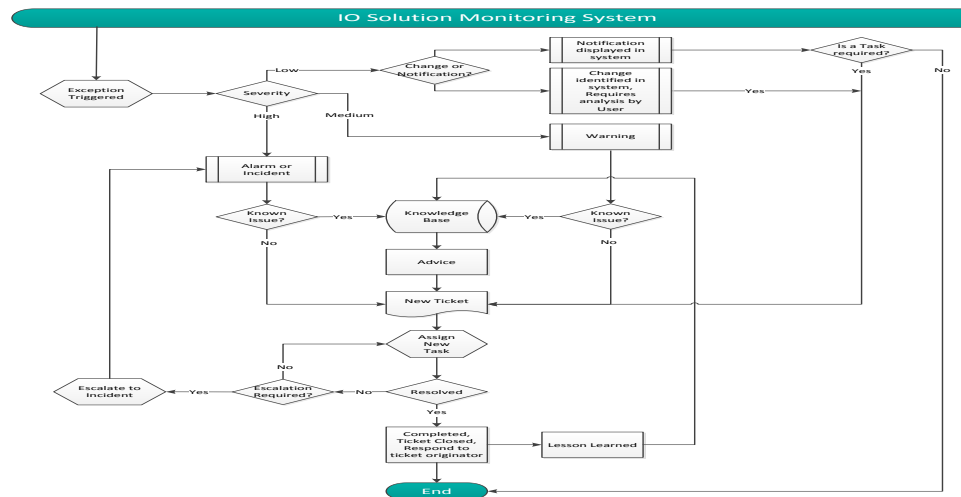
Workflows & Integration

Tools to automate the business process, work-process and interfaces between applications to produce data analysis


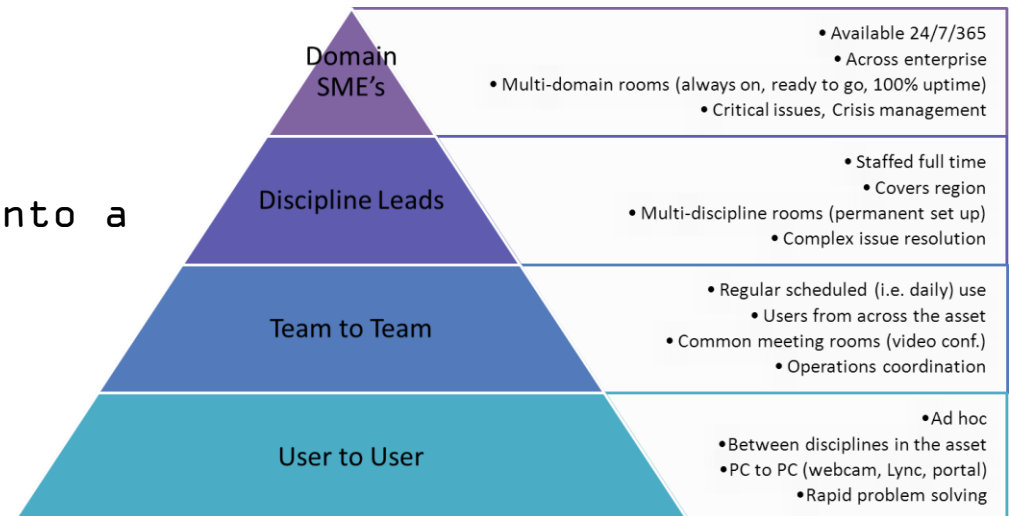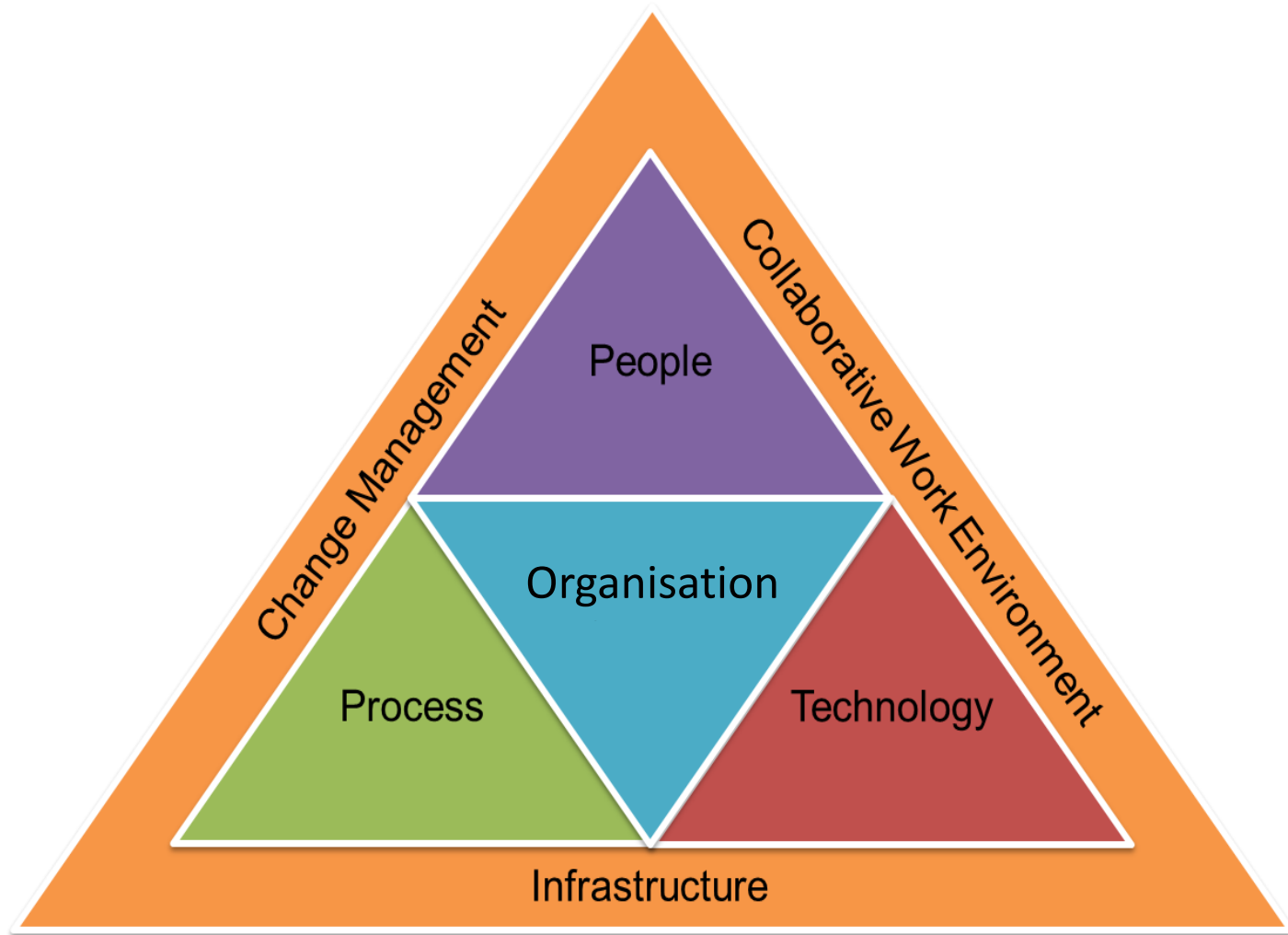|	
Workflow	A workflow is a sequence of connected steps, where each step follows the precedent without delay and ends before the subsequent step may begin. For IO, its technical workflows include into this sequence the interaction of users and petro-technical applications to produce results with consistent quality.
Business Process	A business process is a collection of structured activities or tasks that produce a specific service or goal for the user.

Collaborative Work Environment & Visualisation

Integration of Technology, Process and People
CHANGE MANAGEMENT
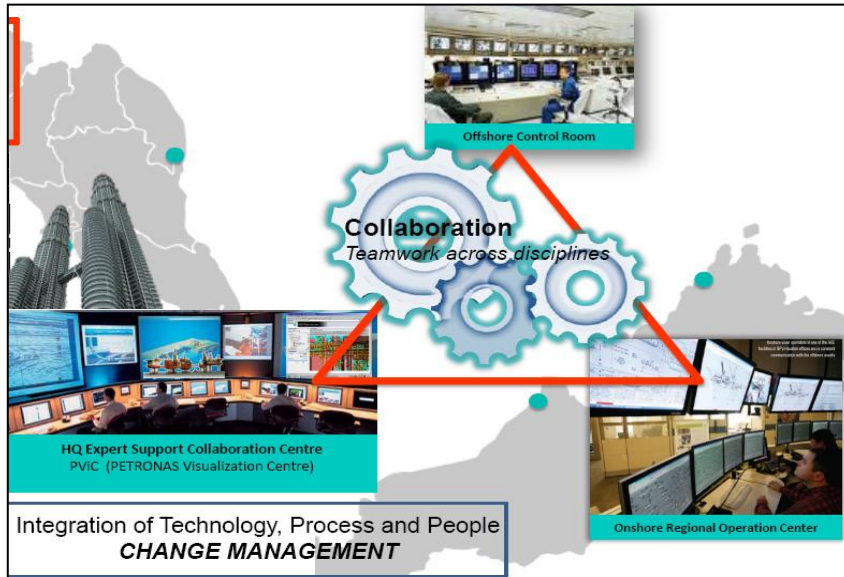
There are different types of collaboration, for different IO solutions and for different asset needs.

Represent the analysed data into a meaningful information.

Domain SME's	• Available 24/7/365 • Across enterprise • Multi-domain rooms (always on, ready to go, 100% uptime) • Critical issues, Crisis management
Discipline Leads	• Staffed full time • Covers region • Multi-discipline rooms (permanent set up) • Complex issue resolution
Team to Team	• Regular scheduled (i.e. daily) use • Users from across the asset • Common meeting rooms (video conf.) • Operations coordination
User to User	• Ad hoc • Between disciplines in the asset • PC to PC (webcam, Lync, portal) • Rapid problem solving

THANK YOU

Acknowledgement

1. Deployment Team, EOR, EPTD, PCSB
2. Mark Anthony Macaranas, Khairul Mustaqim Abd Aziz, Surendran Kandasamy, Dulang IO Team, EOR, EPTD, PCSB
3. IO Department, OE, PCSB

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