



WHITE PAPER

# Digitizing EPC completions and handover process

How-to implementation guide, including workflows, timeline and ROI



# Why digital completions is necessary

## Why digital completions is necessary and why we need best practices | Project completions performance trends



### Increasing complexity

48 megaprojects showed poor execution was responsible for cost and time overruns in 73% of cases (McKinsey).



### Lack of reliable and validated data

Data is validated on an average of 11 times during a project due to ongoing data integrity; this creates inefficiencies.



### Opportunity during transition

A majority of (67%) petroleum companies successfully navigated from project delivery to operating refinery with an Operational Readiness program.

## Why we need best practices | Digital completions financial impact



### Reduce unrealized revenue

Ready For Operations (RFO) effort can be reduced 10% to 20% with faster, smoother and more visible completions processes leading to quicker time to first production.



### Less administrative cost

Eliminate the chance for costly human error through brute force data translation and take printer maintenance costs out of the business. 98% dossier compilation productivity.



### Increase productivity


Decrease wheel spin by 30% and boost time-on-tools with the right information at the right time. Create standardized, repeatable deployment processes to reduce setup costs up to 70%.

# What challenges completions faces


Why we need best practices | Examples of completion challenges



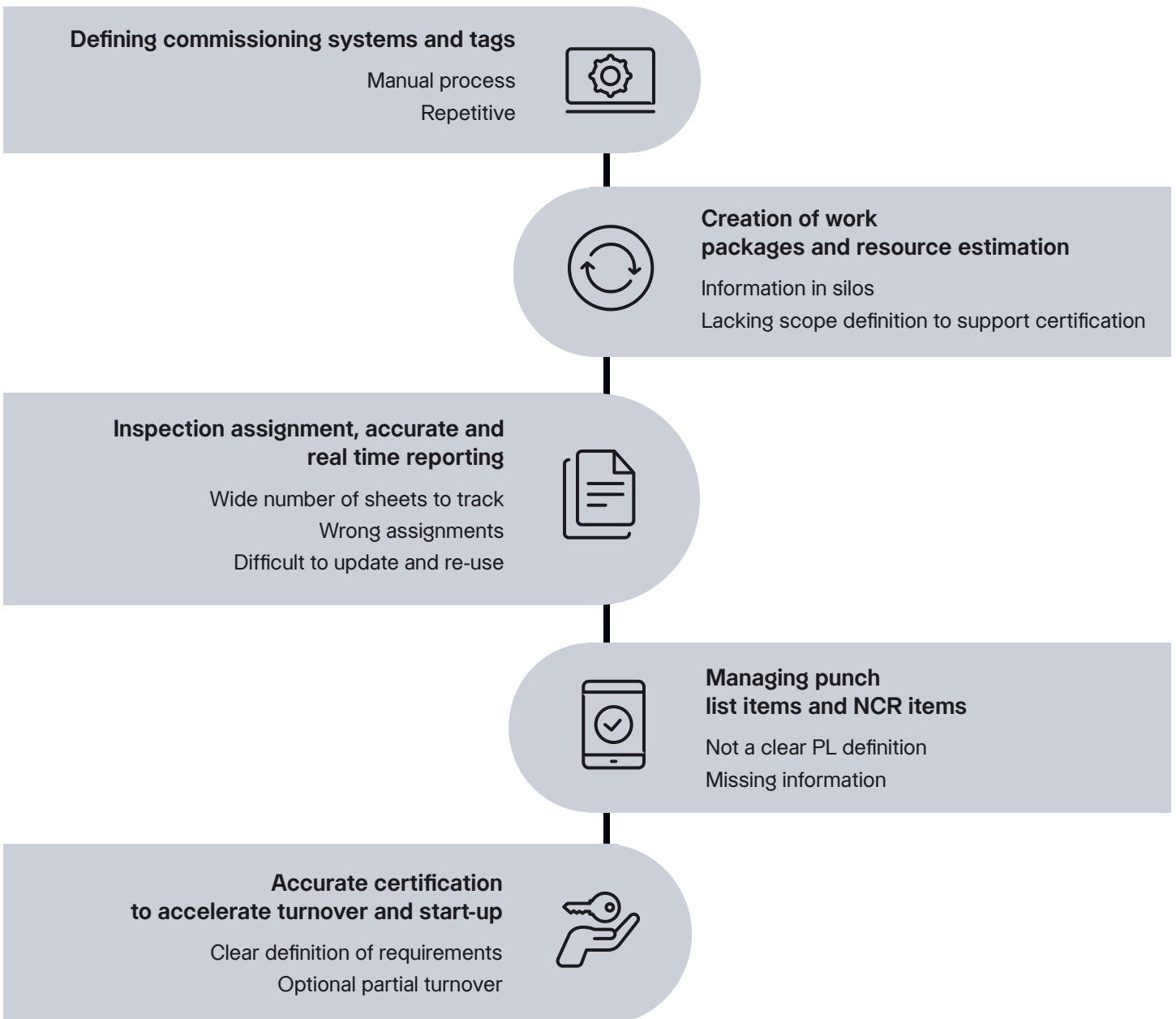
Risk mitigation



Accurate estimates



Optimized turnover



# How digital completions works

## Example of digital at work | Automatic check sheet assignment



### Mechanical (static)

- ✓ Foundation release
- ✓ Installation check
- ✓ Equipment
- ✓ Alignment
- ✓ Grouted
- ✓ Internals complete
- ✓ Box-up / final closure



### Mechanical (static)

- ✓ Base plate align
- ✓ Pre-align (pre-grout)
- ✓ Grouted
- ✓ Final alignment



### Electrical (Equipment)

- ✓ Equipment
- ✓ Inspection
- ✓ Installed
- ✓ Cable terminated
- ✓ Solo motor run



### Electrical (cable)

- ✓ Cable pulled
- ✓ Cable Megger-tested
- ✓ Cable termination
- ✓ HV/LV cable test
- ✓ Insulation test



### Instrument

- ✓ Pre-calibration
- ✓ Instrument
- ✓ Installed
- ✓ Terminated
- ✓ Pre-loop check
- ✓ Loop check



### Instrument (cable)

- ✓ Cable pulled
- ✓ Cable Megger-tested
- ✓ Cable termination
- ✓ Insulation test



### Piping

- ✓ Pre-test line check
- ✓ Pressure test (hydro etc.)
- ✓ Flushed
- ✓ Blowing / drying
- ✓ Reinstatement
- ✓ Chemical cleaned
- ✓ Flange torquing

**Asset:** 77-PI-0010  
**Discipline:** Instrumentation  
**Type:** Pressure Indicator (PI)  
**Stage:** Commissioning  
**System:** LC

## Automatic assignment based on business rules

Business rules based on asset type, phase, etc.

Tasks are created automatically, and it's possible to set recurrence for preservation activities, maintenance jobs, etc.

Digitized or paper execution



## Case study

### CSG upstream project, Australia (mega project)

Project Information	Challenges
<ul style="list-style-type: none"><li>• AUD \$25 to \$30 Billion</li><li>• Developing CSG fields in Surat and Bowen Basins in Queensland</li><li>• Construction of:<ul style="list-style-type: none"><li>- 530 km Pipeline</li><li>- Two water treatment facilities (WTFs)</li><li>- Seven gas processing facilities (GPFs) - total of 15 trains</li><li>- 1100 well sites</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Average of 15 employees for printing and compiling check sheets for technicians, scanning and uploading complete check sheets to database</li><li>• Generally five hours to manually compile an average commissioning dossier (over 180 pages)</li></ul>

Benefits after digitizing completions and commissioning
<ul style="list-style-type: none"><li>• Average savings of about 45% to 50% on resources and time</li><li>• Huge reduction in paper printing, printer ink cartridges and printer maintenance by implementing digital execution</li><li>• Reduction in human error</li><li>• Reduction in time and resources for Handover / Turnover MDR pack compilation</li><li>• Live progress updates</li><li>• Reduce re-work</li><li>• Trend analysis</li><li>• Information accessible and available anywhere</li></ul>

# Systems completion maturity matrix where your business?

## Systems completion maturity matrix

SC = Systems completion	Heroic effort (Level 1)	Organize (Level 2)	Control (Level 3)	Optimize (Level 4)	Best practices (Level 5)
<b>Management approach</b>	Hands-off approach to what checks is used in mechanical completions  'The EPC knows best ...'	Project and operational team (O, M & R) involvement in defining check list content	3D model/ dashboard used to track status  Requirement to use 4D information to optimize completion progress	KPIs tracked to improve processes and reduce the overall schedule in a sustainable manner	Project personnel transition into operations for that facility using AIM content from day one
<b>Work process</b>	Little or no S.C. methodology in place  Leaving it up to the EPC...	Client defines the check documentation  Data/docs reused for commissioning	Automated creation of check documentation and work packages  P6 actively used	Mobile used to optimize the overall work process	Combined engineering and operations content used in the decision-making process
<b>Technology</b>	No deliverables defined, client leaves it to the EPC to provide the paper mechanical completions dossier	Data centric design tools used to define data and work packages in support of S.C.	3D model and P&IDs used for status visualization  P6 integration to optimize sequencing	Mobile access to S.C. support information	Engineering and operations content focused on AIM-driven S.C.s
<b>Data and documents</b>	Paper deliverables (Dump truck approach/ Wall of Books)  Paper mechanical completions dossier	Requirement to capture all S.C. documentation electronically	All information in an AIM system and available three months before first mechanical completion event	Use of 'Briefcase' to package up support information  All documents available via mobile	Data flows become more important than documents
<b>Technical support</b>	Little or no support team in place  Everything left to EPC	Project I.M. team captures data/ content on project to support system completions	A Central Information Management Team manages data/ content for S.C.	KPIs actively tracked to improve processes and reduce the overall schedule	S.C. work processes embedded in the culture  Can't function without it
<b>Culture</b>	Holding onto old work process, not taking advantage of newer technology	Embracing newer technology but still thinking in a document-centric world	Utilizing AIM data/content for additional work process	Leveraging KPIs to improve what and when to capture AIM data/content	AIM embedded in the culture  Can't function without AIM content

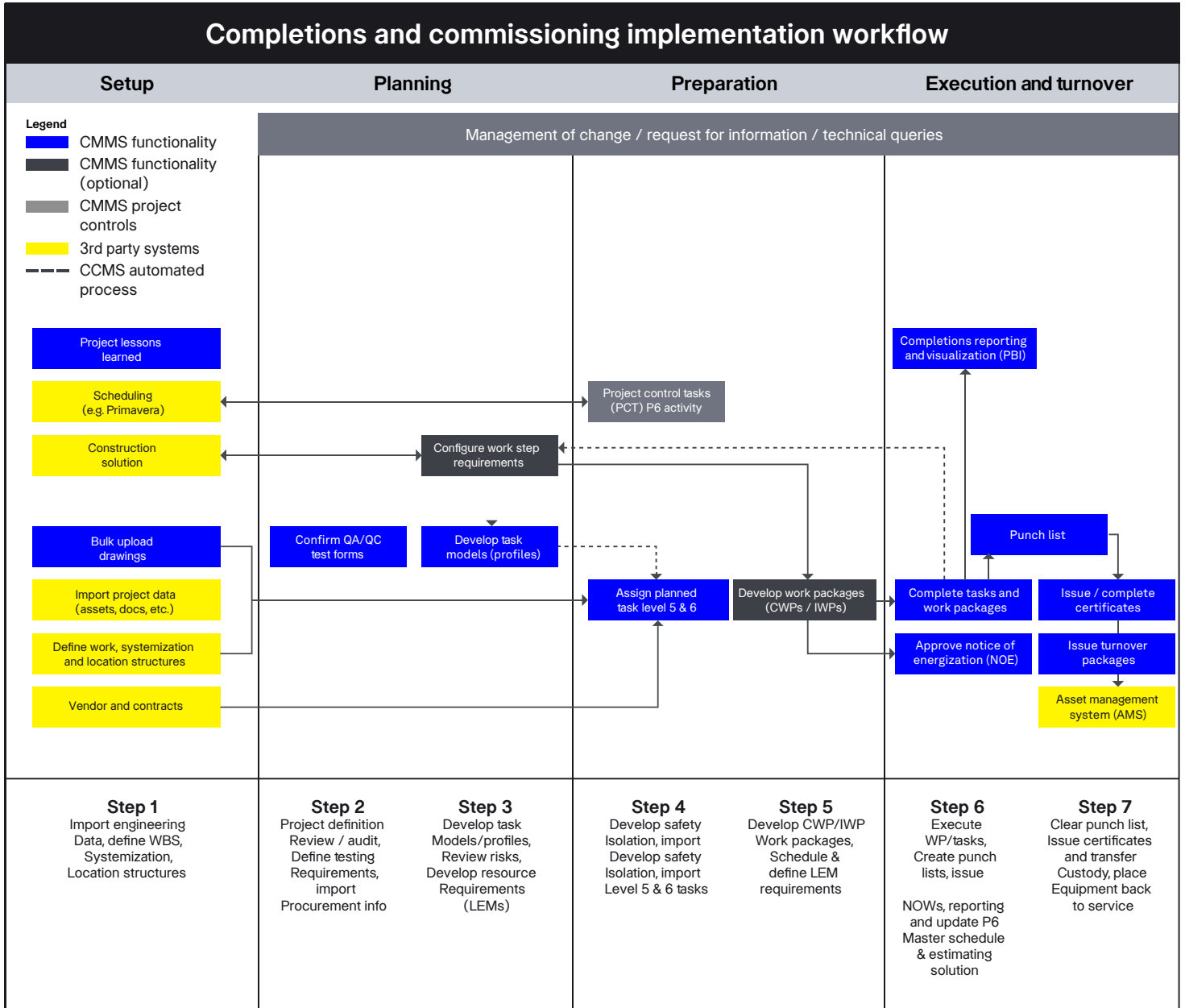
# Data and document maturity matrix where is your business?

## Data and document handover for operational readiness

AIM = Asset Information Management	Heroic effort (Level 1)	Organize (Level 2)	Control (Level 3)	Optimize (Level 4)	Best practices (Level 5)
<b>Management approach</b>	Hands-off approach to what data/content is handed over by the EPC or supplier	Operational team (O, M & R) involvement in handover requirements	3D model/ dasRequirement to capture all AIM data/content in an organized and auditable format	KPIs tracked to improve processes and mitigate risks and exposure	Understands "total cost of ownership" and "cost of un-reliability"  Design reuse a requirement
<b>Work process</b>	Little or no AIM methodology in place, lack of mature work processes	Gathering and cataloging AIM Information for use by projects & operations	AIM Strategy in place including MoC and audit trail	Actively tracking KPIs, looking to improve processes and reduce costs	Combined engineering and operations content used in the decision-making process
<b>Technology</b>	No deliverables defined, client leaves it to the EPC or supplier provide the handover	AIM and data centric design tools used to manage and maintain content	Data reused to load operational systems	MoC keeps the ops systems updated	Engineering and operations content focused on AIM  Operational systems up-to-date
<b>Data and documents</b>	Paper/CAD deliverables (Dump truck approach/ Wall of Books )	Data-centric tools defined for project execution including form, format, etc.	AIM system in place with QA/QC, MoC, PSM with regulatory audit trail	Data/content used to enhance engineering and operational decision support	Data flows become more important than documents
<b>Technical support</b>	Little or no support team in place. Users survive via tribal knowledge	I.M. team captures data/content on the project to support the AIM strategy	A Central Information Management Team manages data/ content for AIM  MoC in place	KPIs and demonstrable audit trail  Support team shares data with all operational systems	Center of Excellence sharing developed best practices across all business units
<b>Culture</b>	Holding onto old work process, not taking advantage of newer technology	Embracing newer technology but still thinking in a document-centric world	Utilizing AIM data/content for additional work process	Leveraging KPIs to improve what and when to capture AIM data/content	AIM embedded in the culture  Can't function without AIM content

# Best practices implementation guide

## Implementation | Best practice workflow



# Best practices implementation guide

Duration: 15 working days

## Pre-setup

- Import load sheet examples
- Test form examples
- Systematization import examples

## Setup

- Create work breakdown structures (phase, stage)
- Import systemization
- Import physical locations
- Create disciplines & import asset types
- Import document type
- Import equipment / asset/ tag list
- Create loop types & import control loops list
- Import or batch edit tags to subsystems (unassigned tags)
- Import document forms list (check sheets, ITRs, certificates, etc.)
- Input, embed mail merger fields to Fforms (reg native MS Doc files)
- Bulk import forms via OnSite Completions scan import tool
- Create / import task models (link to forms)
- Manually create task model steps
- Define & create punch list types and categories
- Define punch list process workflow
- Define & configure turnover packages (TOP) philosophy & types

## Planning

- Finalization of the test forms / check sheets profile index
- Develop task model profiles

## Preparation

- Assign / create task from task model module (by asset & loop types)
- Create job cards using creation wizards
- Create TOPs using TOP creation wizard



### Important

1. Pre-setup can occur earlier
2. Based on 30-50 check sheets
3. Data received will not be validated
4. Setting up users, roles and proles are not included in the 15 days period
5. Clients can provide completions & commissioning execution plan
6. This general implementation time might vary according to the specific project requirements

## About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

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