



# ATA E-BUSINESS FORUM and S1000D User Forum

June 20-22, 2022 | Hyatt Regency Lake Washington | Renton, Washington



# Bridging Aircraft Configuration and Flight Operations

***Alex Masycheff, Intuillion, CEO***

# Why Automation?



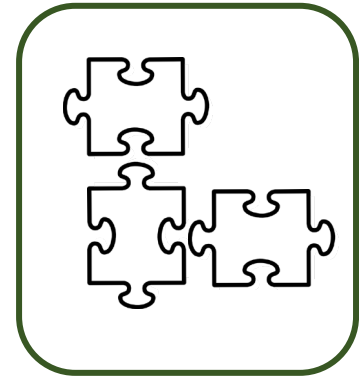
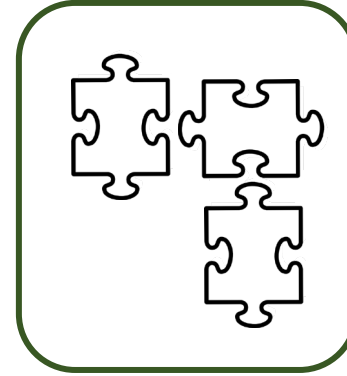
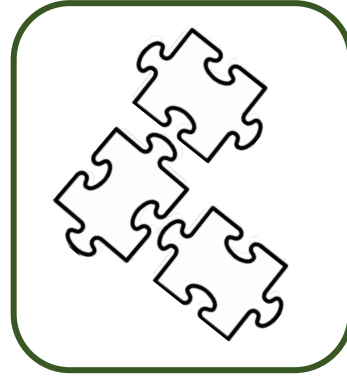
- Multiple aircraft models
- Multiple modifications of each aircraft model
- Each airline receives a custom configuration
- Different modifications within the fleet

# Why Automation?



- Flight ops must be tailored to the specific aircraft.
- The amount of modifications grows.
- Operators and authorities need different content.
- The cost of human error is too high.
- Aircraft configuration data exists anyway.

# What to Automate?



*How to automate the process of documentation assembly based on the aircraft configuration?*

**Partial Answer:  
Applicability in  
ATA2300**

**A way to specify the  
configuration the DM is  
applicable for**



MSN: 12345-12355

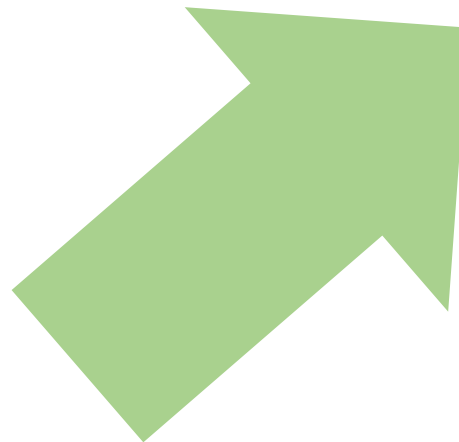


((Model M3) AND (Navigation software 5.0)) OR  
((Model M4) AND (Navigation software 6.0))



(Model M1 or Model M2)  
AND (Avionics software 10.3  
OR Avionics software 10.2)

# Applicability- Based Filtering



*“Create a publication for  
the MSN 12345”*



MSN: 12345-12355

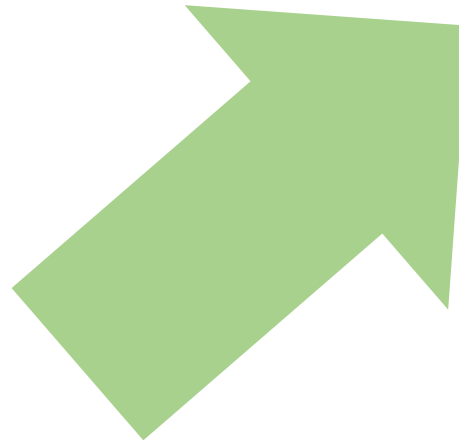


((Model M3) AND (Navigation  
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software 6.0))



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# Information about MSN Configuration Required



MSN: 12345-12355



((Model M3) AND (Navigation software 5.0)) OR  
((Model M4) AND (Navigation software 6.0))

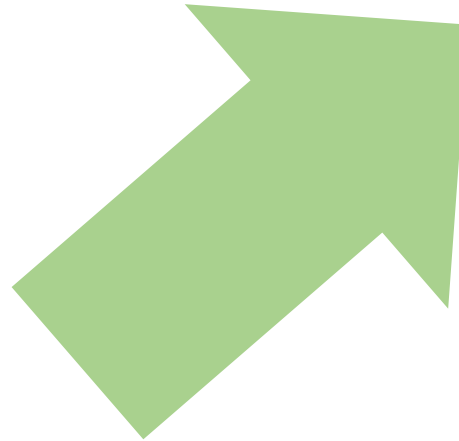


(Model M1 or Model M2)  
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OR Avionics software 10.2)

*“Create a publication for  
the MSN 12345”*

**MSN 12345: Model? Avionics software? Modifications?**

# Information about MSN Configuration Required



MSN: 12345-12355



MSN 98765

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((Model M4) AND (Navigation software 6.0))

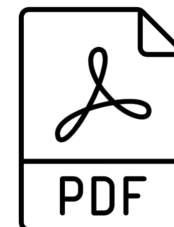


MSN 12345

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AND (Avionics software 10.3  
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*“Create a publication for the MSN 12345”*

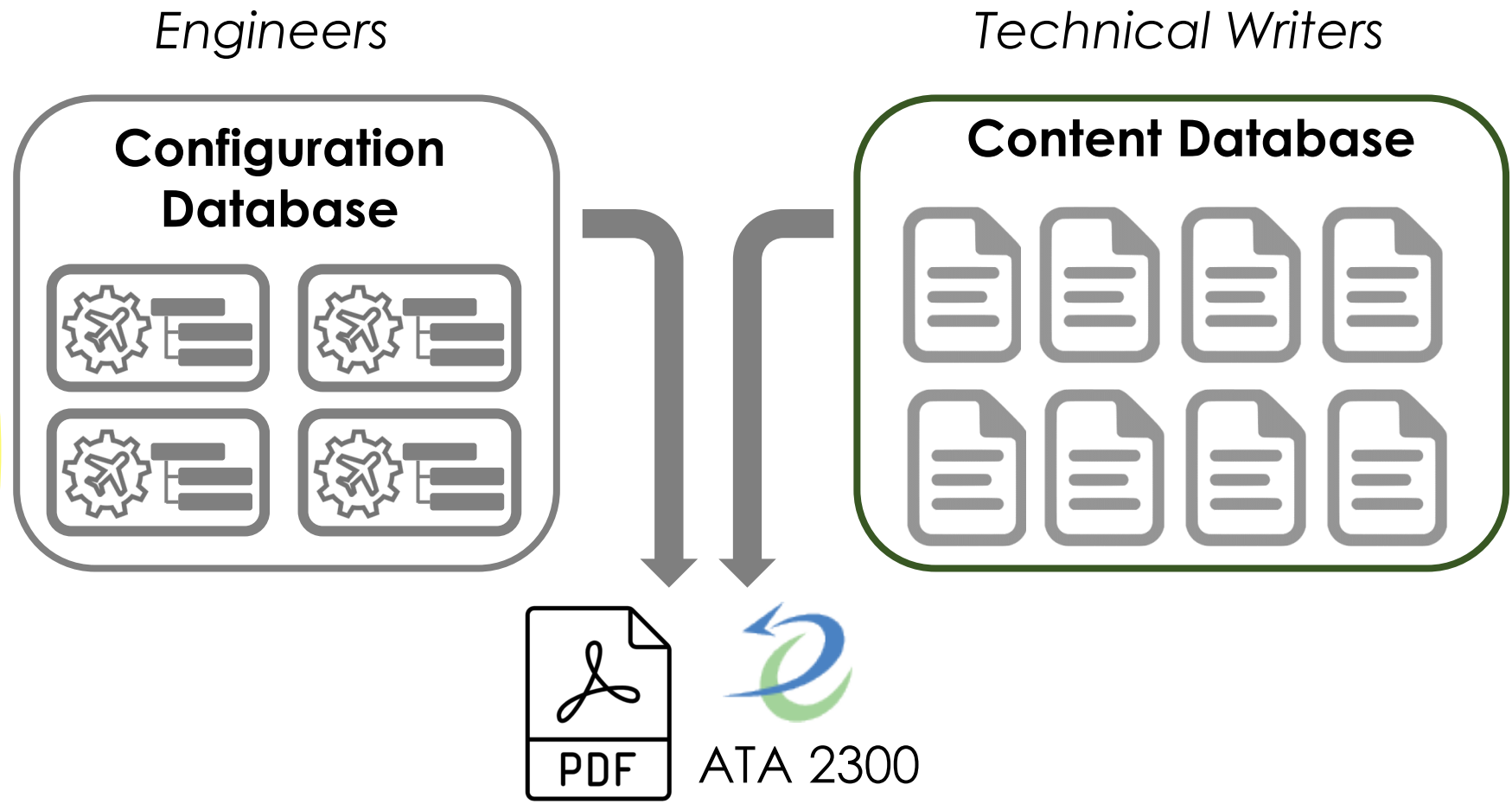


ATA 2300

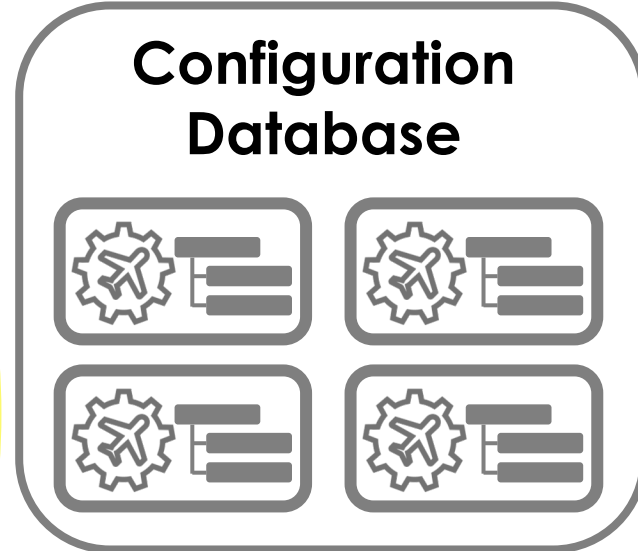
**MSN 12345: Model=M1, Avionics software=10.3**



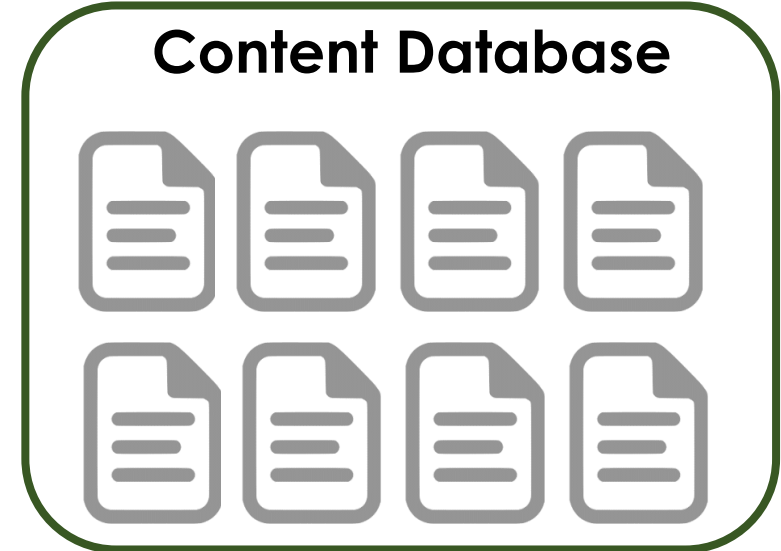
**Configuration Database + Content Database**



# Requirements to Configuration Database

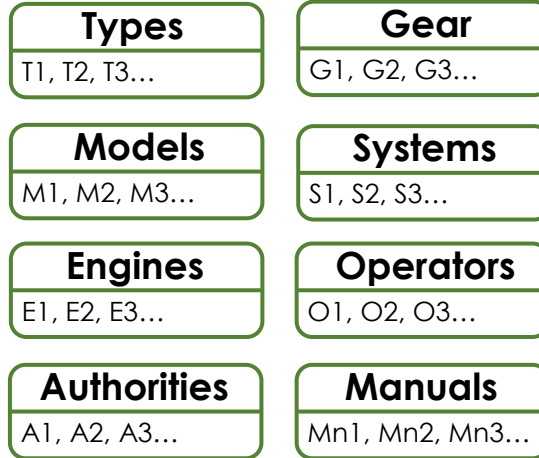


- *Model, equipment, operator, authority, etc.*
- *Modifications, service bulletins*

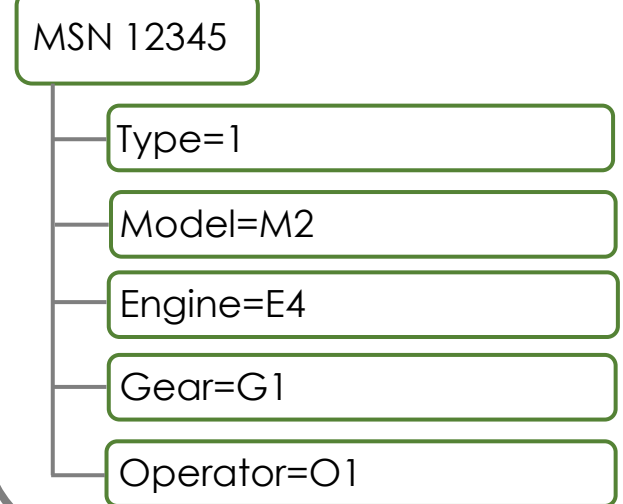


# Configuration Database Components

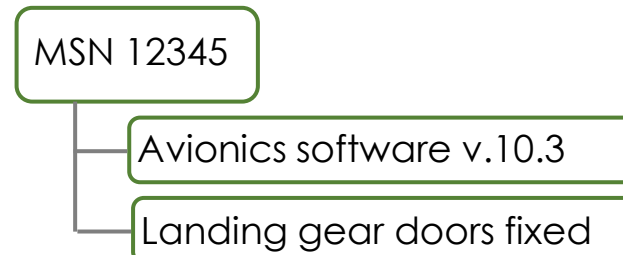
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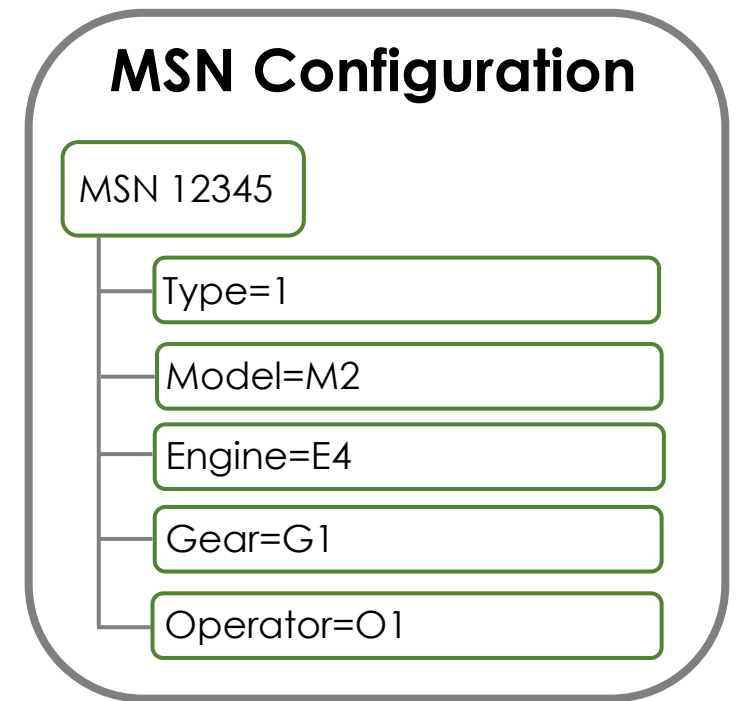
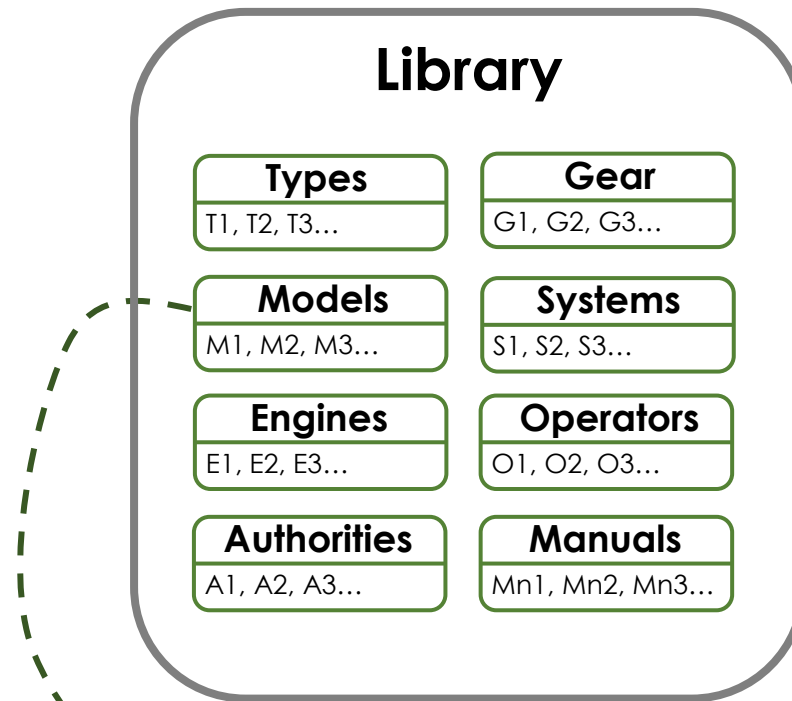
## MSN Configuration



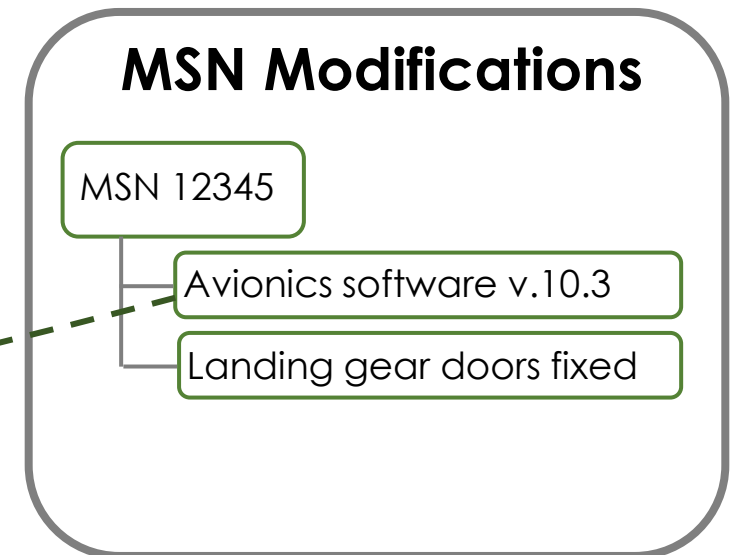
## MSN Modifications



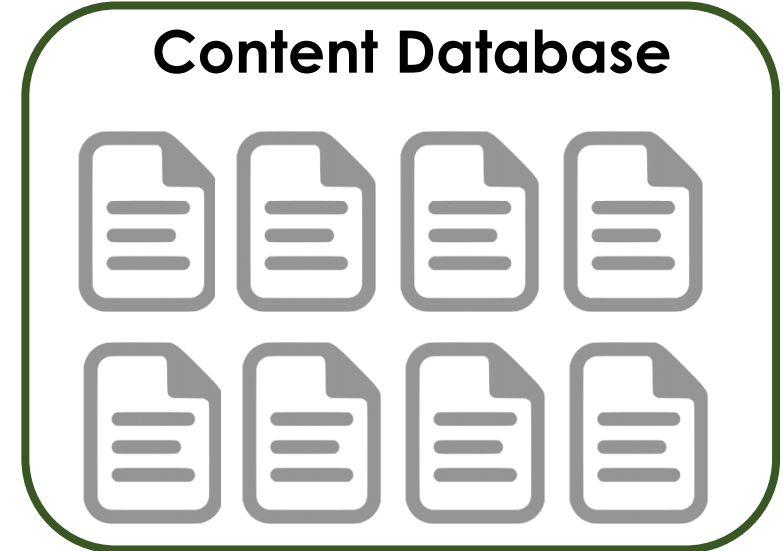
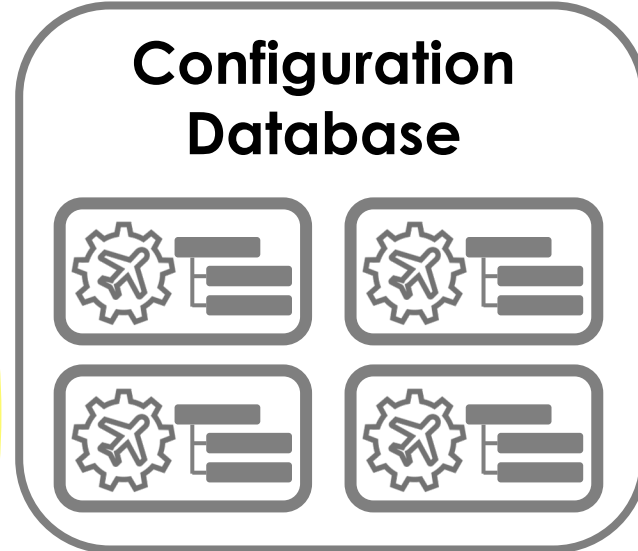
Applicability  
Statements  
Constructed  
Based on  
Configuration  
Database



(Model M1 or Model M2)  
AND (Avionics software 10.3  
OR Avionics software 10.2)



# Requirements to Content

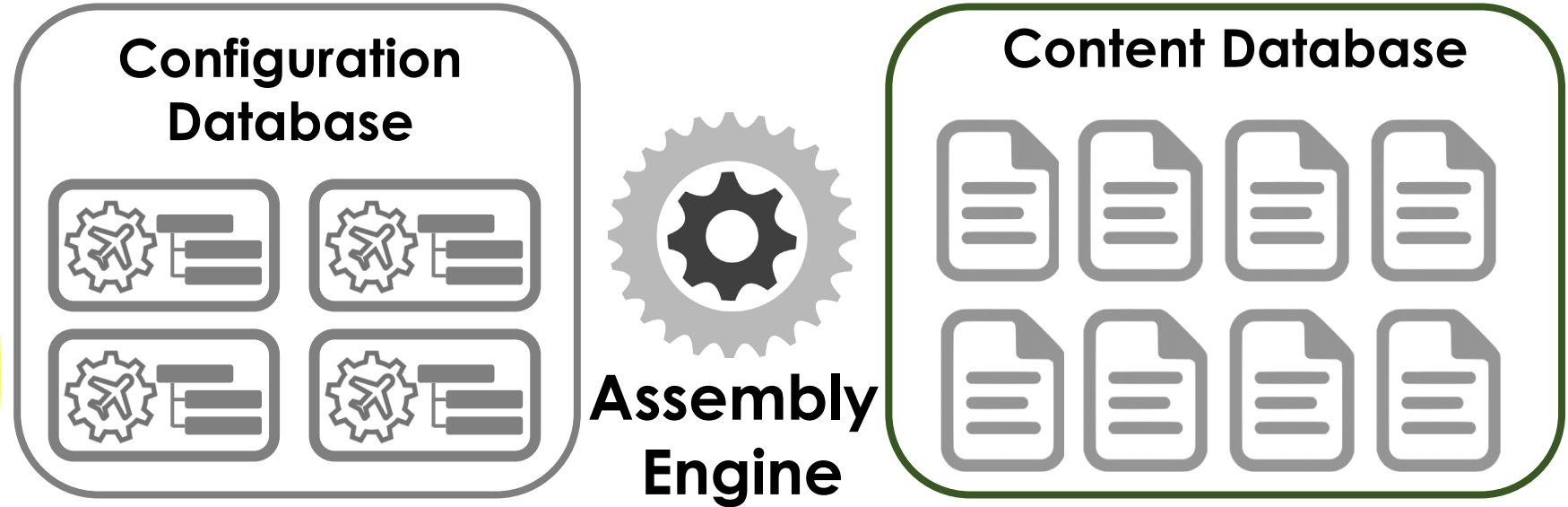


- *Granular*
- *Structured*
- *Enriched with applicability statements & metadata*

# Requirements to Content

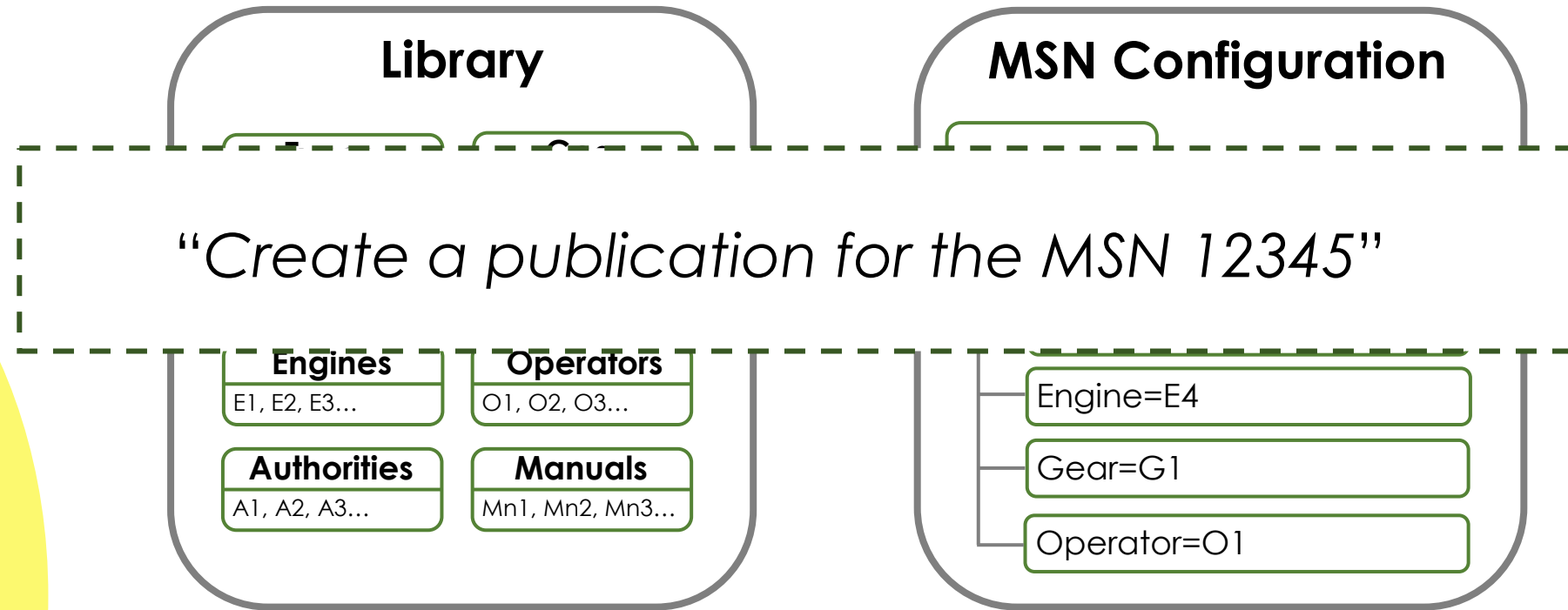
- Granular:
  - Reuse
  - Applicability defined on a granular level
- Structured:
  - Automation requires the content to be both human- and machine readable
  - Format-independent
- Enriched with applicability statements & metadata:
  - Filtering
  - Identifying relationships with configurations

**Assembly Engine:  
Bridge between  
Configuration  
Database and  
Content**



- Find applicable DMs by the MSN*
- Find undocumented modifications*
- Put the DMs together*
- Generate the output (ATA2300, PDF, etc.)*

# Finding Applicable DMs by MSN



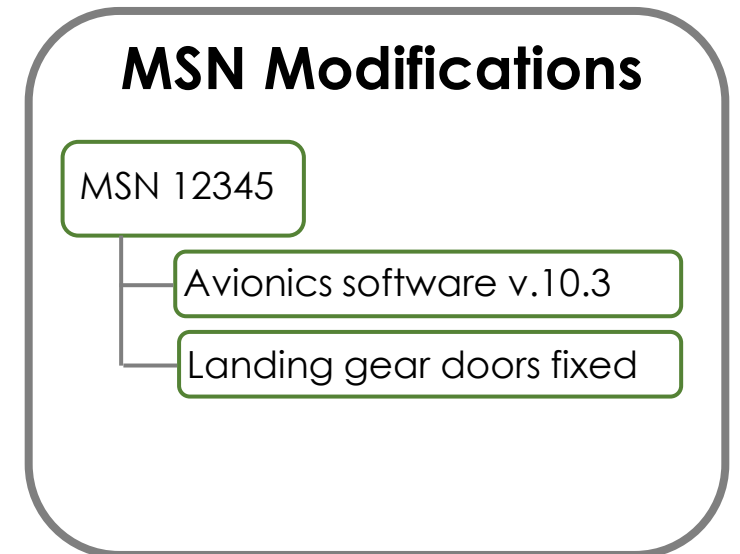
MSN: 12345-12355



((Model M3) AND (Navigation software 5.0)) OR  
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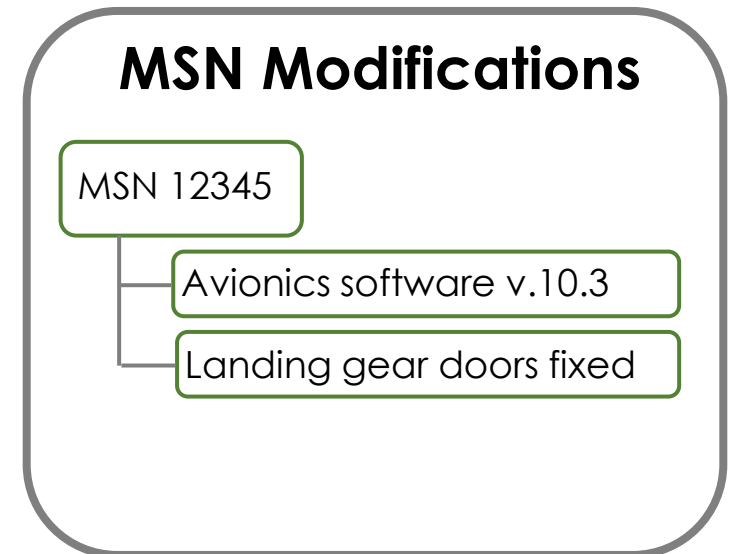
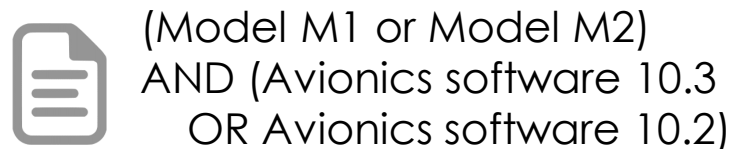
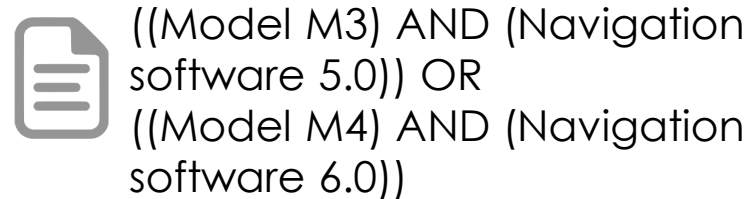
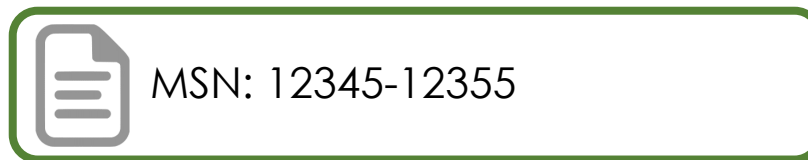
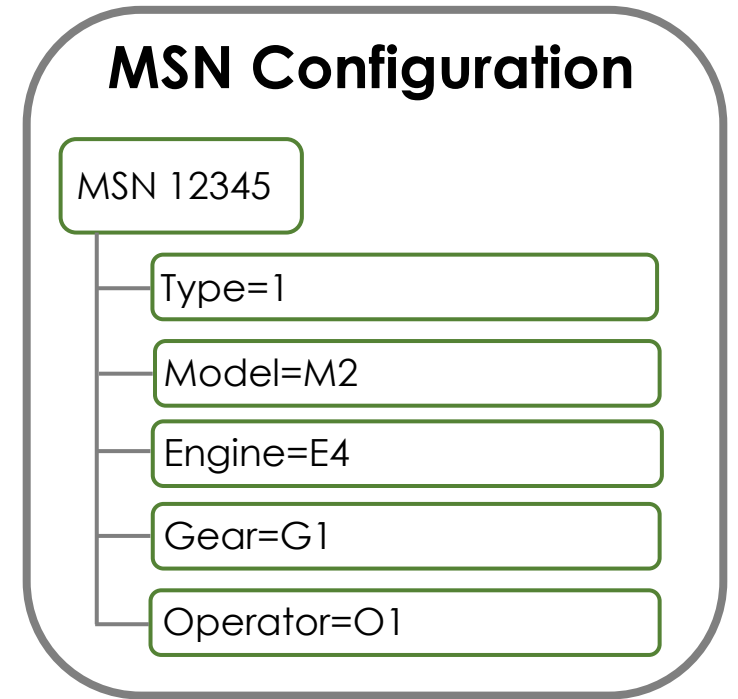
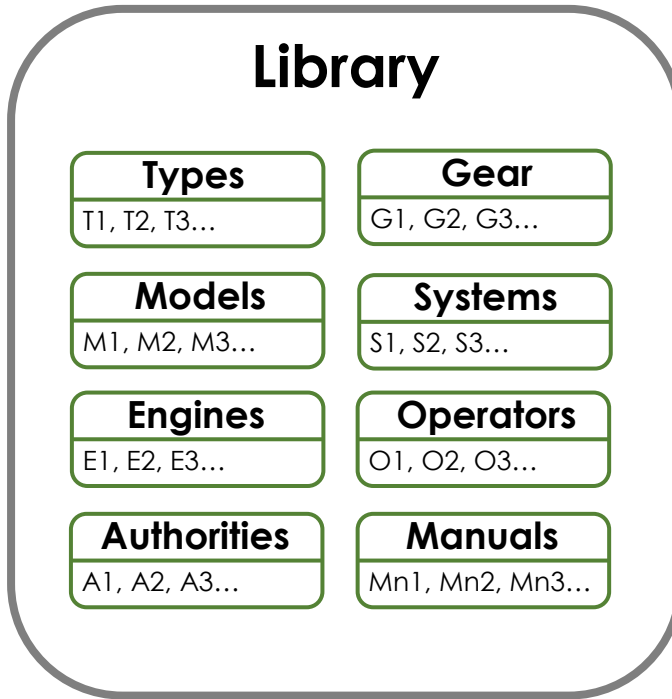


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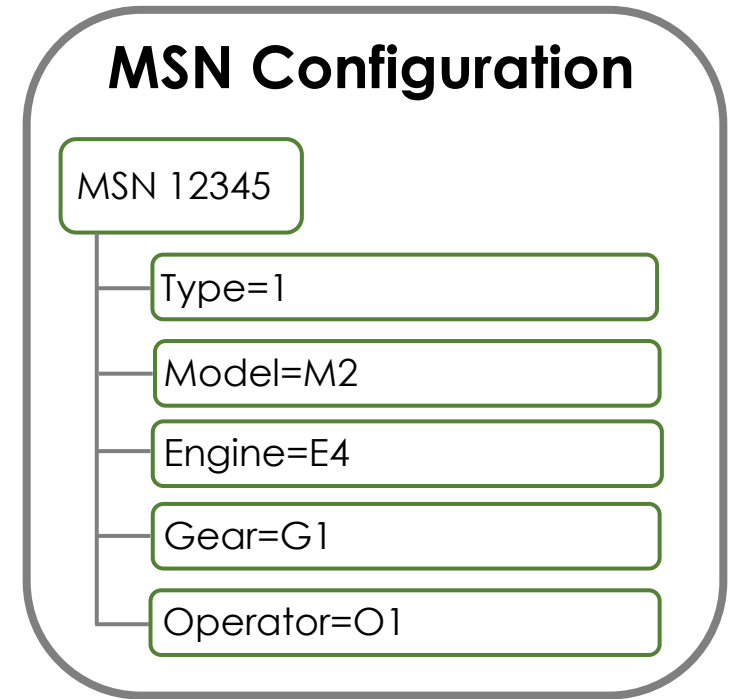
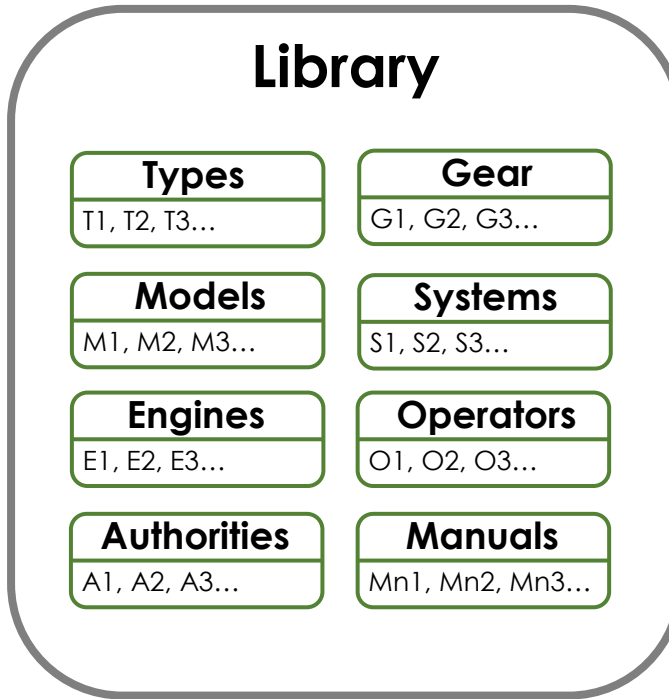




# Finding Applicable DMs by MSN



# Finding Applicable DMs by MSN



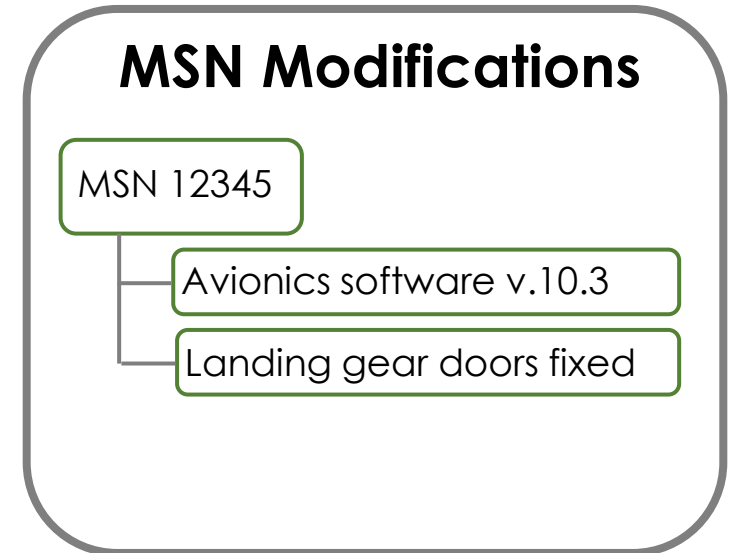
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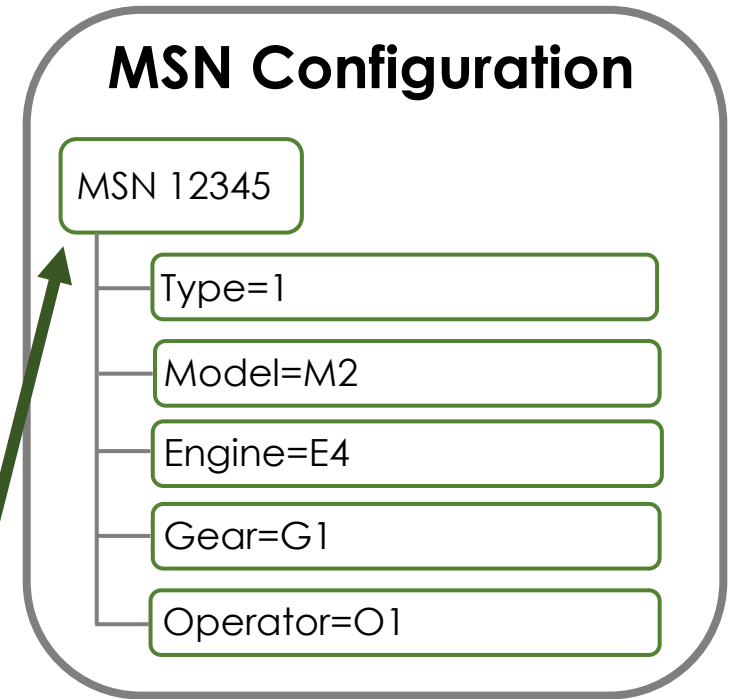
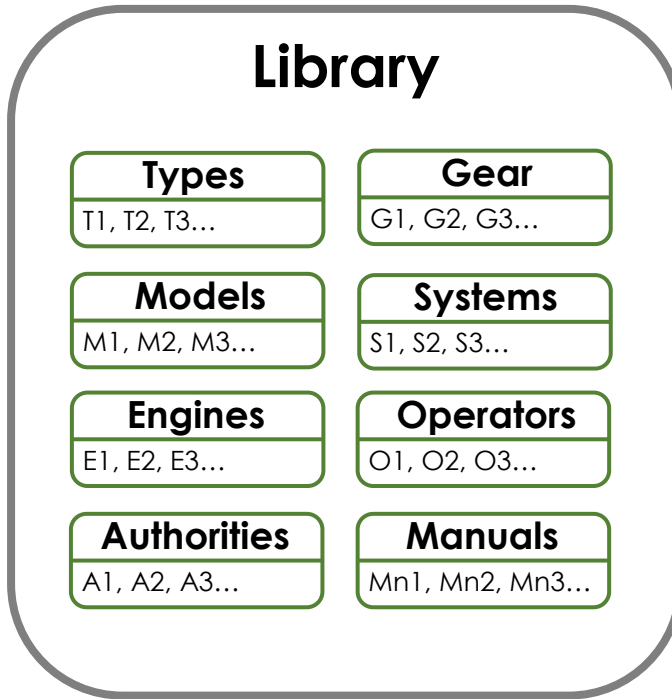
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# Finding Applicable DMs by MSN



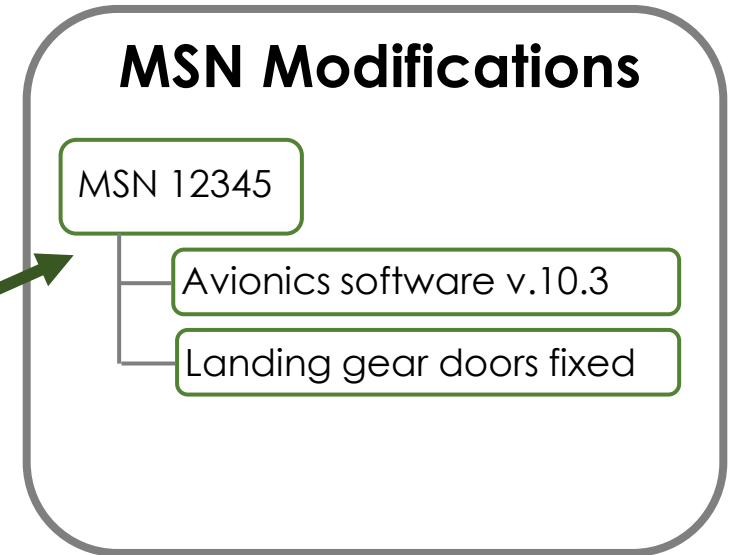
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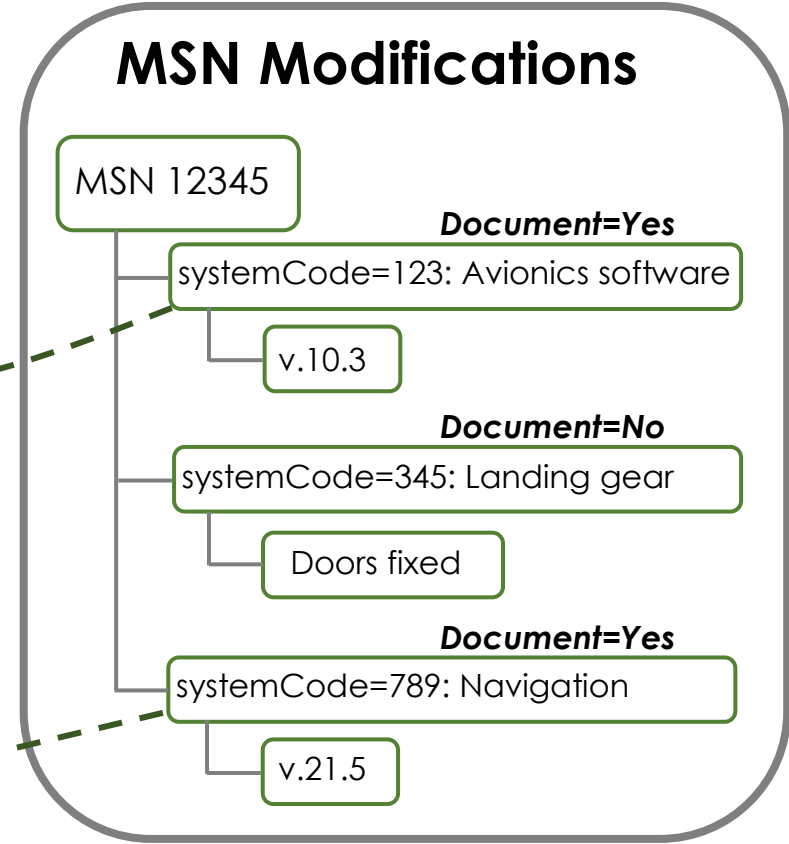


Are All  
Modifications  
Documented?

DM Identification:



systemCode=123

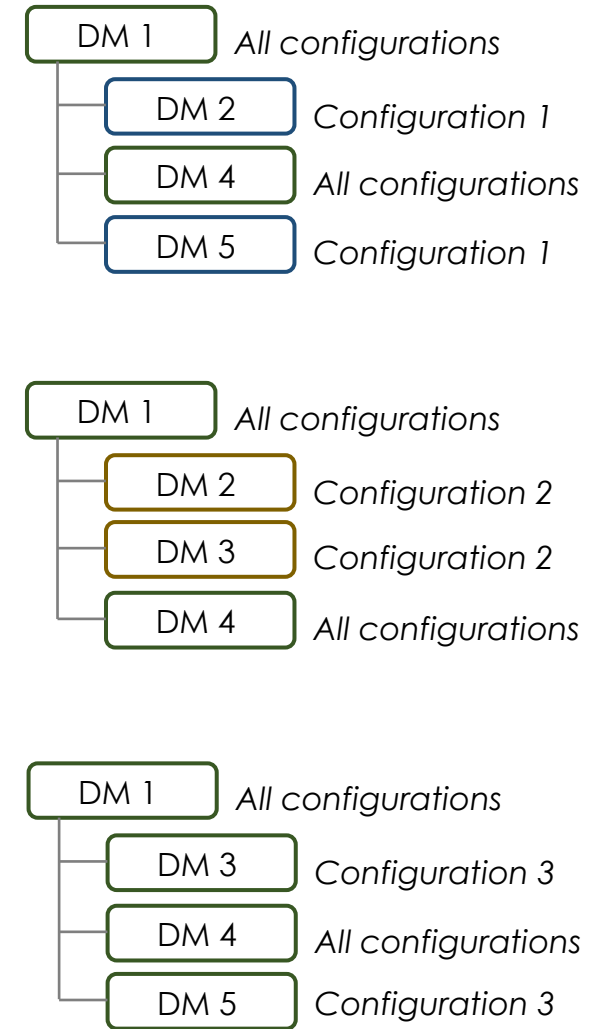
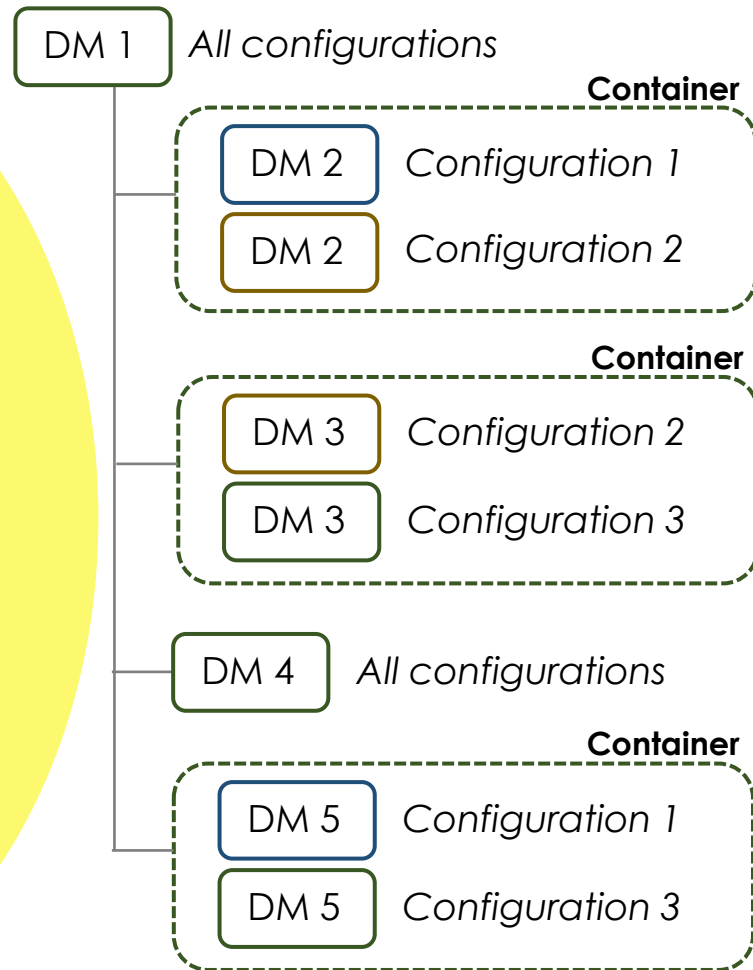


# Putting Applicable DMs Together

- Top-down approach:
  - Master PM, includes everything, DMs irrelevant for a particular aircraft are filtered out, created per document type
- Bottom-up approach:
  - Individual DMs assembled automatically into a PM on-demand

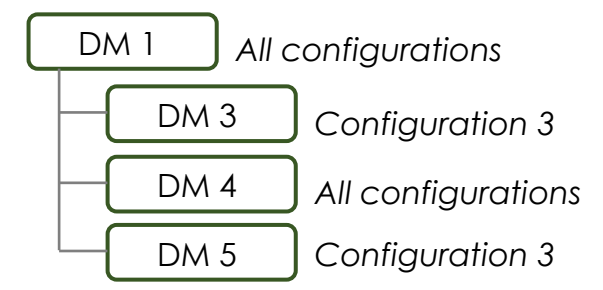
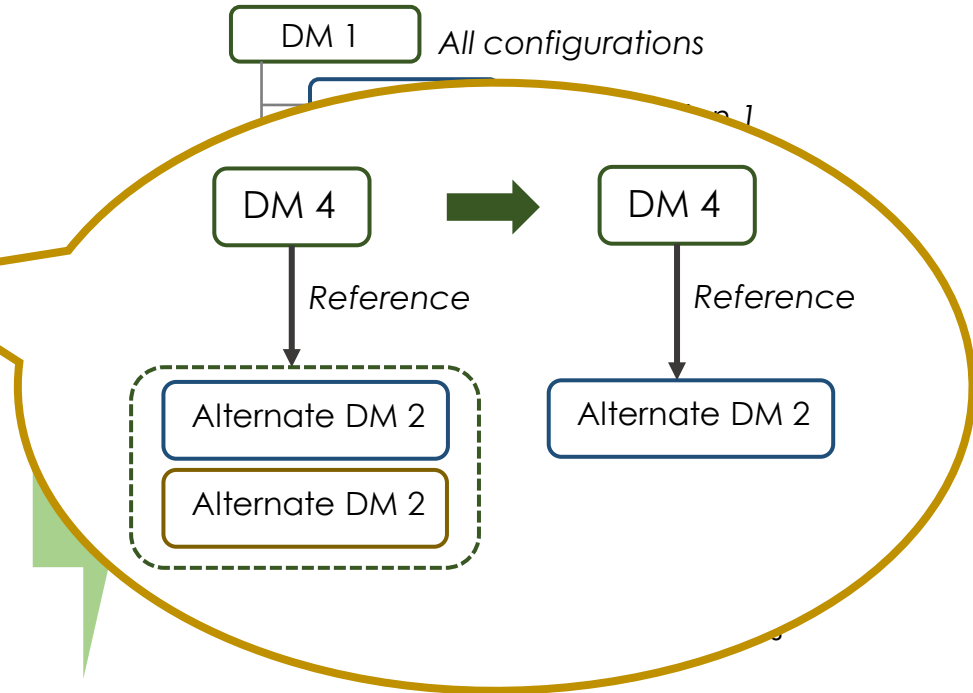
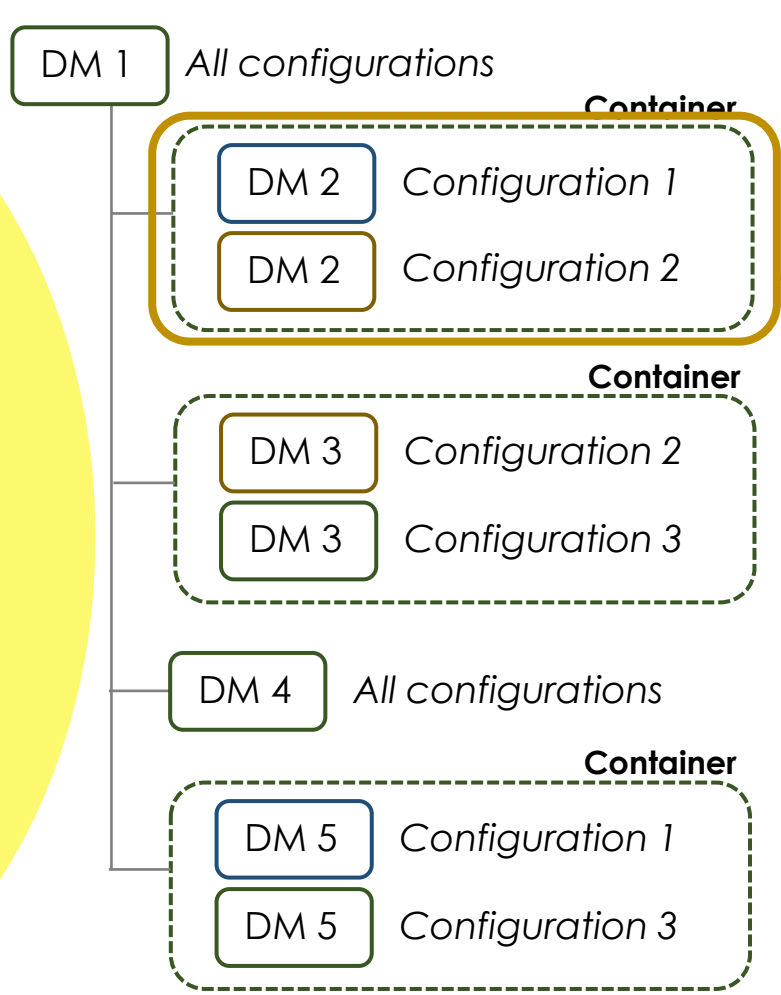
# Generic Master PM (per manual)

# MSN-Specific Publications



# Generic Master PM (per manual)

# MSN-Specific Publications



## When to Use Top-Down Approach

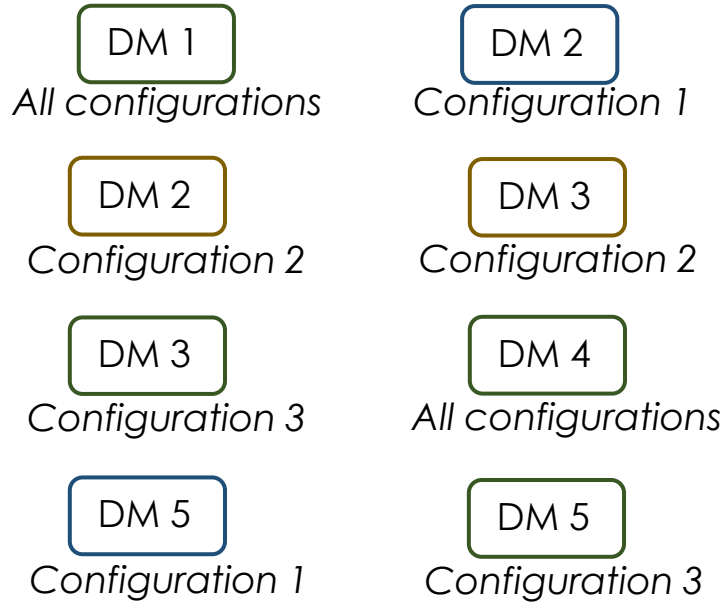
- Existing program with an existing content:
  - Documentation structure and content are in place
  - Only minor changes in the structure
- If a modification requires updating multiple DMs across the PM, but not adding new DMs



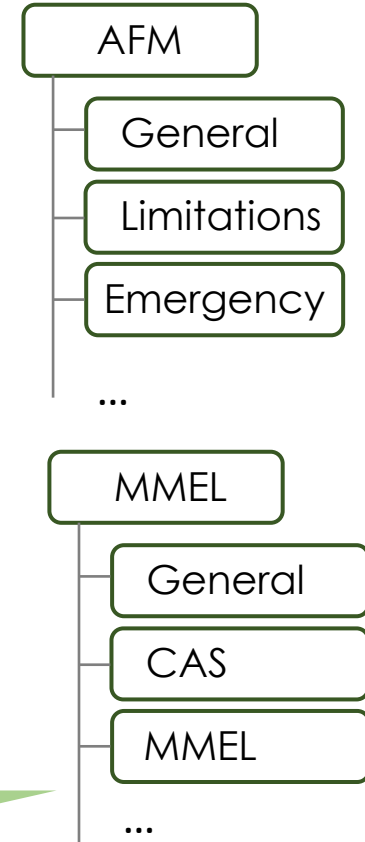


# Bottom-Up Approach

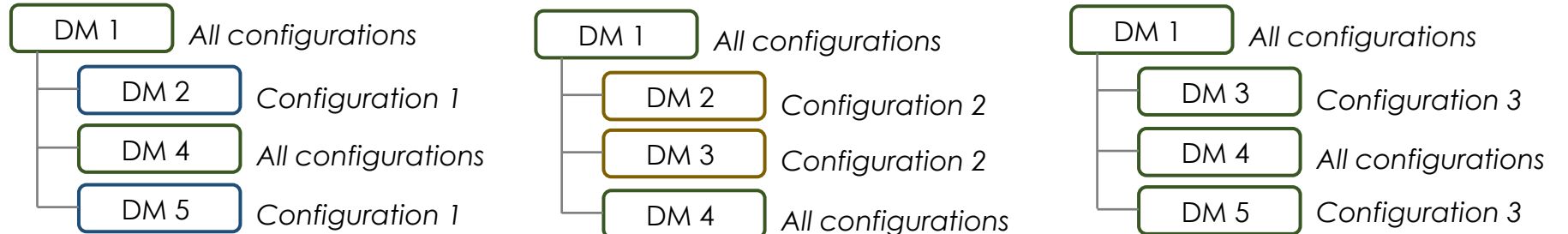
## Content



## Structured Templates



## MSN-Specific Publications

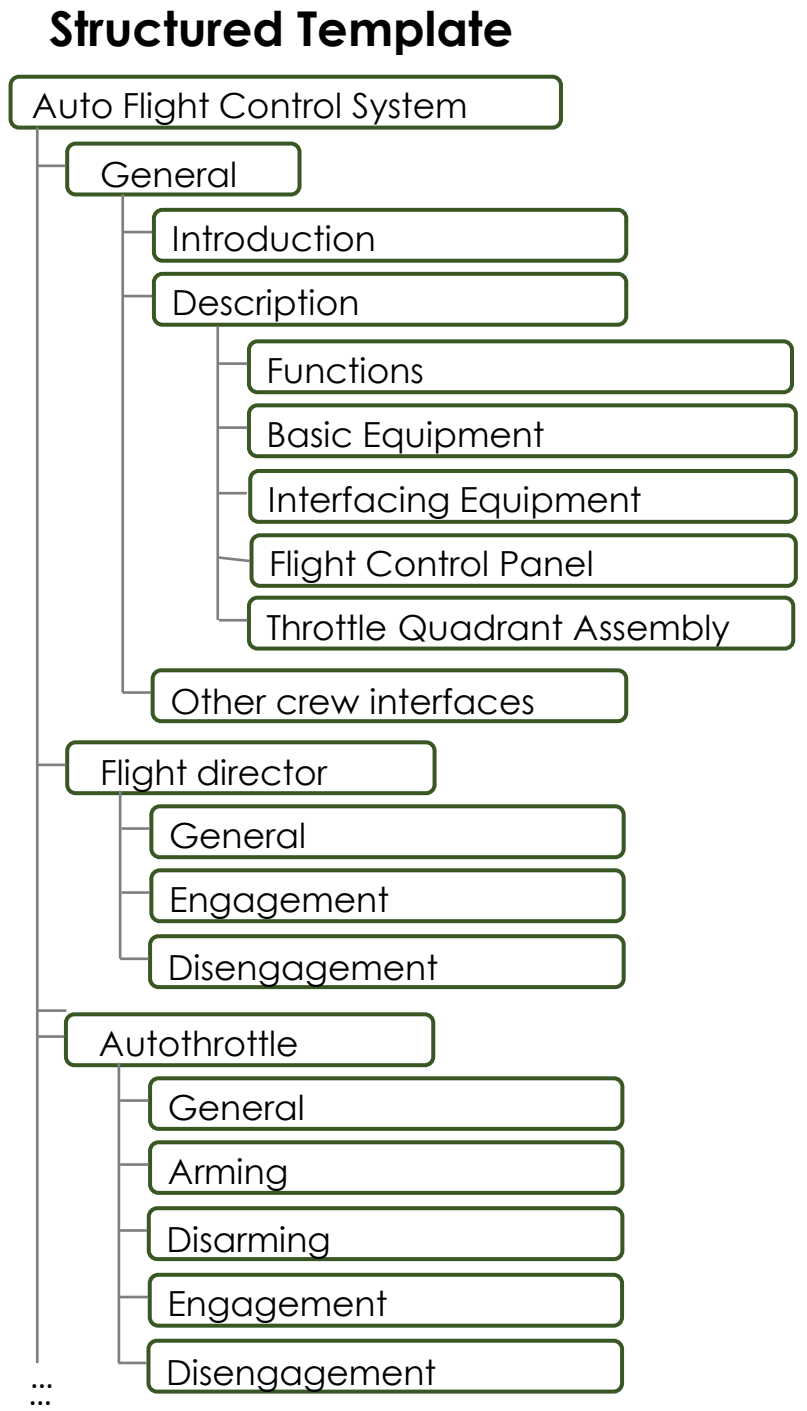
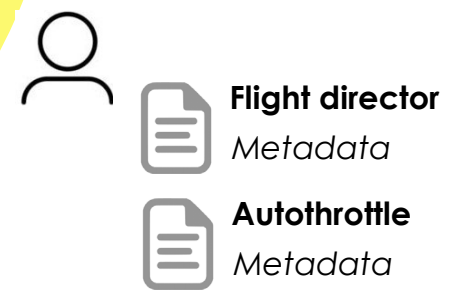
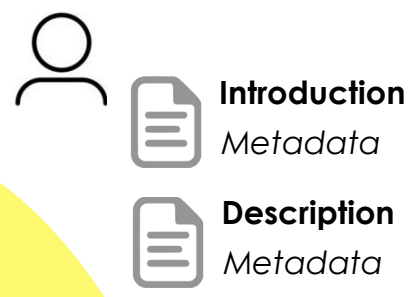


A large yellow shape on the left side of the slide, consisting of a vertical rectangle on the left and a semi-circle on the right.

## When to Use Bottom-Up Approach

- New program:
  - Documentation structure is in place, but no content yet
  - Assembling DMs into a PM manually is an error-prone process
- Multiple authors responsible for different parts of the manual
- If a modification requires adding multiple DMs across the PM -> consistency required

# When to Use Bottom-Up Approach



# Structured Template

Auto Flight Control System

Manual=FCOM  
Chapter=Auto flight control system  
Section=General



**Introduction**  
Metadata

**Description**  
Metadata



**Other crew interfaces**  
Metadata



**Flight director**  
Metadata

**Autothrottle**  
Metadata

Throttle Quadrant Assembly

Other crew interfaces

Flight director

General

Engagement

Disengagement

Autothrottle

General

Arming

Disarming






Engagement

Disengagement

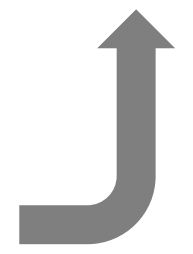
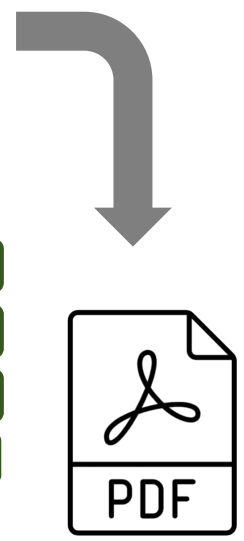
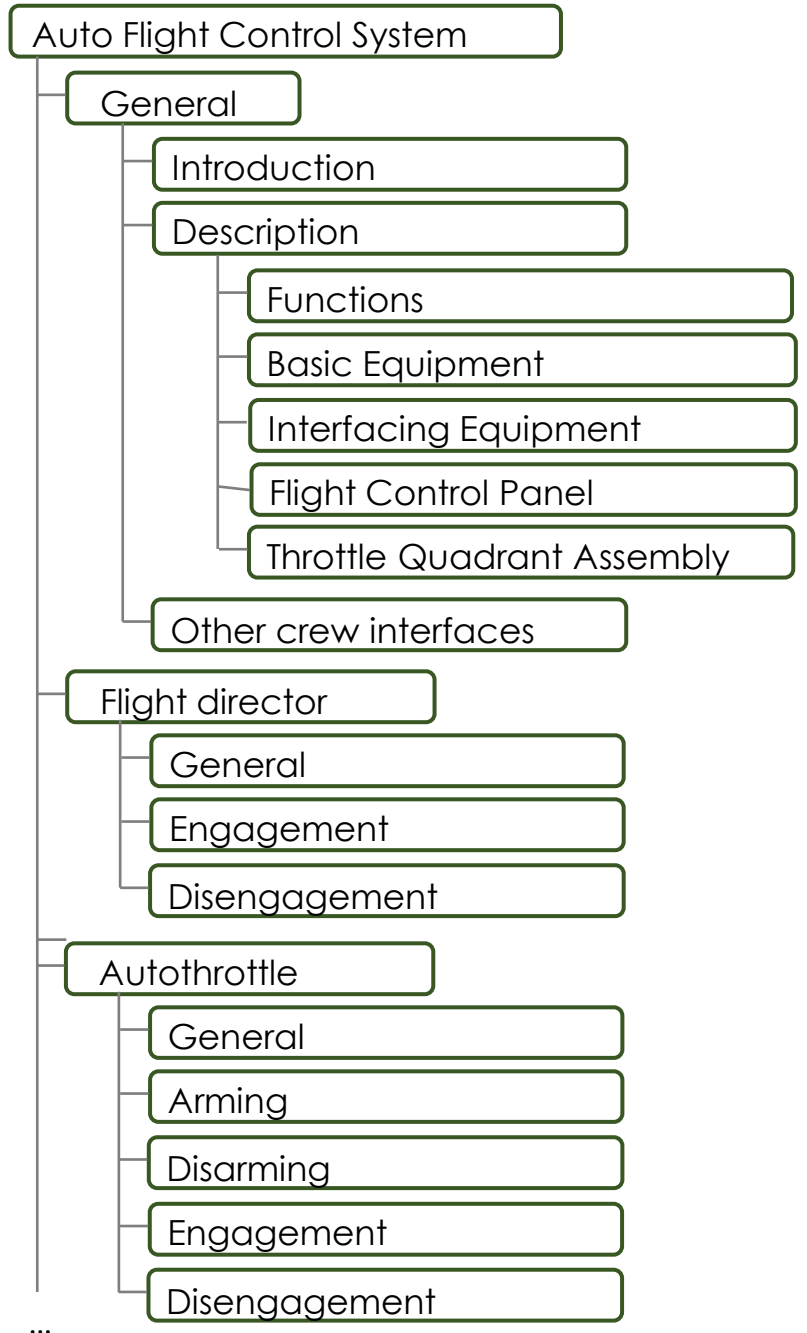
...

When to Use  
Bottom-Up  
Approach

# When to Use Bottom-Up Approach

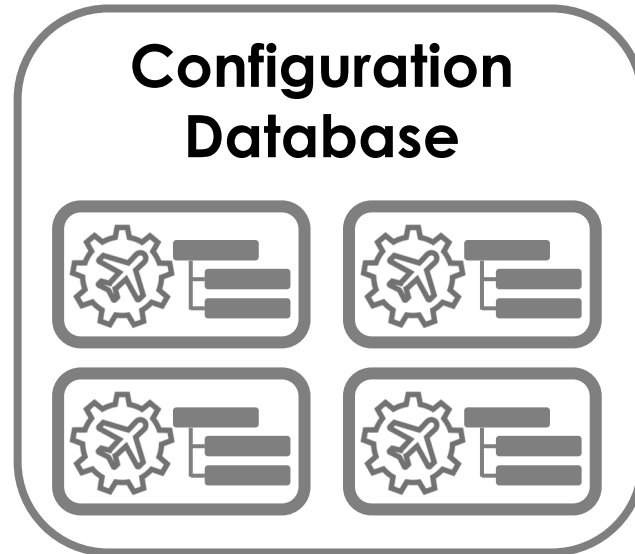
-  **Introduction**  
*Metadata*
-  **Description**  
*Metadata*
-  **Other crew interfaces**  
*Metadata*
-  **Flight director**  
*Metadata*
-  **Autothrottle**  
*Metadata*

## Structured Template

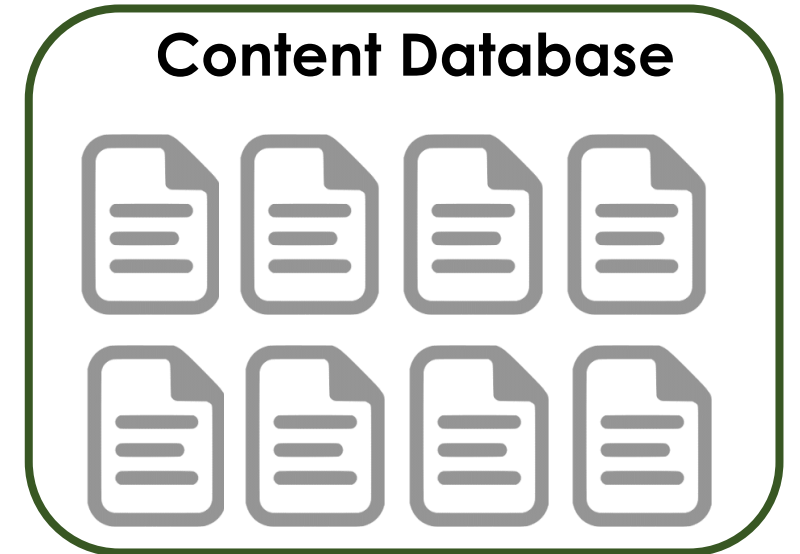


# Does Format Matter?

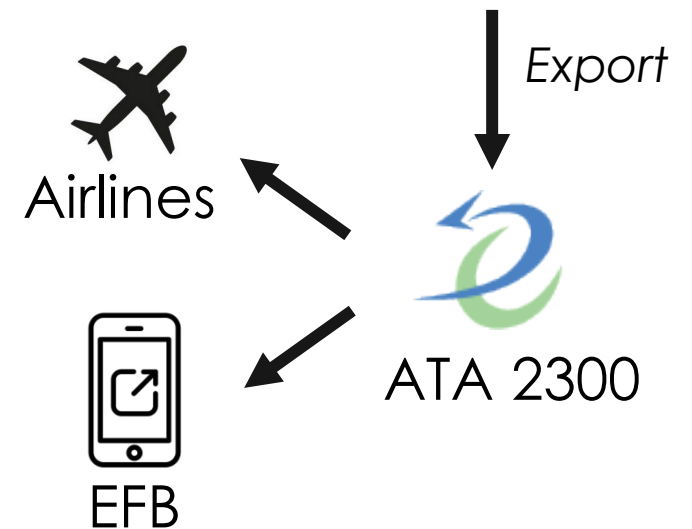
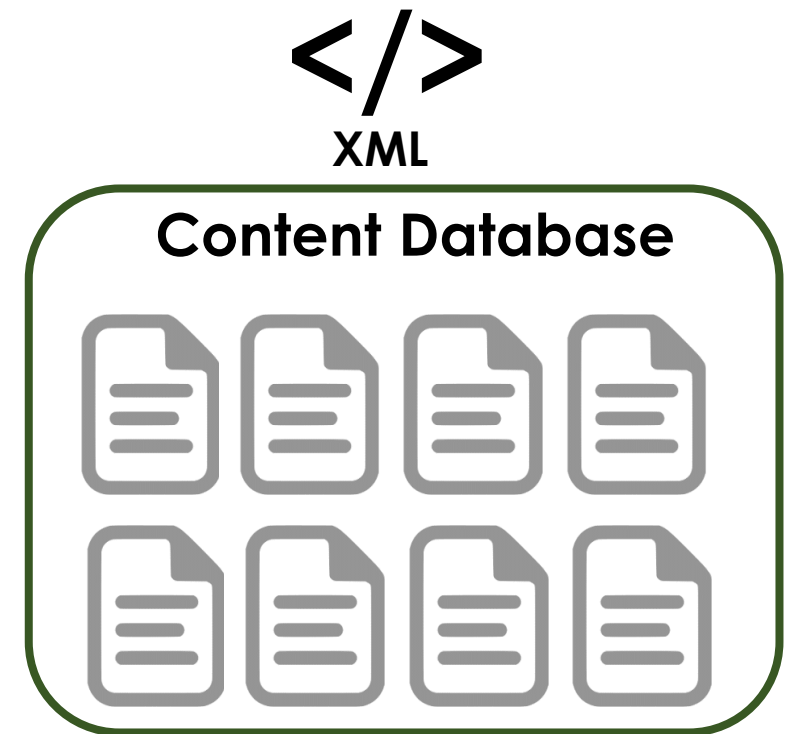
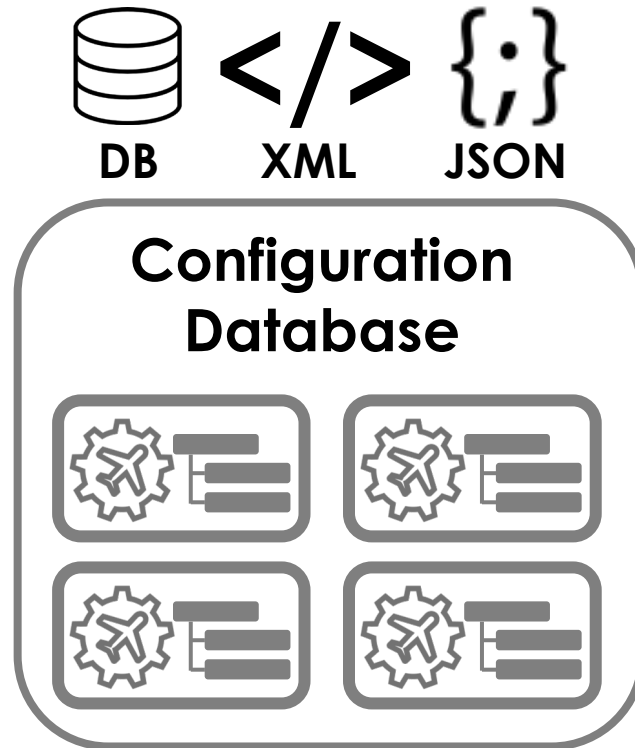
*Format?*



*Format?*



# Does Format Matter?



# Implementation Considerations

- Content standard:
  - Data-centric vs. document-centric
  - ATA2300 vs. proprietary formats
- Top-down vs. bottom-up approach
- The role of information architect is required
- Metadata model to reflect configuration
- Home-grown tools vs. commercial CMS



# Implementation Considerations

- Conversion stages:
  - Architectural
  - Technical
- Rewriting/restructuring might be required before the conversion
- Making conversion smoother:
  - Gradual conversion
  - Mixing converted and non-converted content in publications

# Contact Me



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Website: <http://www.intuillion.com>



LinkedIn: [DITAToo Community](#)