# Smartsheet

# Migrating to Smartsheet

## from Project Online

Complete Migration Guide

December 2024

**Smartsheet**

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# Chapter 1

# Migrating to Smartsheet

## 1.1 Migrating from Project Online to Smartsheet

If you're using Microsoft Project Online and evaluating migration options, this guide explains how to move your project data to Smartsheet. The migration process preserves your project structure, tasks, resources, and assignments while transitioning to a modern work management platform.

### 1.1.1 What This Tool Does

The migration tool: - Connects to your existing Project Online environment - Extracts all your project data including tasks, resources, and assignments - Converts the data to work in Smartsheet's structure - Creates organized workspaces in Smartsheet with your projects - Maintains all relationships between tasks, resources, and assignments - Handles errors and can resume if interrupted

### 1.1.2 Migration Structure

Each of your Project Online projects becomes a dedicated Smartsheet workspace:

```
Your Project Online Project "Website Redesign Q1"
    ↓ MIGRATION ↓
Smartsheet Workspace "Website Redesign Q1"├──
 Sheet: Website Redesign Q1 - Summary (project overview)├──
 Sheet: Website Redesign Q1 - Tasks (your task list with hierarchy) └──
 Sheet: Website Redesign Q1 - Resources (your team members and resources)
```

### 1.1.3 Key Features
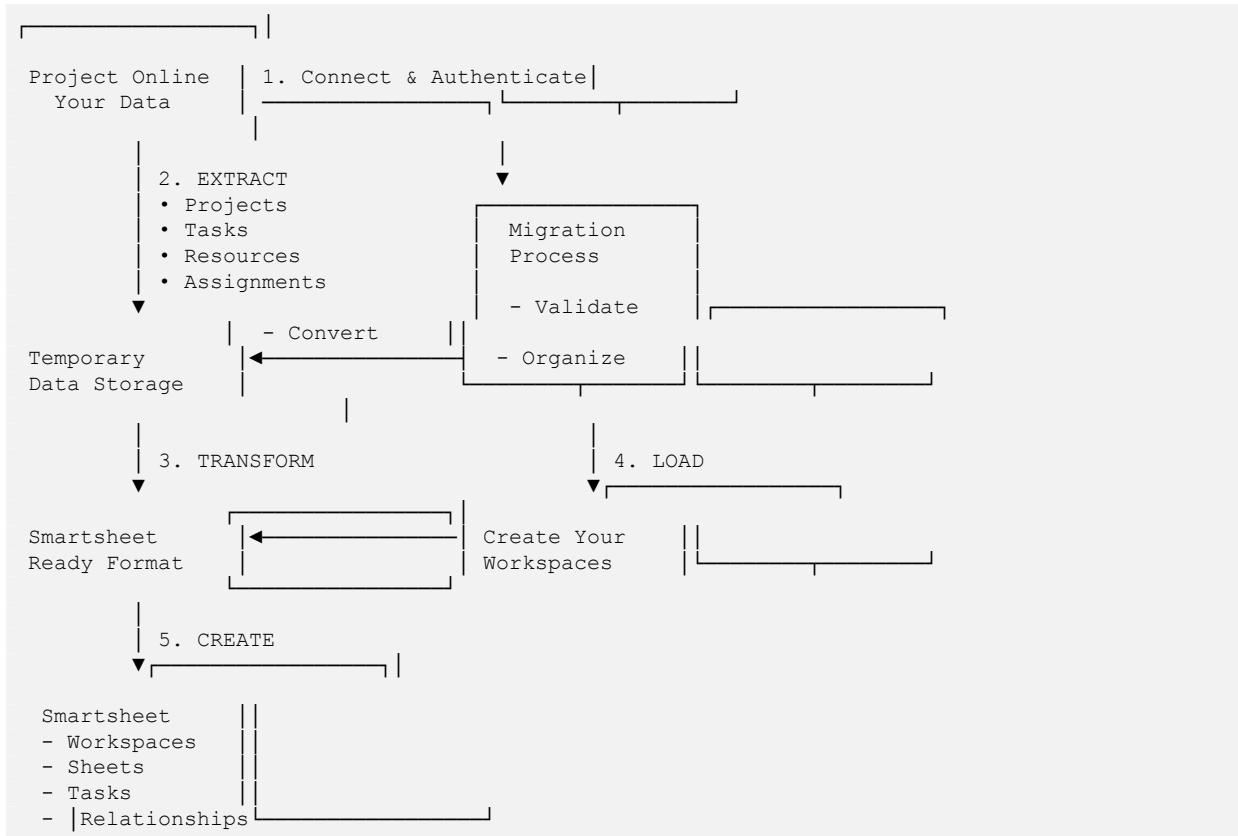
1. **One-to-One Project Mapping**: Each Project Online project becomes its own Smartsheet workspace for clear organization
2. **Name Preservation**: Your workspace names match your Project Online project names
3. **Embedded Assignments**: Team member assignments appear directly in your task list
4. **Centralized Standards**: Status and priority values are managed centrally across all your projects

| Your Project Online Data | Becomes in Smartsheet | How It Works |
|---|---|---|
| **Project** | Workspace + Summary Sheet | Each project gets its own dedicated workspace |
| **Task** | Row in Tasks Sheet | Your task hierarchy is preserved with parent-child relationships |

| Your Project Online Data | Becomes in Smartsheet | How It Works |
|---|---|---|
| **Resource** | Row in Resources Sheet | Your team members and resources with their information |
| **Assignment** | Column in Tasks Sheet | Who's assigned to each task appears right in the task list |

### 1.1.4 Data Flow

The migration follows these steps:

```
 ┌──────────────────┐ ┌─┐
 │                  │ │
 │ Project Online   │ │  1. Connect & Authenticate│        ┌──────────────┐
 │    Your Data     │ │──────────────────────┐ ┌──────────┘              │
 │                  │ │                       │ │
 │      │           │ │                       │
 │      │  2. EXTRACT│                        │
 │      │  • Projects│                        ▼
 │      │  • Tasks   │              ┌───────────────────┐
 │      │  • Resources│             │  Migration        │
 │      │  • Assignments│           │  Process          │
 │      ▼           │               │                   │
 │                  │  - Convert    ││  - Validate      │ ┌──────────────────┐
 │ Temporary        │  ◄────────────┤  - Organize       ││                  │
 │ Data Storage     │               └───────────────────┘│                  │
 │                  │                       │            │                  │
 │      │           │        │              │            │                  │
 │      │  3. TRANSFORM│     │              │  4. LOAD   │                  │
 │      ▼           │               │       ▼           │
 │ Smartsheet       │ ┌────────────┐│  Create Your      ││                 │
 │ Ready Format     │ ◄────────────┤│  Workspaces       ││                 │
 │                  │ └────────────┘└───────────────────┘│                 │
 │      │           │                                     │                 │
 │      │  5. CREATE │                                    │                 │
 │      ▼           │───────────────┐ ┌─┐
 │ Smartsheet       ││                                    │
 │  - Workspaces    ││                                    │
 │  - Sheets        ││                                    │
 │  - Tasks         ││                                    │
 │  - │Relationships └────────────────────────────────────┘
```

The migration tool uses:

**For Connecting to Project Online**: - Microsoft's authentication system (OAuth 2.0) - Secure token-based access - Automatic pagination for large datasets

**For Creating in Smartsheet**: - Smartsheet's official software development kit - Batch operations for efficiency - Automatic retry logic for reliability

### 1.1.5 What You'll Need

To run the migration, you'll need:

1. **Project Online Access**:
   - Azure Active Directory tenant information
   - Application credentials for secure access
   - Your Project Online site URL
2. **Smartsheet Access**:
   - A Smartsheet account with workspace creation permissions
   - API access token

3. **Configuration**:
    - A configuration file (`.env`) with your credentials
    - Node.js installed on your computer (version 18 or newer)

### 1.1.6 Basic Usage

```
npm start -- import --source <your-project-id> --destination <workspace-id> --dry-run

npm start -- validate --source <your-project-id>

npm start -- import --source <your-project-id> --destination <workspace-id>

npm start -- import --source <your-project-id> --destination <workspace-id> --verbose
```

The tool migrates all essential project data:

### 1.1.7 Project Information

- Project name, description, and status
- Start and finish dates
- Priority levels
- Project owner information
- Completion percentage

### 1.1.8 Tasks

- All tasks with their hierarchical structure
- Task names, descriptions, and notes
- Start dates, end dates, and durations
- Status and priority for each task
- Dependencies between tasks (predecessors)
- Milestones
- Constraint types and dates
- Work hours (planned and actual)

### 1.1.9 Resources

- Team member names and contact information
- Resource types (people, equipment, costs)
- Rates and availability
- Department assignments
- Active status

### 1.1.10 Assignments

- Which resources are assigned to which tasks
- Assignment types properly distinguished
- Team member assignments enable collaboration features

The tool maintains high data integrity:

- **Data Accuracy**: All data is validated before and after migration
- **Relationship Preservation**: Task hierarchies, dependencies, and assignments are maintained
- **Error Handling**: Automatic retry logic handles temporary issues
- **Resume Capability**: Can continue if the migration is interrupted

Your data remains secure throughout the migration:

- **Read-Only Access**: The tool only reads from Project Online, never modifies your original data
- **Encrypted Transfer**: All data transfers use secure HTTPS connections
- **Credential Protection**: Your credentials are stored locally and never logged
- **Audit Trail**: Smartsheet tracks who created and modified data

Ready to learn more about how the migration works? The next guide explains the technical architecture and components.

# 1.2 System Design

The migration tool is organized into six main components, each handling a specific part of moving your data from Project Online to Smartsheet.

## 1.2.1 1. Command Interface

**What It Does**: Provides the commands you use to run migrations

**Available Commands**:

```
po-import import --source <your-project-id> --destination <workspace-id>

po-import validate --source <your-project-id>

po-import import --source <your-project-id> --destination <workspace-id> --dry-run

po-import config
```

**Key Features**: - Parses your command options - Loads your configuration settings - Shows you progress as the migration runs - Displays helpful error messages if something goes wrong - Lets you preview changes before committing

## 1.2.2 2. Migration Coordinator

**What It Does**: Manages the overall migration workflow

The coordinator runs through these stages:

```
1. Initialization → Checks your configuration is valid
2. Extraction → Fetches your data from Project Online
3. Transformation → Converts your data for Smartsheet
4. Loading → Creates your workspaces and sheets in Smartsheet
5. Completion → Reports the results
```

**Features**: - Automatically retries if temporary issues occur - Validates your data before migration - Supports preview mode so you can test first - Handles errors gracefully with clear messages

## 1.2.3 3. Data Extraction

**What It Does**: Retrieves your project data from Project Online

**How It Works**: - Authenticates securely to your Project Online environment - Automatically handles large projects with many tasks - Respects rate limits to avoid overloading the system - Retries automatically if network issues occur - Tests connectivity before starting

**What It Extracts**: - Your project information and metadata - All tasks with their hierarchy and relationships - Your resources (team members, equipment, costs) - All assignments linking resources to tasks

**Error Protection**: - Automatic retry with increasing wait times on failures - Detection and handling of rate limits - Detailed logging to help troubleshoot any issues - Graceful handling if some data is missing

## 1.2.4   4. Data Transformation

**What It Does**: Converts your Project Online data into Smartsheet format

The transformation handles these conversions:

### 1.2.4.1   Your Project Information

- Creates workspace structure
- Generates a summary sheet with your project metadata
- Validates your project data
- Sets up consistent dropdown lists (status, priority)

**Features**: - Uses templates for faster workspace creation - Cleans up project names to work in Smartsheet - Configures dropdown lists that reference central standards

### 1.2.4.2   Your Tasks

- Creates 18 columns to hold all your task information
- Builds each task row preserving your hierarchy
- Converts task status and priority values
- Handles predecessor relationships between tasks
- Sets up dropdown lists for consistency

**Features**: - Maintains your task hierarchy through parent-child relationships - Enables Gantt chart view automatically - Calculates duration based on your start and end dates - Handles 8 constraint types (start as soon as possible, finish by date, etc.) - Can safely re-run if the migration is interrupted

### 1.2.4.3   Your Resources

- Creates 18 columns for resource information
- Builds a row for each of your team members and resources
- Discovers and lists your department values
- Validates resource data
- Sets up dropdown lists

**Features**: - Keeps email addresses separate from names - Handles people, equipment, and cost resources differently - Manages standard rates, overtime rates, and cost per use - Converts availability percentages properly - Can safely re-run without creating duplicates

### 1.2.4.4   Your Assignments

- Creates columns on your task sheet for assignments
- Groups resources by type (people vs equipment/costs)
- Generates one column per unique resource

**Important Feature**: Assignment columns work differently based on type: - **People resources** ☐ Collaboration-enabled columns (you can @mention team members) - **Equipment/cost resources** ☐ Simple selection lists (text-based)

**Features**: - Creates columns dynamically based on your actual assignments - Handles re-runs safely - Uses the right column type for people vs non-people resources

### 1.2.4.5   Standards Management

- Manages centralized reference lists for dropdown values
- Creates reference sheets for status, priority, and other standard fields
- Discovers values from your data (like department names)

**Reference Sheets Created**: - Project - Status (Active, Planning, etc.) - Project - Priority (Highest, High, Medium, etc.) - Task - Status (Not Started, In Progress, Complete) - Task - Priority (same levels as project priority) - Task - Constraint Type (8 different constraint types) - Resource - Type (People, Equipment, Cost) - Resource - Department (discovered from your data)

**Benefits**: - Enables consistent dropdown lists across all your projects - Centralizes value management - Single source of truth for your organization's standards

### 1.2.4.6   Common Conversions

- Cleans workspace names to remove invalid characters
- Converts ISO dates to standard format
- Converts durations to hours or days
- Maps numeric priorities to text labels
- Creates contact objects with names and emails
- Generates consistent sheet names

## 1.2.5   5. Smartsheet Integration

**What It Does**: Creates your workspaces, sheets, and data in Smartsheet

**Operations**: - Creates workspaces for your projects - Creates sheets with proper column definitions - Inserts your data in batches for efficiency - Configures dropdown lists and references - Sets up cross-sheet references for consistency

**Smart Features**: - Automatically handles rate limits - Retries operations if temporary failures occur - Provides detailed feedback if issues arise

## 1.2.6   6. Helper Utilities

**What They Do**: Provide supporting functions throughout the migration

**Configuration Management**: - Loads and validates your settings - Ensures all required credentials are present - Provides clear error messages for configuration issues

**Progress Tracking**: - Shows real-time progress as the migration runs - Breaks complex operations into trackable phases - Estimates time remaining for long operations

**Error Handling**: - Categorizes errors by type (configuration, network, data issues) - Provides actionable guidance for fixing problems - Makes error messages user-friendly

**Retry Logic**: - Configurable retry attempts (default: 3-5 tries) - Increasing wait times between retries (1 to 30 seconds) - Applied to all network operations

**Re-run Support**: - Reuses existing sheets by name if you run multiple times - Skips columns that already exist - Prevents data duplication - Enables safe retries if migrations are interrupted

## 1.2.7   During a Successful Migration

```
[2024-12-08 10:30:00] Starting Project Online to Smartsheet Migration
[2024-12-08 10:30:01] Configuration loaded successfully

[2024-12-08 10:30:02] ========== EXTRACTING YOUR DATA ==========
[2024-12-08 10:30:03] Connecting to Project Online...
[2024-12-08 10:30:05] □ Connected successfully
[2024-12-08 10:30:05] Extracting your project data...
[2024-12-08 10:30:08] □ Extracted project information
[2024-12-08 10:30:08] □ Extracted 25 tasks
[2024-12-08 10:30:09] □ Extracted 8 resources
[2024-12-08 10:30:10] □ Extracted 45 assignments
[2024-12-08 10:30:10] Extraction completed
```

```
[2024-12-08 10:30:11] ========== CONVERTING YOUR DATA ==========
[2024-12-08 10:30:11] Validating extracted data...
[2024-12-08 10:30:12] □ Data validation passed
[2024-12-08 10:30:12] Converting project structure...
[2024-12-08 10:30:13] □ Project converted
[2024-12-08 10:30:13] □ 25 tasks converted
[2024-12-08 10:30:14] □ 8 resources converted
[2024-12-08 10:30:14] Conversion completed

[2024-12-08 10:30:15] ========== CREATING IN SMARTSHEET ==========
[2024-12-08 10:30:15] Connecting to Smartsheet...
[2024-12-08 10:30:16] □ Connection established
[2024-12-08 10:30:16] Creating workspace: Marketing Campaign Q1
[2024-12-08 10:30:18] □ Workspace created
[2024-12-08 10:30:18] Creating sheets...
[2024-12-08 10:30:22] □ Created 3 sheets
[2024-12-08 10:30:22] Loading your data...
[2024-12-08 10:30:35] □ Loaded 25 tasks
[2024-12-08 10:30:35] Loading completed

[2024-12-08 10:30:36] ========== MIGRATION COMPLETE ==========
[2024-12-08 10:30:36] Summary:
[2024-12-08 10:30:36]    - Tasks: 25
[2024-12-08 10:30:36]    - Resources: 8
[2024-12-08 10:30:36]    - Assignments: 45
[2024-12-08 10:30:36] View your workspace: https://app.smartsheet.com/workspaces/1234567890
```

### 1.2.8   If Issues Occur

```
[2024-12-08 10:35:42] Issue loading data to "Tasks" sheet
[2024-12-08 10:35:42] Rate limit reached - this is temporary
[2024-12-08 10:35:42] Waiting 5 seconds before retry (Attempt 1/3)...
[2024-12-08 10:35:47] Retrying...
[2024-12-08 10:35:49] □ Retry successful
```

The tool uses these technologies:

**For Connecting to Project Online**: - Microsoft Authentication Library - Secure HTTP client

**For Creating in Smartsheet**: - Official Smartsheet software development kit

**Supporting Tools**: - Configuration file management - Progress tracking - Error handling - Command-line interface

All required software is included - you just need Node.js installed on your computer.

### 1.2.9   Managing Your Credentials

**Best Practices**: - All credentials are stored in a local `.env` file - This file is excluded from version control for security - A sample template is provided without actual credentials - Credentials are never displayed in logs or on screen - Configuration is validated before running

### 1.2.10   Protecting Your Data

**Security Features**: - No personal information is written to logs (only counts and identifiers) - All transfers use encrypted HTTPS connections - Smartsheet tracks all changes automatically - The tool only reads from Project Online, never modifies your original data

### 1.2.11   Access Requirements

**What You'll Need**: - **Project Online**: Read access to your project data - **Smartsheet**: API token with permission to create workspaces - **Standards Workspace**: Owner access to manage dropdown list values

### 1.2.12 Handling Connection Issues

The tool automatically handles network problems:

**Automatic Retries**: - Retries failed operations with exponential backoff - Uses connection pooling for efficiency - Configurable timeout settings - Increasing delays between retry attempts - Automatic rate limit detection and throttling

### 1.2.13 Re-run Safety

**What Happens If You Run Multiple Times**: - The tool reuses existing sheets by name - Skips columns that already exist - Prevents data duplication - Safe to continue interrupted migrations - Can add new columns to existing sheets

**Benefits**: - Safe to re-run if the migration is interrupted - Can be used iteratively during testing - No corruption from multiple runs

### 1.2.14 Validation Checks

**During Extraction**: - Verifies all required fields are present - Checks for empty or invalid values - Validates identifier formats - Confirms date and time formats

**During Transformation**: - Validates converted values match expected formats - Checks text lengths don't exceed limits - Verifies parent-child relationships are valid - Validates all references between entities - Confirms numeric values are within acceptable ranges

**Before Creating in Smartsheet**: - Ensures sheet names are unique within each workspace - Checks column types are compatible - Verifies task hierarchy is consistent - Validates all predecessor references - Confirms required columns exist - Prevents duplicate identifiers

The next guide provides detailed information about how your data is converted from Project Online format to Smartsheet format.

## 1.3 How Your Data Transforms

This guide explains how your Project Online data converts to Smartsheet format, including field mappings, data type conversions, and naming patterns.

1. Transformation Approach
2. Field Mappings
   - Project Information
   - Tasks
   - Resources
   - Assignments
3. Data Type Conversions
4. Naming Patterns
5. Standards Architecture

### 1.3.1 How Your Data Maps

```
Your Project Online Data    →    What You Get in
    ↳ Smartsheet═══════════════════════════════════════


Project                     →    Workspace (one per project)
                            →    Name matches your project name

Task (top level)            →    Row in Tasks Sheet (level 0)
  └ Task (subtask)          →    Indented Row (level 1)
```

```
      └ Task (sub-subtask) →      Indented Row (level 2)

Resource                    →      Row in Resources Sheet
                            →      Contact with name and email
                            →      Available for assignment selection

Assignment                  →      Column in Tasks Sheet
                            →      Shows who's assigned to each task
```

### 1.3.2   Design Approach

1. **One Project = One Workspace**: Each Project Online project becomes its own Smartsheet workspace
2. **Direct Placement**: Sheets are placed directly in the workspace (no folders)
3. **Project Sheet Features**: Tasks sheet includes Gantt chart and dependency tracking
4. **Dual Identifiers**: Original identifier preserved plus readable auto-number
5. **Contact Integration**: Names and email addresses work together
6. **Embedded Assignments**: Assignments appear as columns in your task list

### 1.3.3   From Project Online to Smartsheet Workspace

**What Happens**: Your Project Online project becomes a dedicated Smartsheet workspace

**Workspace Name**: - Uses your exact project name - Removes characters that aren't allowed: `/\:*?"<>|` become `-` - Multiple dashes are consolidated to one - Limited to 100 characters maximum - If longer, truncates to 97 characters and adds `"..."`

**Examples**:

```
"Website Redesign 2024"       → "Website Redesign 2024"
"Q1/Q2 Planning & Execution"  → "Q1-Q2 Planning & Execution"
"IT Infrastructure | Phase 1" → "IT Infrastructure - Phase 1"
```

### 1.3.4   Project Summary Sheet

**Sheet Name**: `{Your Project Name} - Summary`

**Columns Created** (15 columns, one row with your project information):

| Column Name | What It Stores | Source | Example |
| --- | --- | --- | --- |
| Project Online Project ID | Original identifier | `Project.Id` | Hidden column |
| Project Name | Your project name | `Project.Name` | "Website Redesign 2024" |
| Description | Project description | `Project.Description` | "Complete redesign…" |
| Owner | Project owner with email | `Project.Owner` + Email | John Doe (john@example.com) |
| Start Date | When project starts | `Project.StartDate` | "2024-03-15" |
| Finish Date | When project completes | `Project.FinishDate` | "2024-06-30" |
| Status | Current status | `Project.ProjectStatus` | "Active" |
| Priority | Project priority | `Project.Priority` | "High" |
| % Complete | Completion percentage | `Project.PercentComplete` | "45%" |
| Project Online Created Date | When created in Project Online | `Project.CreatedDate` | "2024-03-01" |
| Project Online Modified Date | When last changed in Project Online | `Project.ModifiedDate` | "2024-03-15" |
| Created Date | When created in Smartsheet | System | Automatic |
| Modified Date | When last changed in Smartsheet | System | Automatic |
| Created By | Who created in Smartsheet | System | Automatic |
| Modified By | Who last changed in Smartsheet | System | Automatic |

### 1.3.5   From Project Online Tasks to Smartsheet Task Rows

**Sheet Name**: `{Your Project Name} - Tasks`

**Sheet Features**: Includes Gantt chart view and dependency tracking

**Columns Created** (18+ columns for each task):

| Column Name | What It Stores | Source | Example |
|---|---|---|---|
| Task Name | Your task name | `Task.TaskName` | "Design Homepage" |
| Task ID | Auto-generated identifier | Automatic | "WEB-00001" |
| Project Online Task ID | Original identifier | `Task.Id` | Hidden column |
| Start Date | When task starts | `Task.Start` | "2024-03-15" |
| End Date | When task finishes | `Task.Finish` | "2024-03-22" |
| Duration | How long task takes | `Task.Duration` | 5.0 days |
| % Complete | Task completion | `Task.PercentComplete` | "45%" |
| Status | Current status | Calculated | "In Progress" |
| Priority | Task priority | `Task.Priority` | "Very High" |
| Work (hrs) | Planned hours | `Task.Work` | "40h" |
| Actual Work (hrs) | Hours completed | `Task.ActualWork` | "32h" |
| Milestone | Is this a milestone? | `Task.IsMilestone` | Checkmark or empty |
| Notes | Task notes | `Task.TaskNotes` | "Review with team" |
| Predecessors | Dependencies | `Task.Predecessors` | "5FS" (finish-to-start) |
| Constraint Type | Schedule constraint | `Task.ConstraintType` | "As Soon As Possible" |
| Constraint Date | Constraint date | `Task.ConstraintDate` | "2024-03-20" |
| Deadline | Must finish by | `Task.Deadline` | "2024-04-01" |
| **Assignments** | Who's assigned | Dynamic | Your team members |

## 1.3.6   How Task Hierarchy Works

**Your Project Online Structure**: Tasks have outline levels (0 = top, 1 = subtask, 2 = sub-subtask, etc.)
**In Smartsheet**: Parent-child relationships show as indentation

**How It Converts**: 1. Tasks are sorted by their original order 2. The tool tracks each task's outline level 3. When the outline level increases, a child relationship is created 4. When the outline level decreases, the tool returns to the parent level 5. Parent-child relationships are established in the row structure

**Example**:

```
Your Project Online:          In Smartsheet:
- Task 1 (Level 0)      →     Row 1: Task 1 (top level)
- Task 1.1 (Level 1)    →       Row 2: Task 1.1 (indented under Row 1)
- Task 1.1.1 (Level 2)  →         Row 3: Task 1.1.1 (indented under Row 2)
- Task 1.2 (Level 1)    →       Row 4: Task 1.2 (indented under Row 1)
- Task 2 (Level 0)      →     Row 5: Task 2 (top level)
```

## 1.3.7   From Project Online Resources to Smartsheet Resource Rows

**Sheet Name**: `{Your Project Name} - Resources`

**Sheet Type**: Flat list (no hierarchy)

**Columns Created** (18 columns for each resource):

| Column Name | What It Stores | Source | Example |
|---|---|---|---|
| Resource ID | Auto-generated identifier | Automatic | "WEB-00042" |
| Project Online Resource ID | Original identifier | `Resource.Id` | Hidden column |
| Contact | Name and email together | `Resource.Name +`<br>`Email` | John Doe<br>(john@example.com) |
| Resource Type | People, Equipment, or Cost | `Resource.ResourceType` | "Work" (people) |
| Max Units | Availability percentage | `Resource.MaxUnits` | "100%" |
| Standard Rate | Regular hourly rate | `Resource.StandardRate` | 75.00 |
| Overtime Rate | Overtime hourly rate | `Resource.OvertimeRate` | 112.50 |
| Cost Per Use | One-time cost | `Resource.CostPerUse` | 50.00 |
| Department | Department assignment | `Resource.Department` | "Engineering" |
| Code | Resource code | `Resource.Code` | "ENG-001" |

| Column Name | What It Stores | Source | Example |
|---|---|---|---|
| Is Active | Currently active? | `Resource.IsActive` | Checkmark or empty |
| Is Generic | Generic resource? | `Resource.IsGeneric` | Checkmark or empty |

### 1.3.8   From Project Online Assignments to Task Sheet Columns

**Important**: There is no separate Assignments sheet - assignments appear as columns in your Tasks sheet.

**How It Works**: - **Team members (people)** ☐  Collaboration-enabled columns (you can @mention them) - **Equipment/materials** ☐  Simple selection lists (text-based)

**Example Assignment Columns**:

| Column Name | Type | Contains | How It's Set Up |
|---|---|---|---|
| Team Members | Contact list | Your team members | Options come from Resources Sheet |
| Equipment | Selection list | Equipment items | Text-based options |
| Cost Centers | Selection list | Cost allocations | Text-based options |

**Benefits**: - See assignments directly in your task list - Validated against your resource list - Enable collaboration features (notifications, mentions) - Simpler structure with fewer sheets

### 1.3.9   Duration Conversion

**From Project Online**: ISO 8601 Duration format (e.g., `PT40H` means 40 hours)

**To Smartsheet Duration Column**: Decimal days

```
// PT40H → 5.0 (40 hours ÷ 8-hour day = 5 days)
// P5D → 5.0 (5 days)
// PT480M → 1.0 (480 minutes = 8 hours = 1 day)
```

**To Work Hour Columns**: Hours with "h" suffix

```
// PT40H → "40h"
// PT80H → "80h"
```

### 1.3.10   Date and Time Conversion

**From Project Online**: ISO 8601 DateTime (e.g., `2024-03-15T09:00:00Z`)

**To Smartsheet**: Date in `YYYY-MM-DD` format

```
// 2024-03-15T09:00:00Z → "2024-03-15"
// 2024-12-31T23:59:59-08:00 → "2024-12-31"
```

### 1.3.11   Priority Conversion

**From Project Online**: Number from 0 to 1000

**To Smartsheet**: Text label from dropdown list

| Your Project Online Value | Becomes in Smartsheet |
|---|---|
| 1000 or higher | Highest |
| 800-999 | Very High |
| 600-799 | Higher |
| 500-599 | Medium |
| 400-499 | Lower |

| Your Project Online Value | Becomes in Smartsheet |
|---|---|
| 200-399 | Very Low |
| 0-199 | Lowest |

### 1.3.12   Status Conversion

**From Project Online**: Calculated from completion percentage

**Conversion Rules**: - `0%` ☐ "Not Started" - `1-99%` ☐ "In Progress" - `100%` ☐ "Complete"

### 1.3.13   Contact Information

**From Project Online**: Separate name and email fields

**To Smartsheet**: Single contact field with both

```
// Project Online
Owner: "John Doe"
OwnerEmail: "john@example.com"

// Smartsheet (stored as one contact)
{
  "email": "john@example.com",
  "name": "John Doe"
}
```

### 1.3.14   Currency Values

**From Project Online**: Decimal number (e.g., `75.00`)

**To Smartsheet**: Numeric value (Smartsheet formats it as currency)

```
// Store as number, Smartsheet displays with currency symbol
75.0 → Displayed as "$75.00" in Smartsheet
112.5 → Displayed as "$112.50" in Smartsheet
```

### 1.3.15   Yes/No Fields

**From Project Online**: Boolean (true/false)

**To Smartsheet**: Checkbox column

```
// IsActive = true → ☐ (checked box)
// IsActive = false → ☐ (empty box)
```

### 1.3.16   Percentage Values

**From Project Online**: Decimal where 1.0 = 100%

**To Smartsheet**: Percentage with "%" symbol

```
// 1.0 → "100%"
// 0.5 → "50%"
// 1.5 → "150%" (overallocated)
```

### 1.3.17   Workspace Names

- **Pattern**: Uses your project name directly
- **Cleaning**: Removes characters that aren't allowed: `/\:*?"<>|` become –
- **Examples**:
    - `"Website Redesign 2024"` stays as `"Website Redesign 2024"`
    - `"Q1/Q2 Planning & Execution"` becomes `"Q1-Q2 Planning & Execution"`
    - `"IT Infrastructure | Phase 1"` becomes `"IT Infrastructure - Phase 1"`

### 1.3.18   Sheet Names

- **Pattern**: `{Your Project Name} - {Sheet Type}`
- **Examples**:
    - `"Website Redesign - Tasks"`
    - `"Website Redesign - Resources"`
    - `"Website Redesign - Summary"`

**Note**: All sheets are placed directly in the workspace (no folders).

### 1.3.19   Column Names

**Standard Format**: - Each Word Starts With Capital Letter - Words are separated by spaces - Units are shown in parentheses

**Examples**:  - `"Task Name"` (not "TaskName") - `"Start Date"` (not "StartDate") - `"Work (hrs)"` (not "WorkHours") - `"% Complete"` (not "PercentComplete")

**Identifier Columns**: - Always include " ID" in the name - Hidden by default

**Examples**: - `"Task ID"` - `"Resource ID"` - `"Project ID"`

### 1.3.20   Value Formats

**Dates**: Year-Month-Day (e.g., `"2024-03-15"`)

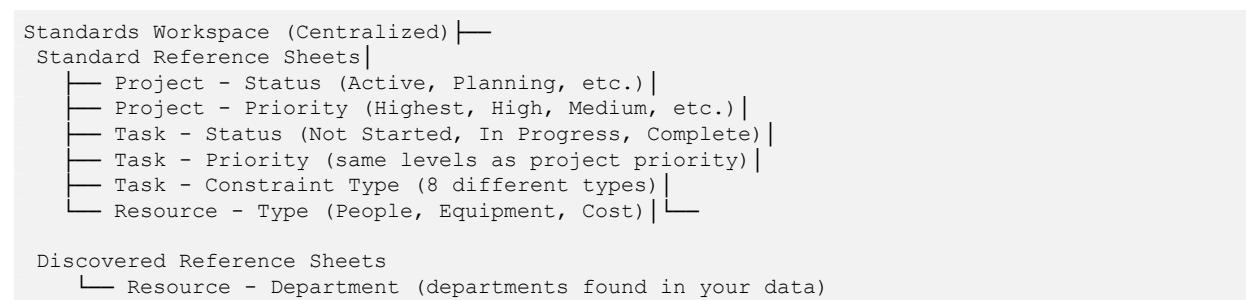**Durations**: Number + unit (e.g., `"5d"`, `"40h"`, `"2w"`)

**Percentages**: Number + `%` symbol (e.g., `"0%"`, `"50%"`, `"100%"`)

**Currency**: Numeric value (e.g., `75.00`, `112.50`) - Smartsheet formats it with currency symbol

**Yes/No**: Checkbox (☐ checked or ☐ empty)

### 1.3.21   Centralized Reference Values

A single "Standards" workspace contains reference sheets with all the dropdown list values used across your projects.

```
Standards Workspace (Centralized)├──
 Standard Reference Sheets│
    ├── Project - Status (Active, Planning, etc.)│
    ├── Project - Priority (Highest, High, Medium, etc.)│
    ├── Task - Status (Not Started, In Progress, Complete)│
    ├── Task - Priority (same levels as project priority)│
    ├── Task - Constraint Type (8 different types)│
    └── Resource - Type (People, Equipment, Cost)│├──

 Discovered Reference Sheets
    └── Resource - Department (departments found in your data)
```

### 1.3.22 Reference Sheet Names

**Pattern**: `{Data Type} - {Field Name}`

**Examples**: - `"Project - Status"` (clearly indicates it's for projects) - `"Task - Priority"` (separate from project priority) - `"Resource - Type"` - `"Resource - Department"`

**Why**: Prevents confusion when the same field name appears in different contexts

### 1.3.23 Reference Sheet Structure

Each reference sheet is simple: - **First Column**: "Name" (main column) - **Rows**: One row for each valid option

**Example - Task Priority Reference Sheet**:

| Name |
| --- |
| Highest |
| Very High |
| Higher |
| Medium |
| Lower |
| Very Low |
| Lowest |

### 1.3.24 How Dropdown Lists Work

Your project sheets reference the standards workspace for dropdown values:

```
// Example: Task Priority Column Setup
{
  "title": "Priority",
  "type": "PICKLIST",
  "options": [{
    "sheetId": 234567890,      // Standards workspace Task - Priority sheet
    "columnId": 345678901      // "Name" column in that sheet
  }],
  "validation": true           // Only values from list are allowed
}
```

### 1.3.25 Benefits of This Approach

1. **Centralized Management**: Update values in one place, affects all projects
2. **Consistency Across Projects**: All projects use the same validated values
3. **Easy Updates**: Change a reference sheet once, all projects reflect the change
4. **Single Source of Truth**: One place for your organization's standard values
5. **Unlimited Scale**: Works no matter how many projects you migrate
6. **Automatic Discovery**: The tool finds and populates reference sheets for you

### 1.3.26 Migration Process

```
1. When You Start
   └─> Tool sets up or verifies the Standards workspace exists

2. For Each Project You Migrate
   └─> Creates your project workspace
   └─> Creates sheets (Tasks, Resources, Summary)
   └─> Connects dropdown lists to Standards workspace
   └─> Loads your data with validation
```

```
3. As You Migrate More Projects
   └> New values automatically added to reference sheets
   └> Existing projects reference the updated values
```

### 1.3.27 When Extracting from Project Online

- Checks that required fields have values
- Validates that identifiers are in the correct format
- Confirms dates and times are valid
- Ensures no critical data is missing

### 1.3.28 When Converting Your Data

- Validates converted values match expected formats
- Checks text doesn't exceed column limits (4000 characters max)
- Verifies parent tasks exist for child tasks
- Validates all references between tasks, projects, and resources
- Confirms numeric values are within acceptable ranges

### 1.3.29 Before Creating in Smartsheet

- Ensures each sheet has a unique name in the workspace
- Checks column types are compatible
- Verifies task hierarchy is consistent
- Validates all predecessor (dependency) references
- Confirms all required columns exist
- Prevents duplicate identifiers

**What Gets Migrated**: 4 main types of data (Projects, Tasks, Resources, Assignments)

**Fields Mapped**: 50+ individual pieces of information with detailed conversion rules

**Data Conversions**: 8 major types (Identifiers, Dates, Durations, Priority, Status, Contacts, Currency, Yes/No)

**Relationships Maintained**: - Your project-task connections - Task parent-child relationships (hierarchy) - Task dependencies (what must finish before what starts) - Resource assignments (who's assigned to what)

**Result Structure**: - 1 Workspace for each project - 2-3 sheets per project (Tasks, Resources, and optional Summary) - All sheets in workspace root (no folders) - Assignments embedded in task list (no separate sheet)

**Key Patterns**: 1. One workspace per project 2. Names preserved (with minor cleaning) 3. Two identifiers (original + auto-number) 4. Contacts with names and emails together 5. Assignments embedded in tasks 6. Standards workspace for consistency 7. Safe to re-run if needed

# Chapter 2

# How it Works

## 2.1 Workspace Creation Options

When you migrate your projects, the tool creates your Smartsheet workspaces in an organized structure. You have options for how this organization works, allowing you to choose what makes sense for your team.

The tool creates each project as its own independent workspace. This approach keeps your projects clearly separated and easy to manage.

**What you get:** - One workspace for each Project Online project - A central Standards workspace that all projects reference for consistent values - Each workspace is self-contained with its own sheets

**Why this works well:** - Clear boundaries between projects - Each workspace can have different access permissions - Easy to share specific projects with team members - Straightforward structure that's familiar from Project Online

You can control how workspaces are created through your configuration file:

```
SOLUTION_TYPE=StandaloneWorkspaces   # Default - creates independent workspaces
```

If you don't specify this setting, the tool automatically uses the default approach.

### 2.1.1 Optional Settings

**Reuse existing Standards workspace:**

```
PMO_STANDARDS_WORKSPACE_ID=your_workspace_id
```

If you've already run a migration and want to reuse the same Standards workspace for new projects, you can provide its identifier here.

**Use a template workspace:**

```
TEMPLATE_WORKSPACE_ID=your_template_id
```

If you've created a template workspace with your preferred structure and formatting, the tool can copy from that template for each project migration.

A portfolio-based approach is planned for future releases. This would organize your projects within a hierarchical portfolio structure, similar to how you might organize projects in Project Online.

**What it would provide:** - Grouped projects under portfolios - Cross-project reporting and dependencies - Portfolio-level roll-ups

**Status:** Not yet available - the default independent workspace approach is currently supported

### 2.1.2 Consistency Across Projects

All your migrated projects reference the same Standards workspace. This means: - Status values are consistent across all projects - Priority levels use the same definitions everywhere - You manage standard values in one place

### 2.1.3 Flexibility

Different workspace structures suit different organizational needs: - **Independent workspaces** work well for distinct projects with different teams - **Portfolio structure** (future) would work well for related projects that need to share information

### 2.1.4 Safe Migrations

The workspace creation process is designed to handle interruptions: - Can safely re-run if the migration stops partway through - Checks if workspaces already exist before creating new ones - Reuses existing resources when appropriate

When you run a migration, the tool:

1. **Sets up or verifies** your Standards workspace exists (done once for all projects)
2. **Creates your project workspace** with the name matching your Project Online project
3. **Creates three sheets** within the workspace (Summary, Tasks, Resources)
4. **Connects dropdown lists** to your Standards workspace for consistency
5. **Loads your data** into the sheets

This process repeats for each project you migrate, with all projects sharing the same Standards workspace.

## 2.2 Using Workspace Templates

When migrating your projects, the tool can use a pre-configured template to create your new Smartsheet workspaces. This means your workspaces start with all the right columns and sheet structure already set up.

**Consistency**: Every project workspace you migrate has the same structure, making it easier to work across multiple projects.

**Pre-configured Columns**: Complex column settings like dropdown lists and contact lists are already set up correctly.

**Simplicity**: The template defines the standard structure once, and every migration uses it.

### 2.2.1 Setting Up the Template

You can optionally specify a template workspace in your configuration file (`.env`):

```
TEMPLATE_WORKSPACE_ID=your_template_id_here

TEMPLATE_WORKSPACE_ID=
```

**What the Tool Does**: - **If you specify a template**: Copies that workspace and customizes it for each project - **If you don't specify**: Creates a blank workspace and builds it from scratch

### 2.2.2 Template Contents

Your template workspace should contain: - **Summary Sheet**: All 15 project information columns properly configured - **Tasks Sheet**: All 18 task columns including duration and dependencies - **Resources Sheet**: All 18 resource columns with dropdown lists and checkboxes

### 2.2.3 Migration Process

When you run a migration using a template:

1. **Copies the Template**: Makes a complete copy of your template workspace
2. **Renames Sheets**: Updates sheet names to match your project:
   - `Tasks` becomes `{Your Project Name} - Tasks`
   - `Resources` becomes `{Your Project Name} - Resources`

   - `Summary` becomes `{Your Project Name} - Summary`
3. **Clears Sample Data**: Removes any rows from the template, keeping only the column structure
4. **Loads Your Data**: Fills the sheets with your actual project information

### 2.2.4 When to Update the Template

You'll want to update your template workspace when: - You want to change which columns appear - You need to reorder columns - Column formatting needs adjustment - You want to add new sheets

### 2.2.5 How to Update

1. Make changes directly to your template workspace in Smartsheet
2. Test that the changes work by running a sample migration
3. Update the `TEMPLATE_WORKSPACE_ID` in your configuration if you're using a different template

No code changes are needed - the tool automatically uses whatever template you configure.

### 2.2.6 Creating a New Template

If you need to set up a new template:

1. Create a new workspace in Smartsheet with the structure you want

2. Add all the sheets with the columns configured properly

3. Optionally add sample data to see what it looks like (the tool will remove this during migration)

4. Note the workspace ID and add it to your `.env` configuration file:

   ```
   TEMPLATE_WORKSPACE_ID=your_new_template_id_here
   ```

You can test that your template works correctly by running the migration with sample data. The tool will verify: - The new workspace is created successfully - Sheets have the correct names - All expected columns are present - Sample data is removed before your real data is loaded

## 2.3 Safe Re-runs

If you need to run a migration more than once for any reason, the tool protects against creating duplicate sheets or columns. This makes it safe to retry a migration if something goes wrong.

## 2.4   How Sheets Connect

In your migrated Smartsheet workspaces, sheets can reference each other to maintain consistent data and enable dropdown lists. This ensures your project data stays organized and validated.

## 2.5   Setting Up Authentication

This guide walks you through connecting the migration tool to your Project Online environment.

To migrate your projects, the tool needs secure access to both your Project Online data and your Smartsheet account. This requires:

1. An application registration in Azure Active Directory
2. Appropriate permissions to read your Project Online data
3. Administrator approval for the application
4. Your credentials in a configuration file

- **Azure Active Directory Admin Access**: You'll need someone with administrator privileges who can:
    - Create application registrations
    - Grant approval for application permissions
- **Project Online Access**: The application needs access to read your Project Online data
- **Your Organization's Information**: Know your Azure Active Directory tenant details

### 2.5.1   Step 1: Create the Application Registration

1. Go to: https://portal.azure.com/#allservices/category/All

2. Navigate to **Identity □   App registrations**

    - In the left sidebar, click on the **Identity** category
    - Click on **App registrations** (highlighted in orange)

3. Click **+ New registration**

4. Fill in the form:

    - **Name**: `Project Online Migration Tool`
    - **Supported account types**: Select "Accounts in this organizational directory only"
    - **Redirect URI**: Leave blank

5. Click **Register**

### 2.5.2   Step 2: Copy Your Application Information

After registering, you'll see the application overview page.

1. **Copy the Application (client) ID**
    - Save this as your `CLIENT_ID`
    - It looks like: `12345678-1234-1234-1234-123456789012`
2. **Copy the Directory (tenant) ID**
    - Save this as your `TENANT_ID`
    - It looks like: `87654321-4321-4321-4321-210987654321`

### 2.5.3   Step 3: Create a Client Secret

1. In your application registration, go to **Certificates & secrets**

2. Click **New client secret**

3. Fill in the form:

- **Description**: `Migration Tool Secret`
- **Expires**: Choose 12-24 months

4. Click **Add**

5. **IMPORTANT**: Copy the secret value immediately

- This is your `CLIENT_SECRET`
- **You can only see it once!**
- If you close the page without copying it, you'll need to create a new one

### 2.5.4   Step 4: Grant Permissions

1. In your application registration, go to **API permissions**

2. Click **Add a permission**

3. Select **SharePoint** (Project Online uses SharePoint's infrastructure)

4. Choose **Application permissions**

5. Find and check **Sites.ReadWrite.All**

- This lets the application read your Project Online data
- Required for the migration to work

6. Click **Add permissions**

7. **CRITICAL**: Grant Admin Consent

**If you see the "Grant admin consent" button:**

- Click **"Grant admin consent for [Your Organization]"**
- Click "Yes" to confirm
- Wait for the status to show "Granted for [Your Organization]" with a green checkmark

**If you DO NOT see the "Grant admin consent" button:**

- You don't have Azure AD admin privileges (this is common)

- **Contact your IT administrator or Azure AD admin** with this request:

```
Subject: Azure AD Admin Consent Required for App Registration

Hi [Admin Name],

I've created an Azure AD app registration for Project Online migration
and need admin consent granted for API permissions.

App Details:
- App Name: Project Online Migration Tool
- Application (Client) ID: [your CLIENT_ID from Step 2]
- Tenant ID: [your TENANT_ID from Step 2]

Required Permission:
- API: SharePoint
- Permission: Sites.ReadWrite.All (Application permission)

Please grant admin consent for this permission in the Azure Portal:
1. Go to: Azure Portal → Identity → App registrations
2. Find the app by Client ID above
3. Click "API permissions"
4. Click "Grant admin consent for [Organization]"

Thank you!
```

- Wait for your admin to grant consent before proceeding
- You can verify consent was granted by checking the "Status" column shows "Granted for [Organization]" with a green checkmark

### 2.5.5 Step 5: Verify the Setup

After granting consent, verify you see:

| Permission | Type | Status |
|---|---|---|
| SharePoint / Sites.ReadWrite.All | Application | ☐ Granted for [Your Organization] |

If you don't see the green checkmark, click "Grant admin consent" again.

### 2.5.6 Step 6: Configure the Tool

1. Copy the sample configuration file:

```
cp .env.sample .env
```

2. Edit the .env file and add your credentials:

```
# Azure Active Directory Configuration
TENANT_ID=your-tenant-id-from-step-2
CLIENT_ID=your-client-id-from-step-2
CLIENT_SECRET=your-client-secret-from-step-3
PROJECT_ONLINE_URL=https://your-organization.sharepoint.com/sites/pwa

# Smartsheet Configuration
SMARTSHEET_API_TOKEN=your-smartsheet-token
```

3. Replace each placeholder value with your actual information

### 2.5.7 Step 7: Test the Connection

Test that everything is configured correctly:

```
npm run test:connection
```

If successful, you'll see:

```
==========================================
Project Online Connection Test
==========================================

Step 1: Initializing Project Online client...☐
 Client initialized

Step 2: Testing authentication with Azure AD...☐
 Authentication successful☐

 Connection to Project Online successful

==========================================☐
 SUCCESS - Connection Test Passed!
==========================================

Your Project Online configuration is working correctly.
You can now run integration tests with:
  npm run test:integration
```

**If you see errors**, check the diagnostic output or see the Troubleshooting section below.

You can also validate with a specific project:

```
npm run dev validate -- --source [your-project-id]
```

Replace `[your-project-id]` with one of your Project Online project identifiers.

### 2.5.8 "Authentication failed" Error

**What this means**: Your credentials aren't working

**How to fix**: 1. Double-check that you copied all credentials correctly 2. Verify your client secret hasn't expired (check in Azure Portal) 3. Create a new client secret if needed

### 2.5.9 "Access forbidden" Error

**What this means**: The application doesn't have the necessary permissions

**How to fix**: 1. Go to Azure Portal □ Your app registration □ API permissions 2. Make sure **Sites.ReadWrite.All** shows with a green checkmark 3. If not approved, click "Grant admin consent for [Organization]" 4. Contact your administrator if you don't have permission to grant consent

### 2.5.10 Common Error Messages

| Error | What It Means | How to Fix |
|---|---|---|
| `invalid_client` | Credentials are wrong | Verify `CLIENT_ID` and `CLIENT_SECRET` are correct |
| `invalid_resource` | URL is wrong | Check `PROJECT_ONLINE_URL` format |
| `unauthorized_client` | Not authorized | Grant admin consent for the application |
| `invalid_grant` | Token request failed | Create a new client secret |

### 2.5.11 "Resource not found" Error

**What this means**: - Your Project Online URL is incorrect - The site doesn't exist - The application doesn't have access

**How to fix**: 1. Verify your Project Online URL format: `https://[your-organization].sharepoint.com/sites/[site-name]` 2. Test the URL in your web browser (you should be able to access it) 3. Ensure your application has been granted access to the SharePoint site

### 2.5.12 "Cannot get token" Error

**What this means**: - Network connectivity issues - Firewall blocking Microsoft authentication - Invalid tenant ID

**How to fix**: 1. Check your internet connection 2. Verify your firewall allows access to: - `https://login.microsoftonline.com` - `https://*.sharepoint.com` 3. Confirm your `TENANT_ID` is correct

### 2.5.13 Protecting Your Credentials

1. **Never commit `.env` files to source control**
    - The file is excluded by default
    - Never share your `.env` file with others
2. **Rotate credentials regularly**
    - Set an expiration when creating secrets (12-24 months is recommended)
    - Create a new secret before the old one expires

  - Update your `.env` file with the new secret
  - Delete the old secret after confirming the new one works
3. **Use separate credentials for testing and production**
  - Create different application registrations for testing versus actual use
  - Never use production credentials for testing

### 2.5.14   Managing Permissions

1. **Grant only necessary permissions**
  - Sites.ReadWrite.All is required to read Project Online data
  - Don't grant additional permissions you don't need
2. **Review regularly**
  - Periodically review which applications have permissions
  - Remove application registrations you're no longer using
  - Check who has administrative consent approval

### 2.5.15   Monitoring Access

1. **Review sign-in activity**
  - Azure Portal ☐  Azure Active Directory ☐  Sign-ins
  - Filter by your application name
  - Watch for failed authentication attempts
2. **Set up alerts** for unusual activity:
  - Multiple failed sign-in attempts
  - Unexpected sign-in patterns
  - Permission changes

### 2.5.16   Microsoft Documentation

  - Creating App Registrations
  - Application Permissions
  - Project Online Documentation

### 2.5.17   Getting Help

If you encounter issues:

1. Read the error message carefully - it often explains what's wrong
2. Review the troubleshooting section above
3. Verify all your configuration values are correct
4. Test the connection using the `validate` command
5. Contact your Azure Active Directory administrator for permission issues

## 2.6   Using the Migration Tool

The migration tool runs from the command line and provides real-time feedback as it moves your data from Project Online to Smartsheet. This guide explains how to use the tool effectively.

## 2.7   Troubleshooting Common Issues

This guide helps you diagnose and resolve common issues you might encounter when migrating from Project Online to Smartsheet.

Each issue includes:

- **What you're seeing**: The symptoms or error messages
- **Why it's happening**: The underlying cause
- **How to diagnose**: Steps to confirm the issue
- **How to fix it**: Solutions that work
- **How to prevent it**: Avoiding the issue in future migrations