



Requirements

CAFM 365

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1 Preface

1.1 Background and Guiding Principles?

This document defines the functional and non-functional requirements for procuring development services to build a Computer Aided Facility Management (CAFM) system on the Microsoft 365 platform. It is intended as the baseline for implementation planning, effort estimation, and the contractual scope for a development partner.

1.2 System idea and overall objective

The core idea is to create a model-driven CAFM system that uses a single conceptual data model as the “digital backbone” across all system modules. All modules described in the requirements are expected to be implemented consistently on top of this conceptual data model, including its entities and relationships (e.g., site/building/floor/space, assets/equipment, tickets, documents, etc.). The data model is therefore not only a reference, but the binding architectural foundation for the solution.

The system should enable a scalable, modular CAFM that connects operational FM processes (e.g., helpdesk, maintenance, cleaning, compliance) with spatial context (rooms/spaces and, where applicable, BIM elements) to support day-to-day work, reporting, and continuous data quality improvement.

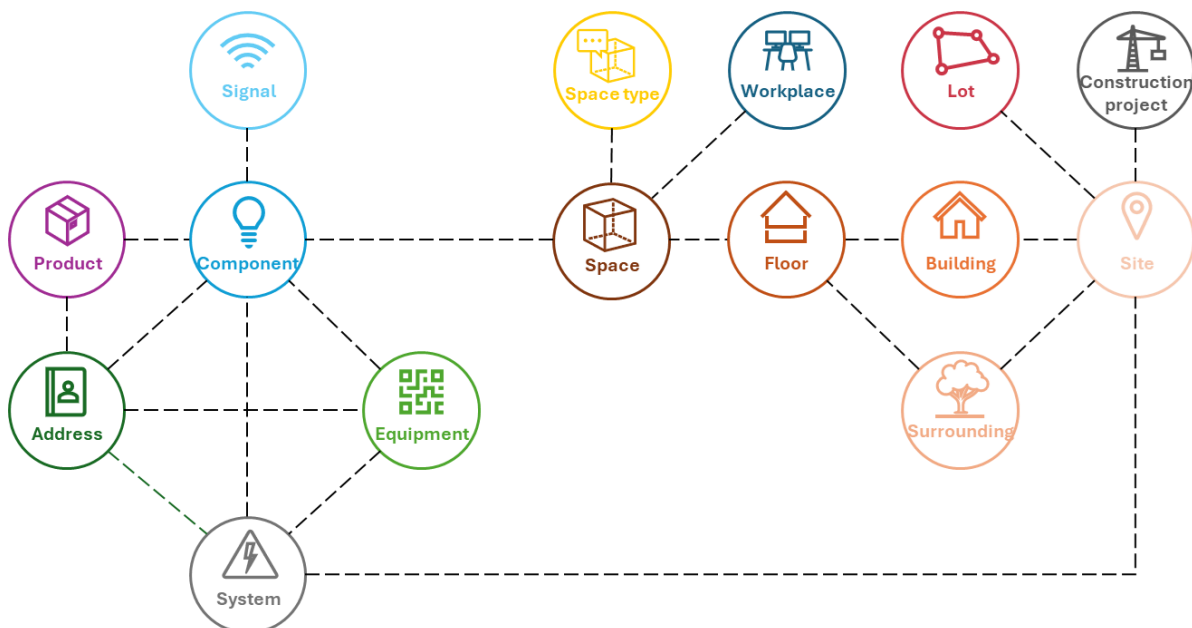


Figure 1: conceptual data model

1.3 Microsoft 365 as the functional platform

The system functionality—and the functionality of each module—shall be achieved primarily by combining and orchestrating Microsoft 365 services, in particular:

- SharePoint Online as the core data layer (lists/libraries) and document management backbone
- Power Apps for user-facing forms and operational apps (mobile and desktop)
- Power Automate for workflows, approvals, reminders, and integration patterns
- Power BI for reporting, dashboards, and role-based views

- Microsoft Teams for collaboration, notifications, and task-oriented user interaction

The relationships shown in the conceptual data model are to be mapped in SharePoint Online through linked SharePoint lists and libraries (e.g., lookup fields, IDs/keys, controlled references), so that the overall structure remains consistent, traceable, and extensible across modules.

1.4 Certification readiness according to GEFMA 444

A key design requirement is that the overall system and the individual modules are structured to meet the certification criteria of GEFMA Guideline 444 and to enable certification of both the system and its modules according to this guideline.

This implies that requirements and implementation must be aligned to the relevant GEFMA 444 criteria catalogs—especially the mandatory catalogs (baseline, space/area management, and maintenance management) and any additional catalogs targeted by the module scope. Beyond delivering features, the solution must be implementable and demonstrable in a way that supports a later certification audit (including a stable data structure, role/permission concepts, traceable processes, and meaningful evaluations/reports as required by the catalogs)

1.5 Expected outcome

The expected outcome is a robust, tenant-capable CAFM foundation with clearly defined modules, consistent data governance, and a pragmatic Microsoft 365 implementation approach. The development partner is expected to implement the requirements in a way that preserves the integrity of the conceptual data model, supports long-term scalability, and provides a clear path toward GEFMA 444 certification.

2 Requirements / modules / functionality

2.1 General

All modules of the CAFM system shall be based on a consistent, system-wide authorization concept. As a minimum standard, the roles Administrator (full access), Editor (create/update rights) and Viewer (read-only access) must be available across all modules. Role-based permissions within each module must be configurable and extendable by an Administrator, allowing additional permission sets or role variants where required without redesigning the solution. In line with the conceptual data model, the authorization concept must also support building-level data access control, i.e., it must be possible to restrict and manage user access to data and objects across modules based on the assigned building(s) (including all related subordinate entities such as floors, spaces, assets, documents, and records linked to those buildings).

Operational data creation and maintenance shall take place within the respective modules (e.g., via SharePoint/Power Apps), while Power BI shall serve as the overarching information management and analytics layer. Power BI shall consolidate data from all modules and provide centralized, role- and user-oriented reporting and analysis. For each module, a dedicated reporting area must be available in Power BI, offering a set of predefined, dynamic reports and KPIs that can be accessed on demand. These reporting areas must support dynamic filtering to tailor views to specific users and use cases (e.g., by building, organizational unit, time period, status, etc.). The available filter criteria within the reporting areas must be administratively extendable, enabling an Administrator to add or adjust filters without fundamental changes to the overall solution. Access to data and reports in Power BI must also be controlled via a permission concept that aligns with the overall authorization model of the CAFM system, ensuring consistent role-based access (Administrator / Editor / Viewer) and, where applicable, enforcing the same building-level access restrictions across all reporting areas.

2.2 Basic requirements

The solution shall meet the following basic requirements:

- The solution is based on an authorization concept. (Role-based permissions and access to attributes and modules)
- The solution is multi-tenant capable.
- The solution can be operated in multiple languages.
- The software provides bulk data import/export. (individual attributes, data structures, CAD, graphics).
- Bulk data changes can be performed (search & replace).
- New data classes can be created and assigned to a navigation structure (e.g., extend room lists, site/location lists, organization).
- Data classes can be extended with data attributes, and the data type and format of attributes are configurable.
- Attribute-based search and filtering functionality is available.
- Documents can be embedded and/or linked as files.
- The solution can generate predefined reports for defined reporting entities. (Functional area, location, building, time period)
- Quick analyses can be filtered by data attributes.
- The solution is packageable and provisionable for customer deployments (SharePoint Online Sites including structure and content, PowerApps, PowerAutomate Flows, Viewer components)

2.3 Viewer

The solution shall provide a browser-based viewer capable of displaying both IFC and DWG files directly within the web interface. The viewer must support loading files directly from SharePoint Online (e.g., from defined document libraries or module-specific repositories) and must enable users to display and navigate 2D and 3D geometries side by side (e.g., synchronized view, coordinated selection where applicable) to support spatial and model-based facility management workflows.

The same viewer component shall be used consistently across the Power BI information management layer as well as across all other modules where a geometric reference is required (e.g., space management, workplace management, tenant management, cleaning management, etc.), ensuring a uniform user experience and consistent interaction patterns. Within the Power BI layer, the viewer must provide module-specific interactive functions, including, for example: thematic coloring of spaces/rooms based on configurable attributes (e.g., utilization type, tenant, cleaning zone, status, KPI thresholds) and bidirectional interaction between lists and geometry, such as selecting a room in a room list/table and automatically highlighting the corresponding geometry in the viewer (and, where applicable, selecting geometry in the viewer to filter or focus the related records in Power BI).

The same principle for graphical analytics (e.g., thematic coloring) must be available for all information objects in the conceptual data model for which a geometric reference can be established. This includes not only spaces/rooms, but also related objects such as assets/equipment, tickets/work orders, inspections, or other module records that can be linked to a spatial entity or a specific geometric element. The viewer must therefore support flexible, attribute-driven visualization layers that can be applied consistently across modules and within the Power BI information management layer.

In addition, the viewer must allow the creation and management of a library of graphical objects (2D and/or 3D) that can be placed at a later stage onto the loaded base geometry (IFC/DWG files retrieved from SharePoint Online). This is intended to enable the addition of graphical elements that are not contained in the IFC model or DWG (e.g., fire extinguishers, smoke detectors, signage, etc.). The base geometry loaded from SharePoint Online must not be modified; instead, the placed objects must be handled as a separate overlay layer that can be displayed, positioned, updated, and managed independently of the underlying IFC/DWG files.

The viewer shall provide standard viewer functionality comparable to common IFC/DWG viewers including zooming, rotating/orbiting, sectioning/clipping, isolating elements, and scale-accurate printing: In addition, the viewer must support at least the following standard capabilities:

- Pan / fit-to-screen / predefined views (top/front/side/isometric) and quick navigation controls
- Model tree / layer management (IFC hierarchy, categories, levels; DWG layers) with show/hide and transparency
- Element selection and highlighting, including multi-select and clear selection
- Property inspection for selected objects (IFC properties/parameters, metadata; basic DWG object info where available)
- Search and filter by object name, type, ID, or properties (e.g., IFC GUID, classification)
- Filter and export functions for object- and attribute-based analyses. (Excelexport)
- Measurement tools for 2D and 3D (distance, area, angle; and where supported: volume) with snapping options
- Section box / multiple section planes with adjustable position and orientation
- Explode / isolate by category (where supported for IFC) and quick hide/show of selected elements
- 2D/3D view synchronization (coordinated navigation and linked selection between plan and model views)
- Saved views (bookmarks) including camera position, active layers, filters, and section settings

- Markup and annotation tools (e.g., comments, text, arrows, shapes, clouds) stored separately from the source file
- Screenshot/export of the current view (image export and/or report-style export of selected object properties)
- Performance controls for large models (progress feedback, level-of-detail handling, and graceful loading behavior)

These capabilities must be available in a way that supports the CAFM use cases (navigation, spatial context, validation, and interactive analysis) while keeping the source IFC/DWG files unchanged and maintaining a consistent user experience across modules and the Power BI information layer.

2.4 BIM data processing

Table 1 contains the functional requirements for the module BIM data processing.

Table 1: Requirements BIM data processing

Functionality	Example / Remarks
The spatial structure, including associated object data, can be imported from the BIM model into the CAFM software database and displayed there.	Building list, floor list, space list
Area data can be transferred from the BIM model to the CAFM software.	Attributes space area, DIN 277 use type
Graphical/geometric data from the BIM model can be visualized in the CAFM software (using the graphical functionalities of the Space Management module).	
Equipment/inventory, including key attributes, can be transferred from the BIM model to the CAFM software.	Technical systems, inventory, and furniture—each with manufacturer, model/type number, performance data, etc
Changes made in the CAFM system (object data and, optionally, geometric data) can be transferred back to the authoring tool.	Equipment is relocated to another room.
Kann eine IFC-Datei in das CAFM-System importiert und nach Bearbeitung auch wieder von dort exportiert werden?	
A function is available to validate and display the files to be exported/imported.	Module viewer

2.5 Space management

Table 2 contains the functional requirements for the module space management.

Table 2: Requirements space management

	Functionality	Example / Remarks
Capture data		
1	Floor plan data can be imported/embedded	e.g., DXF, DWG, DGN, PDF, IFC
2	Graphic objects can be linked to database entries and visualized	Compare requirements viewer
	Assign: area, equipment, technical systems, organization, users	
	Automatic area take-off from graphics	
3	Areas can be assigned to different reference levels	
	Object assignment	Buildings, external facilities, open spaces
	Cost assignment	Cost center, budget account, value, acquisition costs
Evaluate data		
4	List outputs are available for:	
	Vacant areas	
	Area evaluation according to DIN 277	
	Area distribution to users / tenants	

5	Graphical outputs are available for:	Coloring of areas
	Vacant areas	
	Area evaluation according to DIN 277	
	Area distribution to users / tenants	

2.6 Maintenance management

Table 3 contains the functional requirements for the module maintenance management.

Table 3: Requirements maintenance management

	Functionality	Example / Remarks
Capture data		
1	Technical assets can be assigned to different object groups	
	Object assignment	Building, external facility
	Area assignment	Space, supply area
	Discipline assignment	DIN 276
	Cost assignment	Cost center, value
2	Multiple hierarchy levels of assets/components can be represented	Main system, subsystem, assembly, single part
3	Availability categories/priorities can be defined for assets	Fault rectification
4	Maintenance activities from standards/guidelines can be imported/linked	VDMA, AMEV
Process data – plan maintenance		
5	Recurring tasks can be scheduled automatically	Maintenance plan for servicing/testing/inspection
6	Tasks can be assigned to object groups	Object/cost/trade assignments
7	Tasks can be prioritized independently of asset priorities	Immediate, short-term, ...
8	Tasks can be assigned to internal staff and/or external partners	
9	Work instructions can be stored for individual activities	
Process data – execute maintenance		
10	Notifications/tickets can be created and assigned to the asset hierarchy	Faults, linked to module ticketing
11	Processing status of notifications/tickets can be tracked	
12	Deadlines can be tracked	Warranty, maintenance
13	Processing status of maintenance tasks can be tracked	
Evaluate data		
14	The current maintenance plan including task status can be listed	
15	The current maintenance plan can be adjusted with respect to time and staffing	Staff absence
16	A list of safety-relevant assets can be generated.	Availability / priority
17	Cost views over a time period are available	Per asset, discipline, cost group
18	Asset data sheets can be generated including	
	Asset description	Specific asset with components and detailed data
	Warranty period/partne	
	Asset history	Planned tasks, faults, repairs
19	Overviews of all notifications and work orders including their status can be created	

2.7 Asset inventory management

Table 4 contains the functional requirements for the module asset inventory management.

Table 4: Requirements asset inventory management

	Functionality	Example / Remarks
Capture data		
1	Inventory can be assigned to object categories (e.g., cost centers, organizational units, rooms)	Item catalog
2	Inventory can be uniquely labelled and identified (e.g., stickers, barcodes, QR codes, RFID)	
3	Mobile, IT-supported stocktaking/inventory counting can be performed	
Evaluate data		
4	Lists/printouts for inventory numbers/barcodes and/or QR codes can be generated	
5	A target/actual analysis of inventory location can be performed	
6	A history for each inventory item can be displayed	

2.8 Cleaning management

Table 5 contains the functional requirements for the module cleaning management.

Table 5: Requirements cleaning management

	Functionality	Example / Remarks
Capture data		
1	Cleaning intervals and quality standards can be assigned to areas	
2	Activity categories for areas can be defined	
Process data – plan cleaning		
3	Recurring tasks can be scheduled automatically	Cleaning plan, team/zone concepts, results-oriented cleaning, lead time planning
4	Work instructions can be stored for individual activities	
5	Tasks can be assigned to reference levels:	
	Area assignment	
	Cost assignment	Budget, cost center/budget account; labor and material costs
6	Tasks can be prioritized	Immediate/short-term or very important/important
7	Tasks can be assigned to internal staff and/or external partners	
8	Outsourcing/procurement of cleaning services is supported:	
	Creation of RFQs	
	Creation of bills of quantities/quantity frameworks for tenders	
Process data – execute cleaning		
9	Notifications/tickets (e.g., defects) can be created and assigned to the object hierarchy	Link module ticketing
10	Processing status of notifications/tickets can be tracked	
11	Work orders can be created for planned tasks	
12	Work orders can be created for unplanned tasks (from notifications)	
13	Processing status of work orders can be tracked	
14	Control mechanisms exist when closing a work order (e.g., all tasks completed)	
Evaluate data		
15	List outputs are available for:	
	the current cleaning plan	
	list of all areas by priority	

2.9 Space & asset booking

Table 6 contains the functional requirements for the module space & asset booking.

Table 6: Requirements space & asset booking

	Functionality	Example / Remarks
Capture data		
1	Booking objects can be categorized	Rooms, vehicles, mobile devices
	Equipment (technical features)	Seating, media technology/AV equipment, projector resolution, vehicle engine specification.
	Equipment (capacity feature)	Room size, vehicle class
Process data – plan booking		
2	Booking objects can be visualized	Photos, plans, views
3	Objects can be searched by criteria	Time period incl. recurring periods, number of users, capacity, equipment
4	Objects can be temporarily excluded from booking	
Process data – execute booking		
5	Reservations can be created with defined parameters	Flexible time window, event importance
6	Reservations can be created for recurring periods	
7	Object return can be documented	Form
Evaluate data		
8	List outputs are available, including:	
	list of available objects for a searched period	
	list/view of free time slots for a selected object	
	object description with additional information	
9	Reservation confirmations can be generated including:	
	object information	
	period	
	costs	

2.10 Locking system management

Table 7 contains the functional requirements for the module locking system management.

Table 7: Requirements locking system management

	Functionality	Example / Remarks
Capture and process data		
1	Changes to the locking system can be implemented during ongoing operation	Locking plan, graphical representation
2	Responsible persons are informed about upcoming changes (e.g., staff change, cylinder replacement)	Reports, notifications, confirmation dialog
3	Current locking plans can be generated at any time	Locking plan, graphical representation
4	Individual and collective receipts for key issuance can be created	Paper and electronic
5	Reorders for keys, cylinders and other locking system components can be initiated	Purchase order document
6	Full historization of all locking actions and key holders is possible	Report
7	Key issuance can be documented	Form
8	Key returns can be documented	Form
9	Key issuance periods can be extended	
10	Loss, defect and/or blocking of keys can be managed	
Evaluate data		
11	Outputs for all individual and group lockings are available	Report / graphical evaluation
12	Outputs of access authorizations are available (per room, per key)	Report / graphical evaluation

13	List of keys per person is available	Report / graphical evaluation
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2.11 Move management

Table 8 contains the functional requirements for the module move management.

Table 8: Requirements move management

	Functionality	Example / Remarks
Capture data		
1	Fit-out and move variants can be created and displayed graphically	
	Individual inventory, work places, employees, departments, graphical data	
2	The planned variant can be adopted as the "as-is" structure without data loss	
Evaluate data		
3	Labels with destination information for move inventory can be printed	Report
4	Lists for moving companies/logistics providers can be generated	Bill of materials with location reference
5	Additional lists/printouts can be generated (e.g., door signs, keys)	

2.12 Tenant management

Table 9 contains the functional requirements for the module tenant management.

Table 9: Requirements tenant management

	Functionality	Example / Remarks
Capture data		
1	New lease contracts can be created	Contract type, start date, tenant/user, deadlines, bank details, deposit
2	Areas can be assigned to lease contracts	Assignment of area objects—such as rooms (of different types with different rental rates) or outdoor areas (parking spaces, storage areas)—to the contract
3	Contract adjustment mechanisms can be stored for contracts	Index-linked rent, stepped rent
Process data		
4	General contract data can be adjusted	Contract type, contract start date, tenant/user, deadlines/notice periods, bank details, security deposit
5	Assigned areas can be changed time-dependently	Assignment of area objects—such as rooms and outdoor areas (as described above)—to the contract
6	Contract terms/conditions can be changed time-dependently	Area-based terms and conditions, flat-rate terms and conditions, and terms and conditions for base rent and ancillary/service charges.
7	Lease contracts can be terminated while retaining all data required for service charge reconciliation	Form, contract end date
8	Current contract data can be filtered and displayed by various criteria	Form, report
9	Non-leased areas can be determined as of a reference date	Vacancy report, graphical analysis
Evaluate data		

10	Current letting status of a building or floor can be displayed	Report, graphical analysis
11	Revenue forecasts from leases can be calculated	Report
12	Letters can be generated from templates	Termination letter
13	Contracts can be listed by status (offer, active, terminated, ended)	Report
14	Lease documents can be generated and/or stored electronically against the contract	Report or document assignment.
15	Rent invoices can be created	Report, file as a batch posting
16	Users can be informed about termination/change dates and deadlines; largely automated follow-up/reminders are supported	Report, notifications

2.13 Energy controlling

Table 10 contains the functional requirements for the module energy controlling.

Table 10: Requirements energy controlling

	Functionality	Example / Remarks
Capture data		
1	Meter readings can be recorded	List
2	Bulk import of meter readings is available	
3	Complex meter structures can be integrated	Virtual meters for sum/difference metering
4	Calibration/verification due dates can be managed as a meter attribute	
5	Consumers can be assigned to meters	Areas, technical systems
6	Plausibility checks during data entry are performed	Prevent wrong entries, meter replacement
Evaluate data		
7	Time-based consumption overviews can be generated	by cause/consumer (users, areas, assets)
	Separately by media	
	Conversion into emissions (CO ₂)	
8	KPIs can be derived and displayed from consumption data	Benchmarking
9	Weather normalization of consumption data is supported	Degree days and consumption values

2.14 Health & safety

Table 11 contains the functional requirements for the module health & safety.

Table 11: Requirements health & safety

	Functionality	Example / Remarks
Capture data		
1	Safety-relevant objects can be recorded and labelled	
2	Objects can be assigned to hazard groups	
3	Accident and training/instruction logs can be maintained	
4	Protective measures can be assigned to specific objects	
5	Templates for workplace risk assessments can be stored in the system	
6	Hazard potentials can be displayed graphically using hazardous substance symbols	
7	The system supports defined processes to ensure health and safety	Workflow
Evaluate data		
8	Workplaces/objects can be categorized by different hazard types	Lists
9	Plans and signage can be output including:	CAD drawings, floor plans, printouts
	fire brigade and escape route plans	
	escape route signage	
10	The solution provides overviews of the fulfillment level of legal requirements and can identify gaps	Trained persons per system, qualifications per employee

2.15 Environmental management

Table 12 contains the functional requirements for the module environmental management

Table 12: Requirements environmental management

	Functionality	Example / Remarks
Capture data		
1	Emission values can be recorded	List
2	Type and quantity of generated waste can be recorded	
3	Legally compliant waste disposal documentation can be created	In accordance with the Waste Verification Ordinance
4	Discharges into water bodies can be recorded	
5	Required accompanying documents for substance declarations for disposal can be created/assigned and/or official online procedures are supported	
Evaluate data		
6	Environmental KPIs can be generated	Energy consumption, waste volume
7	Objects can be compared using environmental KPIs	
8	Waste balances can be created	

2.16 Help desc (ticketing)

Table 13 contains the functional requirements for the module help desc

Table 13: Requirements help desc

	Functionality	Example / Remarks
Capture data		
1	Reporter data can be captured in a predefined format	Portal, app, form
2	Forwarding of reported data to other modules (e.g., resource planning, order management) is supported	
3	The reporter is supported during the reporting process, for example through questionnaires or checklists	Recording a maintenance request or a move.
Process data		
4	Additional requirements can be added to reporter data	Additional fields
5	Tickets/requests can be created based on a standard requirement catalogue	Catalogue
6	Status of a ticket/request can be changed	
7	(Estimated) costs can be added to a ticket/request	Costs field
8	Documents/files can be attached to a ticket/request	
9	The reporter receives feedback when the status changes	E-mail, SMS
Evaluate data		
10	Reporting/analysis of tickets/requests is available, including by:	Report, statistics
	object	Building, asset, safety relevance
	reporter	
	status	
11	Searching for similar tickets/requests via filters is supported	Notifications/requests that relate to specific buildings, rooms, installations/equipment, or points in time
12	A change history can be retrieved	
13	Statistics can be generated from processed tickets	Response time, distribution of incoming tickets over the day

2.17 Budget management & cost control

Table 14 contains the functional requirements for the module budget management & cost control

Table 14: Requirements budget management & cost control

	Functionality	Example / Remarks
Capture data		
1	Budgets can be created and assigned by: projects/measures cost types/cost centers economic units/objects/assets time periods	
2	(Sub-)tasks with defined planned costs can be assigned to budgets	
3	Cost-relevant processes e.g. planning, approval, posting, etc. can be defined with role-based permissions	Approval workflow
Process data		
4	Incoming invoices/postings can be assigned to budgets	
5	Integration with commercial/ERP systems (e.g., SAP) via defined interfaces is prepared	
6	Budget hierarchies are supported	Sub-budgets, cross-covering funds, etc.
7	Reservation/commitment of funds within a budget is supported	Commitment/obligo
8	Overrun tolerances are supported	Percentage/absolute
9	Budgets can be adjusted retrospectively value adjustment time allocation adjustment	Supplementary budget Carry-over
Evaluate data		
10	Real-time comparison of planned vs. actual costs is available time-dependent views	Project progress, budget utilization, remaining budget
11	Continuous monitoring of budget compliance is supported	Automatic signaling, dashboard, warnings/notifications

2.18 Contract management

Table 15 contains the functional requirements for the module contract management

Table 15: Requirements contract management

	Functionality	Example / Remarks
Capture data		
1	Contracts can be created and enriched with attributes	E.g., contract type, subject, contracting party, terms, termination dates, deadlines, site/distribution list
2	Contracts can be linked to objects of the as-built documentation (contract subject)	Assignment of contracts, among other things, to technical systems/equipment (maintenance), to areas (cleaning), and to objects/properties (real estate assets)
3	Contract data can be modified/supplemented the original version remains unchanged	Contract term and contract subject matter (technical systems/equipment, areas, etc.) Historization/versioning
Process data		

4	Contract data can be accessed directly from FM processes (e.g., maintenance)	E.g., reporting a fault on a system/equipment; showing the responsible maintenance company, maintenance history, and maintenance costs.
5	Contracts can be linked to quality assurance documentation of contract performance	Form, report, e.g., within the scope of an SLA.
6	Permanent cost control (budget management) for contracts is ensured	Form, report, with a distinction between accrued, committed, and planned
Evaluate data		
7	Contract subjects can be presented	Report (list of systems/equipment, etc.) and graphical analysis (areas, etc.)
8	Contracts can be listed by status (offer, active, terminated, ended)	Report
9	Forecasts of costs resulting from contracts can be calculated and displayed	Report
10	Users are informed about termination dates/deadlines; largely automated follow-up/reminders are supported	Report, notifications, e-mail

2.19 Workplace management

For the purposes of Workplace Management, the terms “occupancy” and “booking” are defined as follows: “occupancy” generally refers to long-term assignment, whereas “booking” refers to short-term use. Shared-desk workplaces, including their equipment attributes, can therefore be reserved as “occupied” on a longer-term basis for specific departments, while the actual time-limited use is made (and, if required, must be made) via bookings

Table 16 contains the functional requirements for the module workplace management

Table 16: Requirements workplace management

	Functionality	Example / Remarks
Capture data		
1	A “workplace” object (physical workstation) exists and is linked to rooms/areas	
	The workplace object contains attributes for equipment features	Desk type, docking station, sensor
	The system shall allow, based on an area standard, the definition of a maximum number of workplaces of a specific type that can be placed per room or room zone	
	A distinction between territorial and non-territorial workplaces is supported	Assigned vs. freely usable
2	Workplaces can be displayed in floor plans	Symbols in floor plan
	Visualization of workplaces (Symols)	
	Visualization of booking/reservation	
	Visualization of occupancy	
3	Workplaces can be linked to an occupancy assignment	
	Time-limited occupancy can be recorded for workplaces, including as a prerequisite for a booking system.	For permanent use: from/to dates; for temporary bookings: from/to day and time.
	Booking rules for workplaces can be defined and stored	Organizational hierarchy, automatic release in case of no-show 15 minutes after the booking start time.
Process data		
4	Variant-based occupancy planning with time dependencies is supported for densification and/or placing new employees	Planning from 01/01 of the following year; drag-and-drop in the graphical view; continuous

		view of available capacity/potential.
	Move chains can be derived from an approved variant	A CSV list (who moves when and from where to where) for move management
	Entire workplaces can be defined as move objects and relocated	Include the associated furnishing objects and inventory items
5	Workplaces can be booked by time, price and equipment-oriented criteria	A specific workplace type can be booked on working days from 08:00 to 12:00.
6	Group bookings can be performed while respecting functional/team relationships	Purchasing work group with 7 employees
7	Workplace booking can be performed via calendar function as single or recurring series	Calendar appointment (e.g., in Outlook)
Evaluate data		
8	Current occupancy/booking of individual workplaces or groups can be displayed at any time	Smartphone, lobby monitor
9	Integration with workplace monitoring via sensors/IoT through a defined interface is prepared	Occupancy of the workplace (anonymized)
10	Occupancy/utilization can be evaluated as potential analysis using KPIs and charts	"Find" available workplaces in floor plans
11	Time-based statistics on workplace usage can be generated	Room and cost planning
12	Workplace usage can be evaluated per billing unit	Cost allocation

2.20 IoT data processing

The CAFM solution shall include an integrated IoT platform that ingests sensor and device data and makes this IoT data available within the Workplace Management and Energy Controlling modules, as well as other CAFM modules described above.

Table 17 contains the functional requirements for the module IoT data processing

Table 17: Requirements IoT data processing

	Functionality	Example / Remarks
Capture data		
1	Real-time data from IoT sensors can be captured	Occupancy planning, asset/equipment management, predictive maintenance; attributes: motion sensor, occupancy status.
2	IoT sensors can be assigned to FM objects (building, room, asset).	Occupancy detection at room level and sensors on assets/equipment
3	Different measurements can be captured via sensors	Temperature, humidity, CO ₂ concentration, motion, window status, occupancy, number of employees in a building
4	Sensitive data is only available to authorized users via an authorization concept	Occupancy detection must be anonymized
5	Master data can be transferred to the IoT platform	Room register, asset data
Process data		
6	Information can be provided based on sensor data	High CO ₂ value shown on display/dashboard with ventilation prompt
7	Alarms can be triggered based on sensor data	Moisture sensor sends alarm to mobile devices
Evaluate data		
8	Analysis tools exist to filter, aggregate and summarize IoT data	Bulk-data aggregation

9	A dashboard displays aggregated sensor data in real time within the CAFM software	Average room occupancy over time
10	Sensors can be read live via a floor plan	Objects on current floor plan show current as-is status
11	Historical data can be displayed	Temperature, utilization; year/month/week views

2.21 AI Assistance

The solution shall include an integrated AI assistant based on Microsoft 365 built-in capabilities:

- AI-powered assistant answering natural language queries (e.g. "Show all smoke detectors")
- Context-aware search across all modules described above including document management, which is not described within this document. Documents are stored in metadata structured SPO document libraries and also linked to the conceptual data model.
- Chat interface with deep links to relevant rooms, elements, and records
- Configurable AI agents for customer-specific workflows (no-code setup)

2.22 API Hub

The solution shall provide a central, configurable API hub that enables data to be exposed from the various modules to third-party systems and enables data from third-party systems to be integrated into the various modules:

- ERP (e.g. SAP)
- CAFM / CMMS
- GIS
- IoT platforms
- Automated master data synchronization
- Controlled data flow pausing and resynchronization
- Asset master data reconciliation with digital twin

2.23 Handover

The CAFM solution shall provide a Handover module integrated into the Microsoft 365-based CAFM platform (including SharePoint Online as the DMS). The Handover module shall enable automated control of project deliverables, support efficient phase close-outs, and ensure the transfer of a complete, reviewed and verified building documentation from projects into the CAFM platform's DMS:

- Configurable target scope: The target scope of required documentation shall be configurable per project and per project phase (including definition of required document types, quantities and quality criteria).
- Standards-based document type catalogue: The module shall support configurable document-type catalogues/structures (e.g., based on recognized building documentation standards) and allow project-specific adaptations.
- Dossier structuring: Documentation shall be clustered into dossiers based on a configurable structure (e.g., by phase, discipline, trade, object, system, or organizational unit).
- Dossier responsibilities: Each dossier shall have an assigned owner/responsible person with defined tasks, deadlines and permissions.
- Direct upload to SharePoint: The responsible person for a dossier shall be able to upload documents directly to SharePoint Online into the correct dossier structure, including mandatory metadata capture.

- Document metadata & findability: Uploaded documents shall be enriched with structured metadata (e.g., project, phase, dossier, document type, discipline/trade, object/system reference, revision/status, date, author/supplier) to enable reliable search and downstream use.
- Metadata is inherited directly from the dossier to the documents uploaded for the dossier.
- Comparison: The module shall provide an automated target vs. actual comparison for required/ordered documentation, showing completeness per project, phase, dossier and document type.
- Completeness status & dashboards: The module shall provide real-time status views (e.g., missing, delivered, under review, accepted, rejected) and dashboards for phase close-out readiness.
- Review and acceptance workflow: The module shall support a review/approval workflow for deliverables, including comments, rejection reasons, resubmission and audit trail/versioning.
- Packaging for handover: Once documentation is complete/accepted, the module shall be able to generate a structured handover package (e.g., dossier-based data set) for distribution and archiving.
- Dossier/package dispatch: Dossiers and/or handover packages shall be sendable/distributable to defined recipients (internal/external), including tracking of sending status and proof of dispatch.
- Notifications & reminders: The module shall support automatic notifications and reminders for upcoming deadlines, missing documents, rejected items, and phase close-out milestones.
- Traceability & audit trail: All actions (requests, uploads, changes, reviews, approvals, dispatch) shall be fully traceable with timestamps, users/roles and version history.
- Handover to CAFM DMS: Accepted documentation shall be transferred/organized in the CAFM DMS in a consistent target structure (including retention of metadata and links to relevant CAFM objects where applicable).

2.24 Logging

The solution must provide centralized, cross-module logging of user and system activities across all modules. This includes, among other events, user logins and logouts (authentication and session activity) as well as comprehensive audit trails for data changes. For any modification to a record, the system must log who (user identity) made the change, what was changed (field/values, including before/after where feasible), when it was changed (timestamp), and where it occurred (module, entity, and record reference), in order to ensure traceability, auditability, and compliance.

3 Documentation & handover

The contractor shall deliver complete technical documentation for the implemented solution. The documentation must be sufficiently detailed to enable operation, maintenance, troubleshooting, and further development by the client or third parties. In particular, it shall cover at least the following topics:

- Deployment setup guide (end-to-end installation/configuration steps, prerequisites, environments, dependencies, and release/deployment procedure)
- Viewer setup guide (APS configuration, viewer setup, embedding approach, migration to an APS tenant, and any required registrations/permissions)
- Data mapping (mapping of the conceptual data model to the implemented data structures, including SharePoint lists/libraries, keys/IDs, relationships, and any transformation or synchronization logic)

In addition, the contractor shall provide the complete source code of the implemented solution in a reusable and editable form. This shall include all application components (frontend, backend, configuration, infrastructure-as-code where applicable), build and deployment scripts, and any libraries or modules developed specifically for the solution. The source code shall be delivered in a version-controlled repository format (or an agreed export thereof) together with all instructions required to build, run, and further develop the solution.

