isBIM | JARVIS

JARVIS AI BIM

JARVIS 智能模型助手

AI-Powered BIM Copilot for Natural-Language Model Interaction

AI-Powered BIM Copilot—— 面向 BIM 模型自然语言交互智能协同工具

Model Interaction · Intelligent Measurement · Property Analysis · Efficient Empowerment

模型交互·智能算量·属性解析·高效赋能

Pilot reference. In real project deployment cases, a residential BIM model containing more than 1,000 components can complete full query and analysis within 1 minute. The AI Copilot automatically classifies 95% of components in accordance with industry measurement standards, identifies progress deviations by matching model status with construction schedules, and generates complete quantity take-off reports to support tender evaluation.

真实项目落地验证。一套包含上千构件的住宅 BIM 模型，1 分钟内即可完成全部查询与分析。BIM 智能协同助手按照行业计量标准自动完成 95% 构件分类，对比施工计划识别进度偏差，并输出完整工程量测算报告，支撑招投标图纸核算。

Executive summary

执行摘要

Traditional BIM workflows rely entirely on heavy manual operations, covering model inspection, component attribute query, quantity take- off, cross- check between drawings and models, and construction progress tracking. As outlined in the whitepaper's five core industry pain points, BIM models store massive engineering data yet are hard to access without professional skills. Repetitive manual work wastes massive manpower and time, easily triggering human calculation errors, outdated data, lagging reactive progress supervision, inconsistent review standards, and high operation barriers for non- BIM staff. These drawbacks lead to tender quantity deviations, contract claims and on- site shutdowns, severely limiting construction efficiency and quality. To break the constraints of traditional BIM operation modes, JARVIS AI BIM — an AI Copilot for BIM developed by isBIM — leverages advanced artificial intelligence to realize full- process upgrading of the entire BIM workflow.

传统 BIM 工作流程高度依赖人工操作，涵盖模型检查、构件属性查询、工程量计算、图纸与模型交叉核对、施工进度追踪五大工作。白皮书列明五大行业核心痛点：BIM 模型存储海量工程数据，但无专业技能则难以调取；重复性人工工作耗费大量人力工时，极易产生人工计算错误、数据更新滞后、进度管控事后补救、审图标准不统一、非 BIM 人员操作门槛高等问题。以上弊端会造成招标工程量偏差、合同索赔、现场停工等后果，严重制约施工效率与工程质量。为打破传统 BIM 作业模式的局限，isBIM 研发的 JARVIS AI BIM——BIM 领域 AI Copilot（智能协同助手），依托前沿人工智能技术，实现全流程 BIM 工作流升级。

5	95%+	30 min	100%
Core AI Capabilities 核心 AI 能力	**Auto-Classification Rate** 自动分类准确率	**Full Model Analysis** 全模型分析	**Element Traceability** 构件可溯源

1. The challenge

1.挑战与核心前提

BIM models store the most comprehensive project data, but users need professional software and skilled personnel, spending hours manually browsing to obtain valid analysis results. Cost engineers spend several days manually counting component quantities and volumes; project managers cannot quickly obtain accurate model data and engineering information for project decision-making; drawing reviewers can only compare models and specifications manually. Complete data is stored inside models, while valuable project insights cannot be quickly extracted.

BIM 模型承载完整项目数据，但想要获取有效分析结果，必须依托专业软件、专业人员，耗费大量时间手动翻阅模型。造价人员需要耗时数日人工统计构件数量、核算体积；项目经理无法快速获取精准模型数据与工程信息，支撑项目决策；审图人员只能手工对照规范核验模型。完整数据存储于模型内部，关键项目价值洞察难以快速提取。

Pain Point 痛点	What it means in practice 实务含义
Model data locked and hard to extract **模型数据调取困难**	BIM models store massive attribute, quantity and spatial data. Mastery of complex BIM software is required to retrieve information, consuming massive manual hours. BIM 存储海量属性、工程量、空间数据，调取信息需要熟练操作复杂 BIM 软件，消耗大量人工工时。
Manual quantity calculation consumes heavy manpower 人工算量人力成本高	Tender and cost budgeting require manual component selection, classification and measurement, which takes days and easily causes human errors. 招投标、成本预算都需要人工挑选、归类、计量构件，全程耗时数日，极易产生人为差错。
Data feedback is slow and inefficient **数据反馈低效滞后**	。 Traditional BIM viewing and data querying rely on manual operation and layer-by-layer checking. Massive model data cannot be quickly screened and extracted, resulting in low overall project work efficiency. 传统 BIM 查看、数据查询依赖人工操作、逐层翻查，海量模型数据无法快速筛选提取，整体项目工作效率低下。
Inconsistent standards for manual design review **人工审图标准不统一**	Different inspectors adopt different judgment standards when browsing large models, easily leading to omission of non-compliant components. 不同审核人员翻阅大型模型时评判标准不一，极易遗漏不合规构件。
High independent operation threshold of BIM **BIM 自主操作门槛高**	Standard BIM software requires professional training to open, browse and extract model data. Non-Ordinary staff without BIM training cannot view or analyse model data without dedicated BIM technicians' support. 未经过 BIM 专业培训的普通工作人员，必须依靠专职技术人员才能调取模型数据。

Core Premise for BIM AI Adoption　　AI BIM 落地核心前提

JARVIS AI BIM follows three core design principles:

1. The AI Copilot acts as an auxiliary intelligent tool to assist rather than replace BIM practitioners. All AI analysis results are attached with confidence scores and source traces, and professionals hold final judgment rights;

2. It is fully compatible with existing mainstream BIM tools and standards including IFC, Revit, ArchiCAD, BIM Collaborate, without the need to deploy new independent platforms;

3. Natural language interaction is open to all project staff, not limited to BIM specialists, so all team members can directly acquire model data.

JARVIS AI BIM 遵循三大核心设计原则：

AI Copilot 智能协同工具仅作辅助，赋能而非替代 BIM 从业人员；所有 AI 分析结果均附带置信分值与数据溯源，由专业人员做最终判定；

全面兼容 IFC、Revit、ArchiCAD、BIM Collaborate 等现有主流 BIM 软件与标准，无需全新搭建独立平台；

自然语言交互面向全体项目人员开放，不局限 BIM 专业人员，所有岗位均可直接调取模型信息。

2. What JARVIS AI BIM Is

2. 平台介绍

JARVIS AI BIM is an AI Copilot embedded inside the JARVIS BIM viewer. After opening any BIM model, project teams can communicate with the AI Copilot in plain Chinese or English, raise inquiries, request analysis reports and send model analysis instructions. The intelligent tool can identify model structure, building components, attributes and their correlations, and extract, classify, analyse and summarise model data as required.

JARVIS AI BIM 是嵌入 JARVIS BIM 浏览器的 AI Copilot 智能协同工具。项目人员打开任意 BIM 模型后，均可使用简单中英文和该工具交互，提出查询需求、申请分析报告、下达模型分析指令。智能工具可识别模型架构、建筑构件、属性及相互关联，按需调取、分类、分析、汇总模型数据。

The platform will not replace users' original BIM modeling software. It runs as an upper intelligent layer compatible with IFC, Revit and other standard BIM formats. As a universal intelligent tool applicable to all project types, the same AI Copilot can be deployed for residential buildings, medical complexes, municipal infrastructure and industrial plants.

平台不会替换用户原有 BIM 建模软件，以上层智能功能层形式运行，兼容 IFC、Revit 等各类标准 BIM 格式。作为适配全业态通用智能工具，同一套智能协同工具可应用于住宅楼宇、医疗综合体、市政基建、工业厂房。

Five Core AI Capabilities　五大核心 AI 能力

AI Capability AI 能力	What it does 功能说明
Intelligent Model Querying **智能模型查询**	Natural-language querying of BIM element properties, quantities, spatial relationships and parameters — "show all fire-rated doors on Level 3", "what is the total concrete volume in the basement?" 基于自然语言查询 BIM 构件属性、工程量、空间关系与参数——「显示三楼所有防火门」「地下室的混凝土总体积是多少？」。
Automated Element Classification **自动构件分类**	Auto categorize all components under industrial measurement standards to support cost budgeting and bill of quantities creation. 依据行业计量规范自动划分全部构件，支撑成本测算、工程量清单编制。
Construction Progress Identification **施工进度识别**	AI-driven analysis of BIM model status against construction schedules — identifying completed, in-progress and delayed tasks, and flagging discrepancies between model and programme. AI 驱动的 BIM 模型状态与施工进度计划对比分析——识别已完成、进行中和延误的任务，并标记模型与进度计划之间的差异。
Conversational Project Insights **对话式项目洞察**	Automatic generation of summaries, reports and insights from model data — quantity take-offs, element schedules, clash summaries, cost estimates and progress dashboards, all generated on demand through conversation. 从模型数据自动生成摘要、报告与洞察——工程量提取、构件明细表、碰撞汇总、成本估算与进度仪表板，全部通过对话按需生成。
Design Review Support **设计审查支持**	Auto cross-check components against drawings and specifications to screen non-compliant and missing components. 联动图纸、规范自动核验构件，筛查不合规、缺失构件。

3. BIM Knowledge Architecture

3. BIM 知识架构

JARVIS AI BIM organises all ingested model data into a structured knowledge graph that links building elements, systems, spaces, properties, relationships and construction tasks within a unified BIM ontology. Model data is ingested automatically through IFC and native BIM format parsers, without manual data entry.

JARVIS AI BIM 将所有接入的模型数据组织为结构化知识图谱，在统一的 BIM 本体框架内关联建筑构件、系统、空间、属性、关系与施工任务。模型数据通过 IFC 与原生 BIM 格式解析器自动接入，无需人工录入。

The architecture extends Jarvis Knowledge+ with BIM domain entities — element classifications, measurement rules, construction methods, specification references and progress logic — so that a wall is understood not just as a geometric object, but as a construction element with a type, a material, a measurement method, a cost code, a construction sequence and a specification reference.

该架构在 Jarvis Knowledge+ 基础上扩展了 BIM 领域实体——构件分类、计量规则、施工方法、规范引用与进度逻辑——使墙不仅被理解为一个几何对象，而是一个具备类型、材料、计量方法、成本编码、施工顺序与规范引用的施工构件。

Layered Entity Structure　分层实体结构对照表

Layer 层级	Core Entities 核心实体	Data Source 数据来源
Governance **治理层**	Role-based access, audit trail, element citations, decision records 基于角色的权限、审计追踪、构件引用、决策记录	JARVIS OS / RBAC JARVIS 操作系统 / 分级权限
Insight **洞察层**	Query results, classifications, progress findings, report outputs, confidence scores 查询结果、分类结果、进度发现、报告输出、置信度评分	AI Analysis Engines AI 分析引擎
Construction **施工层**	Construction tasks, schedules, progress status, method statements, WBS items 施工任务、进度计划、进度状态、施工方法说明、工作分解结构	Construction programme 施工进度计划
Element **构件层**	Building elements, systems, spaces, components, assemblies, families, types 建筑构件、系统、空间、组件、装配体、族、类型	BIM model / IFC BIM 模型 / IFC
Property **属性层**	Dimensions, materials, quantities, parameters, specifications, cost codes, fire ratings 尺寸、材料、工程量、参数、规范、成本编码、耐火等级	BIM properties / COBie BIM 属性 / COBie
Geometry **几何层**	3D geometry, coordinates, spatial relationships, clashes, intersections, bounding volumes 三维几何、坐标、空间关系、碰撞、交集、包围体积	BIM geometry engine BIM 几何引擎

Key Ontological Relationships　核心本体关系

An element belongs to a system and occupies a space. An element has properties — dimensions, material, fire rating, cost code — and those properties are tested against specifications. A construction task is linked to the elements it installs, and its progress status is derived from model state compared against the programme. A classification is assigned to an element according to a measurement standard, and the classified quantity feeds into the bill of quantities.

一个构件属于一个系统并占据一个空间。一个构件拥有属性——尺寸、材料、耐火等级、成本编码——这些属性对照规范进行检验。一个施工任务关联到它所安装的构件，其进度状态由模型状态与进度计划的比较得出。一个分类根据计量标准分配给一个构件，分类后的工程量输入到工程量清单中。

That final chain — geometry → element → property → classification → quantity → cost — is what makes every figure defensible. At audit, the question is not only what the number is, but which elements it came from, how they were classified, and against which standard. JARVIS AI BIM holds all six.

最后这条链路——几何 → 构件 → 属性 → 分类 → 工程量 → 成本——正是每一个数据经得起辩护的原因。审计所关注的不仅是「数字是多少」，更是「它来自哪些构件、如何分类、依据哪个标准」。JARVIS AI BIM 将这六者一并保存。

4. Embedded Business Logic

4. 内嵌式业务逻辑

JARVIS AI BIM embeds a defined set of business rules that govern how the AI copilot answers queries, classifies elements, identifies progress and generates reports. These rules are configurable per project but follow a consistent baseline logic aligned with industry standards.

JARVIS AI BIM 内嵌成套标准化业务规则，管控 AIcopilot 回答查询、分类构件、识别进度与生成报告的方式。各类规则支持按项目自定义配置，同时共用一套与行业标准对齐的基础逻辑。

Rulefamily 规则族	Logicapplied 所施加的逻辑
Intent mapping 语义意图映射	A natural-language request is mapped to one of the model operations it maps to — search, count, list, navigate — before anything is queried. 自然语言请求在被查询之前，先被映射至对应的模型操作——搜索、统计、列出、导航。
Category / family / type / name resolution 类别/族/类型/名称解析	Terms in the request are resolved against the model's own naming — including near-matches and synonyms — rather than requiring an exact category name. 请求中的用词，会对照模型自身命名进行解析——包括近似匹配与同义表述——而非要求输入完全一致的类别名称。
Quantity aggregation 工程量聚合逻辑	Area, length, volume and count are aggregated with correct units across the scope implied by the question — one model or many. 面积、长度、体积与数量，会按问题所隐含的范围（单一模型或多个模型）以正确单位聚合。
Layer-by-layer traversal 逐层遍历逻辑	A model-exploration request steps through category → family → type → name in order, rather than returning everything at once. 模型探索类请求会按 类别→族→类型→名称 的顺序逐层展开，而非一次性返回全部内容。
Isolate / focus / highlight 隔离/聚焦/高亮逻辑	Matching elements are isolated from the rest of the model, the camera focuses on them, and they are highlighted — every time, without a separate command. 匹配构件会从模型其余部分中被隔离，视角随之聚焦，并予以高亮——每次皆如此，无需额外指令。
Federated resolution 联合模型解析逻辑	A question spanning disciplines is resolved against the federated set as one model, with results attributed back to their source package. 跨专业的问题会作为一个统一模型对照联合模型集解析，结果同时标明其来源专业包。
Model-agnostic ingestion 模型无关摄取逻辑	NWD, IFC and Revit sources are normalised into the same internal structure, so the same question works regardless of source format. NWD、IFC 与 Revit 源文件均被归一化为相同的内部结构，使同一问题不因源格式而异。
Foundation model choice 基础模型可替换	The language layer is swappable, so model selection can follow a department or firm's data-residency and procurement position. 语言理解层可自由更换，模型选择可依循部门或企业在数据存放地与采购方面的立场。

5. The AI Assistant

5.人工智能助理

All professional logic and underlying algorithms run automatically in the background. Users can operate BIM models simply through daily Chinese or English conversations, supporting one-click query for a single model or multi-discipline integrated project models.

所有专业规则与底层运算逻辑均在后台自动运行，用户无需复杂操作，只用日常中英文对话即可操控 BIM 模型，可单独查询单一体模型，也可一键统筹查询多专业整合项目模型。

What users ask it 用户会问什么

- What is the total road area?
- How many drainage channels are there?
- Show me the soil nails.
- Isolate the manholes.
- Show the invert levels of all manholes and catchpits.
- Take me through the model level by level.

- 道路总面积是多少？
- 有多少条排水沟？
- 显示所有土钉。
- 隔离检查井。
- 显示所有检查井和集水井的井底标高。
- 带我逐层浏览模型。

Agent 智能体	Role 职责
Extract 提取智能体	Reads the connected model source — NWD, IFC or Revit — and structures categories, families, types and properties. 读取已接入的模型源——NWD、IFC 或 Revit——并将类别、族、类型与属性结构化。
Locate 定位智能体	Resolves a search request against the model hierarchy and returns the matching set of elements. 将搜索请求与模型层级结构进行匹配，返回相应的构件集合。
Aggregate 聚合智能体	Counts and sums quantities across the scope implied by the question, with units and source attribution. 按问题所隐含的范围统计与汇总工程量，并附带单位与来源标注。
Navigate 导航智能体	Steps a layer-by-layer browsing request through the model hierarchy in order. 按顺序引导逐层浏览请求，穿越模型层级结构。
Render 渲染智能体	Isolates, focuses and highlights the matching elements in the 3D view for every answer. 为每一个回答，在 3D 视图中隔离、聚焦并高亮匹配构件。

6. Full Lifecycle Process

6. 全生命周期流程

JARVIS AI BIM supports the project across six stages, from early design through handover and into long-term facilities management.

JARVIS AI BIM 为项目提供全周期支撑，完整覆盖六大阶段，从方案设计、工程交付，一直延伸至长期设施运维管理。

Stage 阶段	What happens 执行内容
1. Design Development **1. 设计深化**	Natural-language model queries, design option comparison, automated element scheduling, specification compliance checking. 自然语言模型查询、设计方案比选、自动构件明细表、规范合规性检查。
2. Tender Preparation **2. 招标准备**	Automated quantity take-off by standard measurement methods, bill-of-quantities generation, tender model validation. 按标准计量方法自动提取工程量、生成工程量清单、招标模型验证。
3. Pre-construction **3. 施工前**	Constructability review, method statement alignment, WBS-to-model mapping, baseline progress establishment. 可施工性审查、施工方法说明对齐、工作分解结构与模型映射、基准进度建立。
4. Construction Monitoring **4. 施工监测**	Progress identification from model updates, discrepancy detection against programme, critical path impact analysis. 从模型更新识别进度、检测与进度计划的差异、关键路径影响分析。
5. Handover & DLP **5. 交付与缺陷责任期**	As-built model validation, asset register generation, defect mapping to model elements, DLP tracking with geotagged records. 竣工模型验证、资产台账生成、缺陷与模型构件映射、带地理标记的缺陷责任期全流程追踪。
6. Operations & FM **6. 运营与设施管理**	Asset information queries, maintenance scheduling support, space utilisation analysis, ESG and energy performance benchmarking. 资产信息查询、维护计划支持、空间利用分析、ESG 与能源绩效对标。

How a request flows through the system 请求在系统中的流转方式

Ask → Understand → Query model → Isolate & highlight → Answer shown

提问 → 理解意图 → 查询模型 → 隔离并高亮 → 呈现答案

7. Core Value, Scope & Deployment

7. 核心价值、适用范围与落地部署

7.1 Core Value 核心价值

Faster Insight
洞察提速

Answers that took hours of manual navigation now come in seconds through natural language.

Accurate Quantities
工程量精准

Automated classification by standard methods reduces human error and ensures consistency.

Full Traceability
全程可溯源

Every figure, classification and finding carries element-level source citations for audit.

Democratised Access
人人可用

Every team member — not just BIM specialists — can get answers from the model.

7.2 Application Scope 适用领域

Public building projects, infrastructure works, hospitals and healthcare facilities, schools and campuses, housing and residential developments, government office buildings, and cultural and sports facilities — scalable from a single building to a department's entire capital works pipeline.

公共建筑项目、基础设施工程、医院与医疗设施、学校与校园、房屋与住宅发展、政府办公楼、以及文化体育设施——并可由单一建筑扩展至整个部门的基本工程全流程。

Public Buildings
公共建筑

Government offices, community centres, cultural facilities, sports buildings

Healthcare
医疗建筑

Hospitals, clinics, healthcare complexes, specialist medical facilities

Education
教育建筑

Schools, universities, campuses, training centres, research facilities

Residential
住宅发展

Public housing, private residential, mixed-use developments

Infrastructure
基础设施

Bridges, tunnels, stations, drainage, utilities, transport infrastructure

Industrial & Special
工业与特殊建筑

Factories, warehouses, data centres, laboratories, secure facilities

Jarvis AI Twin does not replace your BIM viewer. It gives the model a voice, inside the viewer your team already uses.

Jarvis AI Twin 不代替您的 BIM 查看器，而是在团队已在使用的查看器之中，赋予模型“对话的能力”。

Clause and standard references follow the form of contract and the departmental standards in use on the project concerned; the checking item set is configured accordingly at setup. Performance figures reflect illustrative examples and vary with model size, quality and configuration. This document is for information only and does not constitute an offer.

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