



# 让图书馆更智慧

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# 什么是智慧图书馆？



- **智能身份识别**
- **智能书库管理**
- **智能书架整理**
- **自助借还服务**
- **智能参考咨询服务**
- **高科技产品体验服务**
- **智慧空间预约服务**
- **图书馆导航服务**
- **个性化推荐服务**
- **机器学习馆藏识别**



The diagram features a large dark gray circle on the left containing the text '智慧型服务'. To its right, three smaller dark gray circles are arranged vertically, connected by a thick dark gray line. Each of these three circles contains a white number (1, 2, or 3). To the right of each numbered circle is a dark gray rectangular box containing white text. The top of the slide has a decorative yellow and white zigzag border, and a small yellow speech bubble icon is in the top-left corner.

## 智慧型服务

1

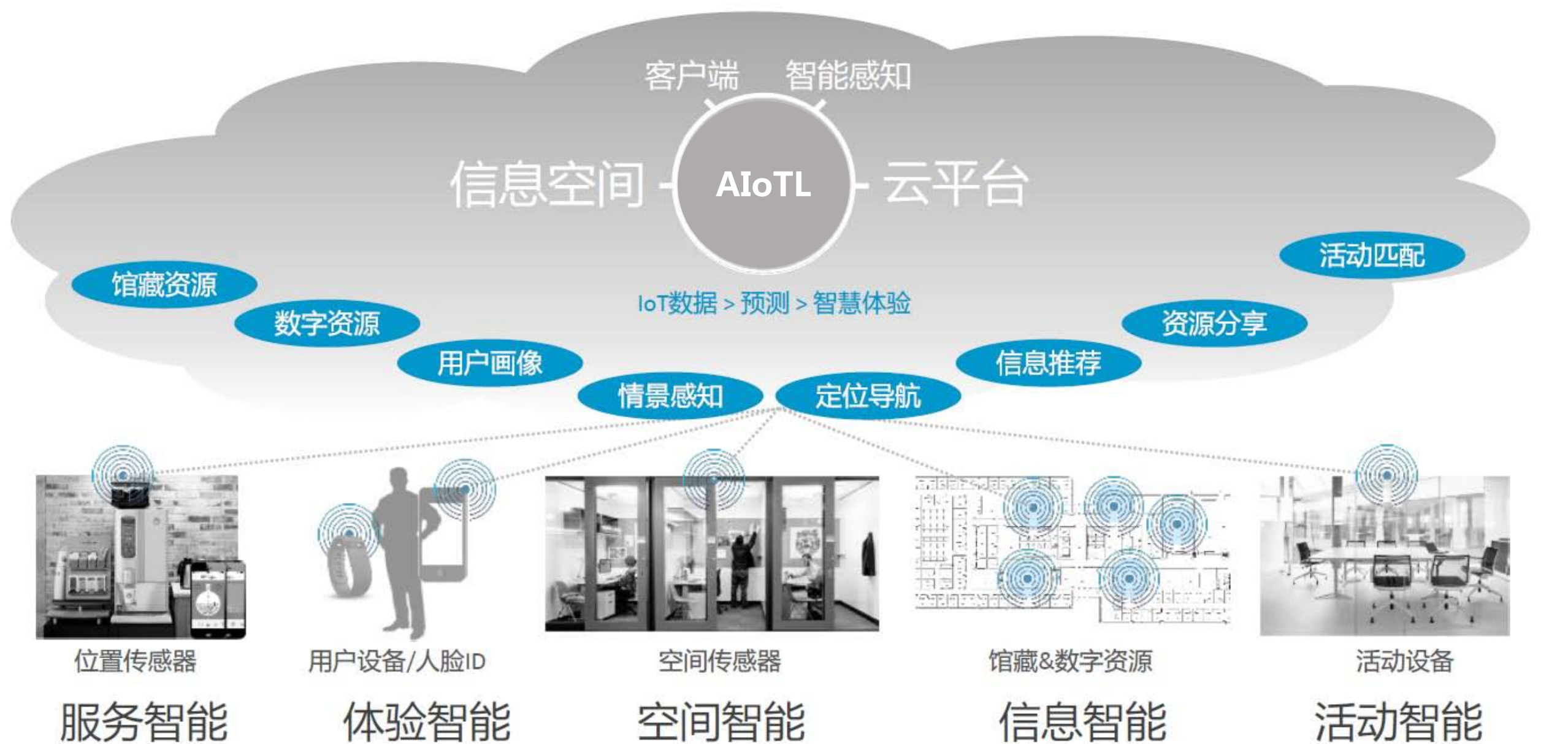
提供大量的“无人”或“自助”服务

2

通过对用户需求的自动感知而提供精准的、高质量的服务

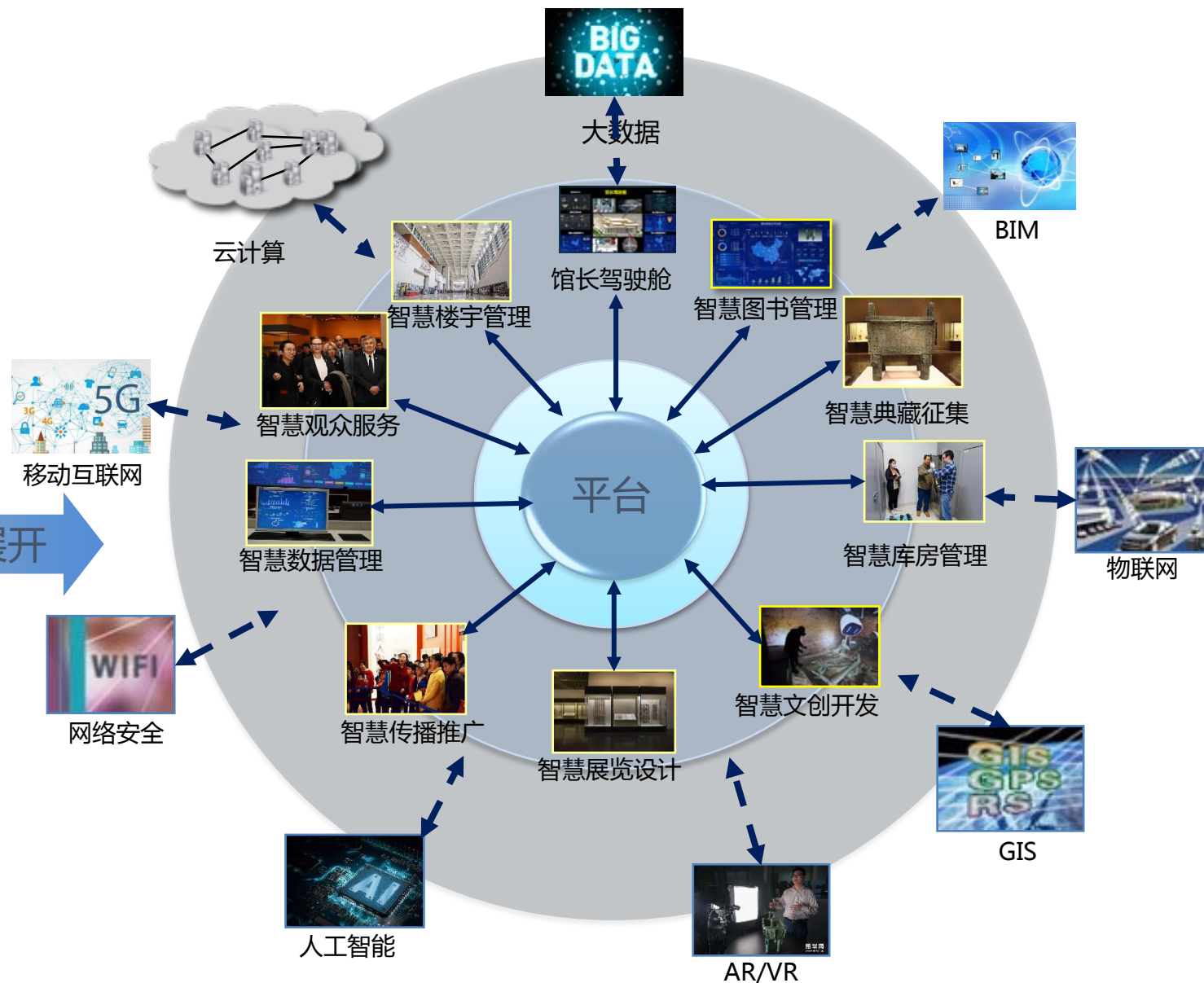
3

提供深入到知识数据层面，围绕知识数据获取和交流的一切服务，甚至智慧深入到加工、处理、发布





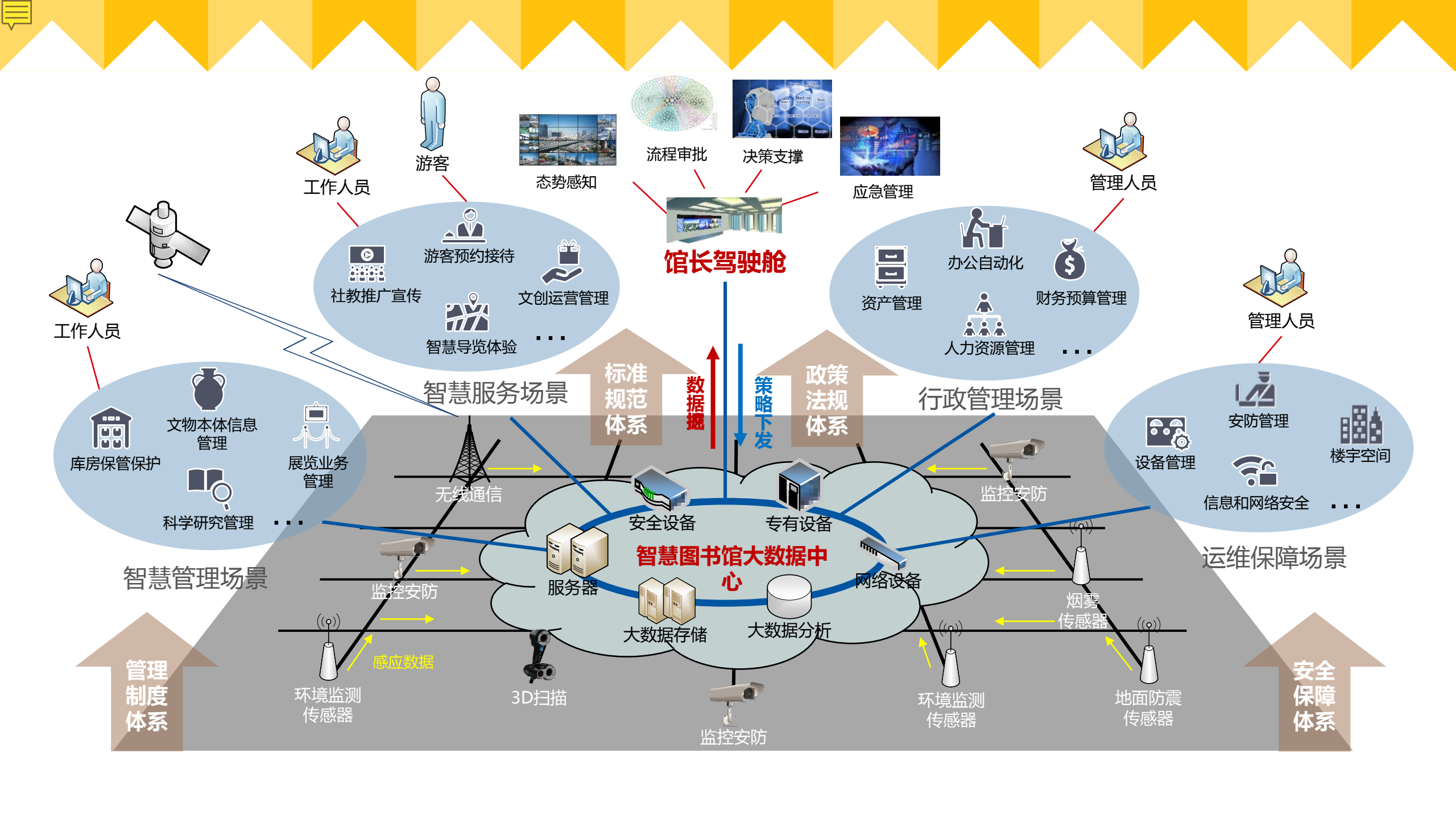
展开





- 平台会通过人工智能识别和校验海量的古籍和历史文献等内容，并将之转化为文本数据。通过文本数据挖掘相关的知识并形成数据模型和图谱。最终，由前端的各种智慧服务应用为读者提供更加个性化和智能的服务
- 在馆内，通过大数据和传感器、大屏、机器人等设备，统一管理并信息共享，形成了一套馆内用户感知的体系，在感知到用户的进入后，通过相关数据根据AI模型形成用户行为预测，最终增加用户在使用图书馆服务中的智慧感
- 在馆外，通过最新技术手段采集和保存优秀历史建筑的内外结构，通过AI技术实现建筑空间与图书馆海量历史事件、人物的勾连，让用户能通过简单交互操作不断发掘建筑的丰富历史内涵，真正实现“建筑可阅读”这一概念









智慧图书  
馆(SL)体系结构模型

平台

SL产品

SL 服务

应用  
类别

侦测

智能  
楼宇

控制

感知

智慧  
空间

处理

获取

智慧  
数据

加工

集成

智慧  
业务

融合

关键  
技术

RFID/  
Beacon  
传感

生物信  
息识别

自然语  
言处理

AR/VR  
交互

机器人  
技术

计算机  
视觉

自动  
翻译

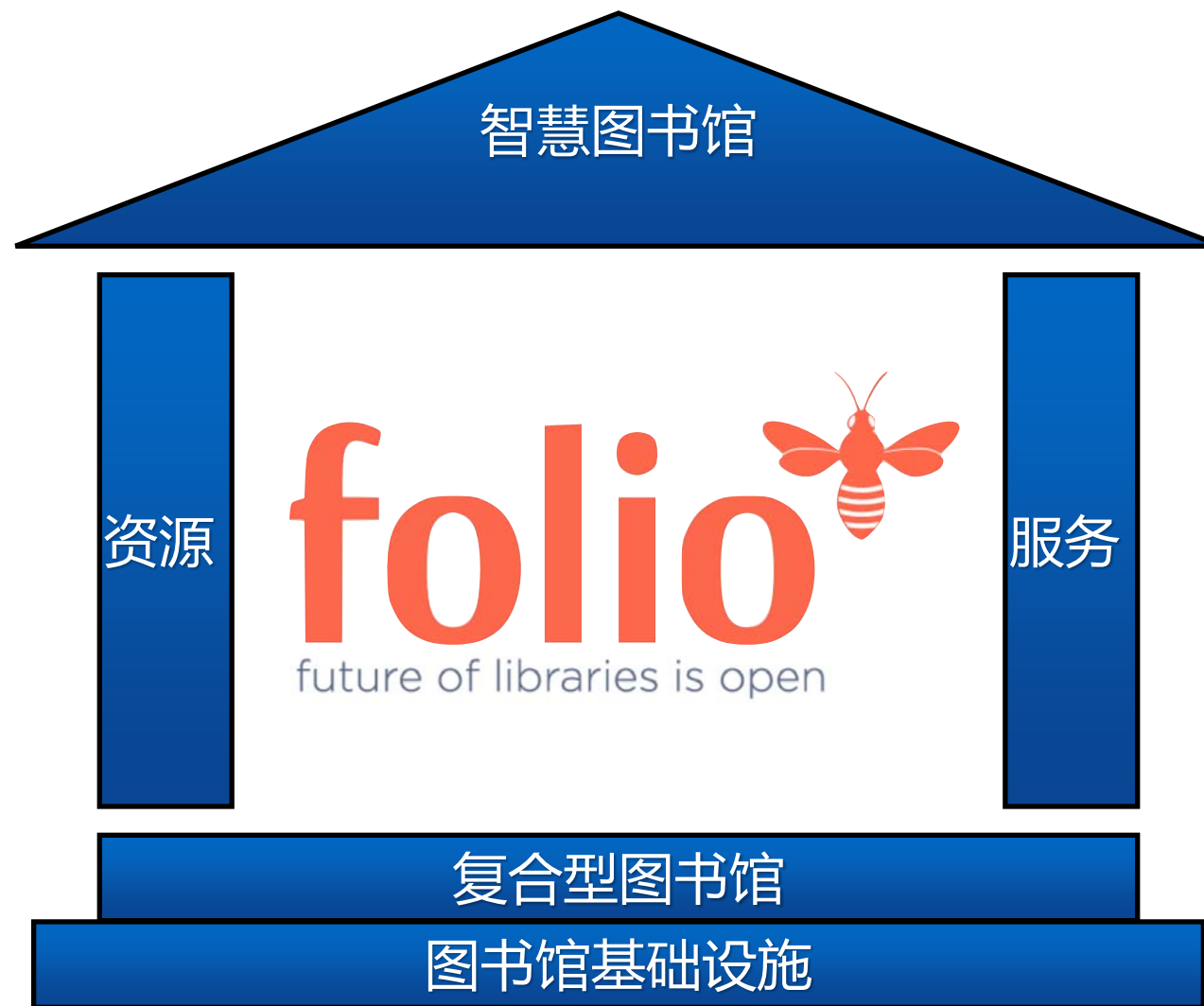
语义技  
术应用

数据分  
析挖掘

Hadoop机器学习 NoSQL

基础

人工智能通用设施：传感器、智能芯片、云计算





Open source

Community

Modern

Modular

Supported

# 开源的第三代图书馆服务平台





**CHALMERS**  
UNIVERSITY OF TECHNOLOGY

THE UNIVERSITY OF  
**ALABAMA**



**Duke**  
UNIVERSITY

**NC STATE**  
UNIVERSITY

**UMASS**  
AMHERST



**UWI**



Cornell University

UNIVERSITÄT LEIPZIG



**SOAS**  
University of London



**GBV | VZG**



Universidad Nacional  
Autónoma de México



CHARLES  
UNIVERSITY  
IN PRAGUE



上海图书馆



上海科学技术情报研究所



**LEHIGH**  
UNIVERSITY



SAPIENZA  
UNIVERSITÀ DI ROMA




China Academic Library and  
Information System (CALIS)



Universität Bremen



Fenway  
Libraries  
Online  
fio.org

- 
- 支持微服务架构的图书馆服务平台，开放的、灵活的、可扩展的面向未来的架构，能够链接智慧场景所需的各个软硬件模块
  - 采用Codex基于bibframe的数据方案，使数据管理、发现、迁移更灵活，天然的支持数据的互操作
  - 由社区驱动的开源项目，比其它基于微服务架构的图书馆平台更具有开放性和可互操作性，结合智慧图书馆有无限的扩展性

# Closed systems vs Open Source Platforms Choice. Innovation.

---



What was



What is today:  
Open platform, rich features, many hardware  
and software vendors, new frequent innovative  
solutions



① 烟囱应用

HR

OA

客服

营销

人力

办公

服务

市场

MES

PLM

ERP

SRM

CRM

财务

生产

供应链

销售

财务

孤立

以业务部门为导向构建业务系统

孤立的组织、功能型团队、单一用途的应用，系统信息孤岛严重，数据难以流通

② 点对点集成

线条

集成诉求出现，系统间开始相互对接

意面式集成，满足系统间点对点通信的诉求  
接口耦合度高，集成能力及经验无法复用，极易重复开发造成资源浪费，运维复杂

③ 总线集成

集中

使用SOA架构解耦，总线架构集成

“集成工厂”模式，由统一的组织和团队负责集成实现和运维，集成团队不懂业务，难以为业务团队提供最佳的决策信息  
企业业务边界被固化，集团与子公司间跨地域对接困难，子公司内部大量系统也面临集成整合

④ 分布式集成

分布

分布式管理，集成安全受到挑战

集团与国内外分子公司建将联邦式总线，基于企业内网实现跨集团与分子公司间跨地域对接  
无法与合作伙伴共同进行业务跨领域协同创新，打破边界又面临严重的安全威胁，给IT团队带来巨大的管理成本

⑤ 混合集成平台

融合

A、B、C、D全打通

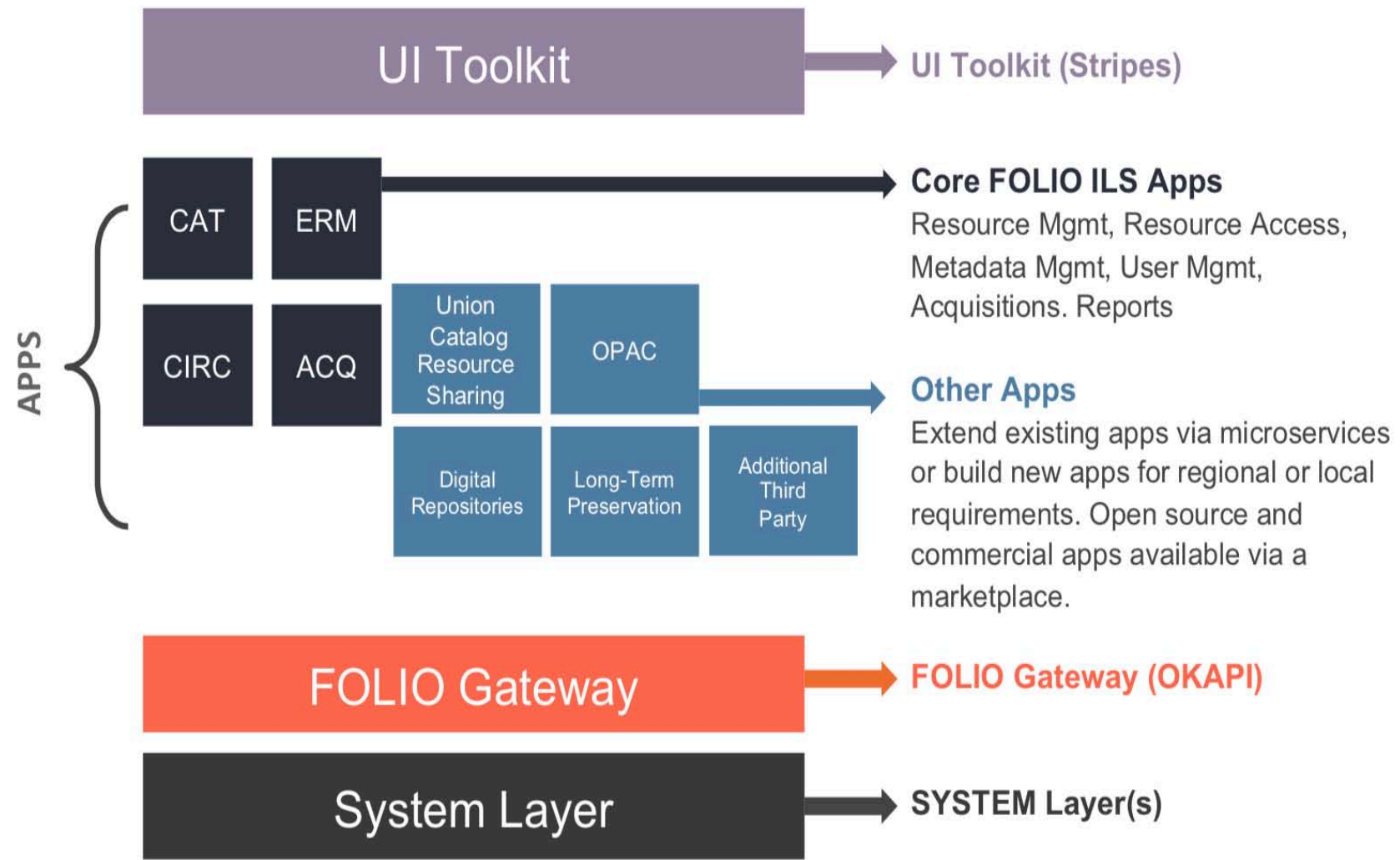
突破企业集成边界，为企业的一切应用、大数据、云服务、设备及合作伙伴构建连接  
传统的由IT团队控制的“集成工厂”模式将转变为支持由业务部门，子公司，应用程序开发团队和最终业务用户负责的自助集成模式

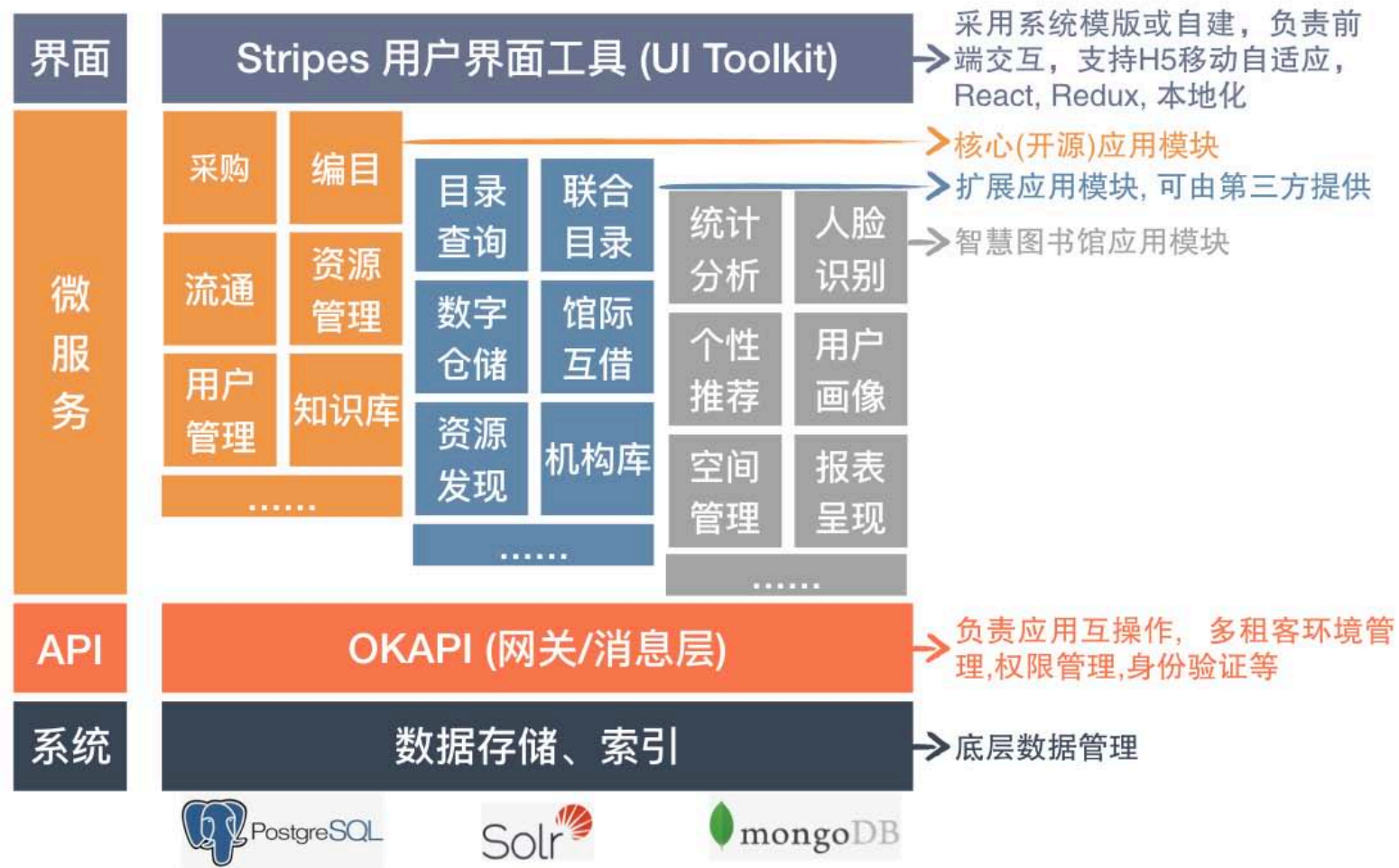
图书馆业务系统现状

跨越式发展

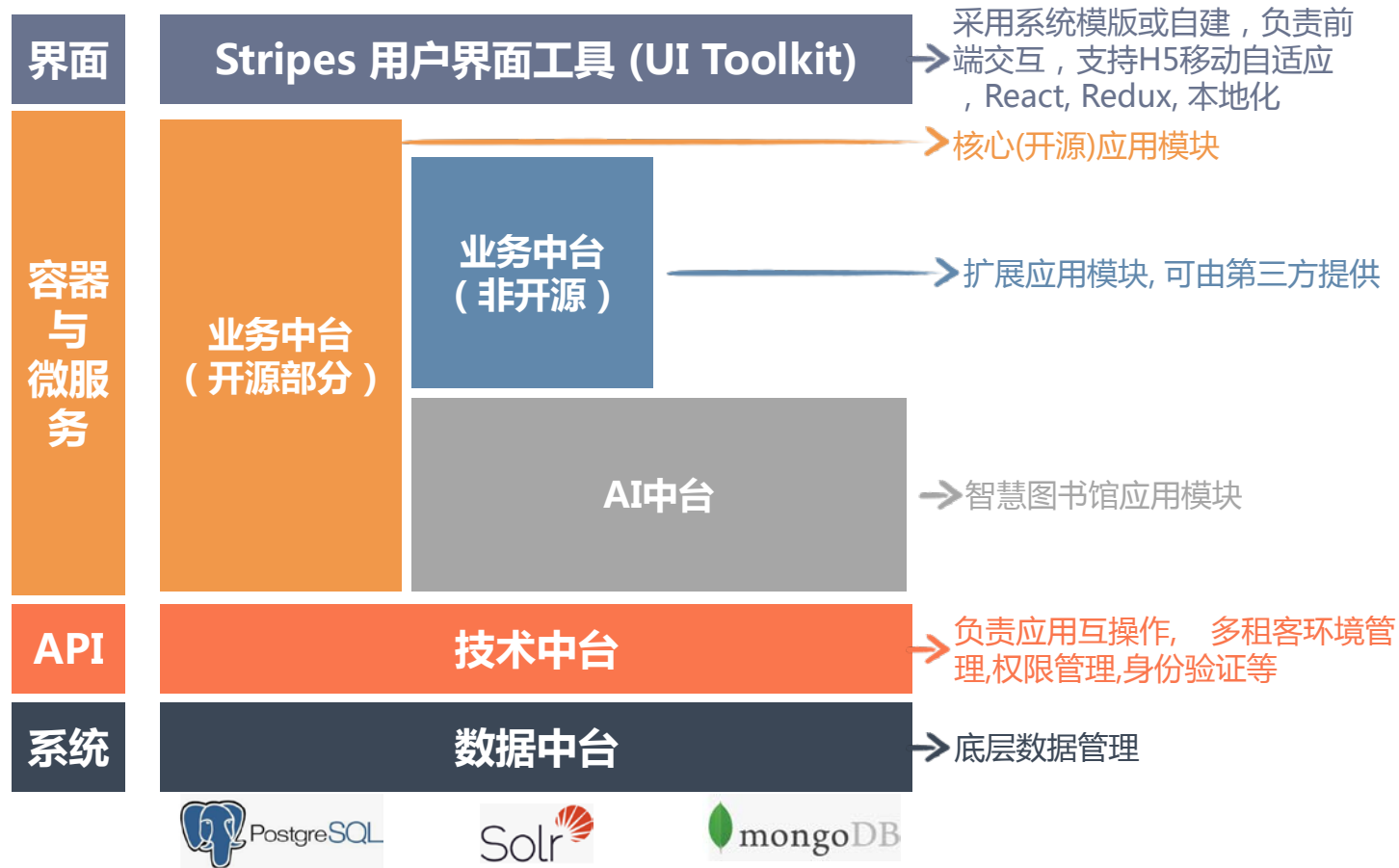
业界领先的业务系统架构





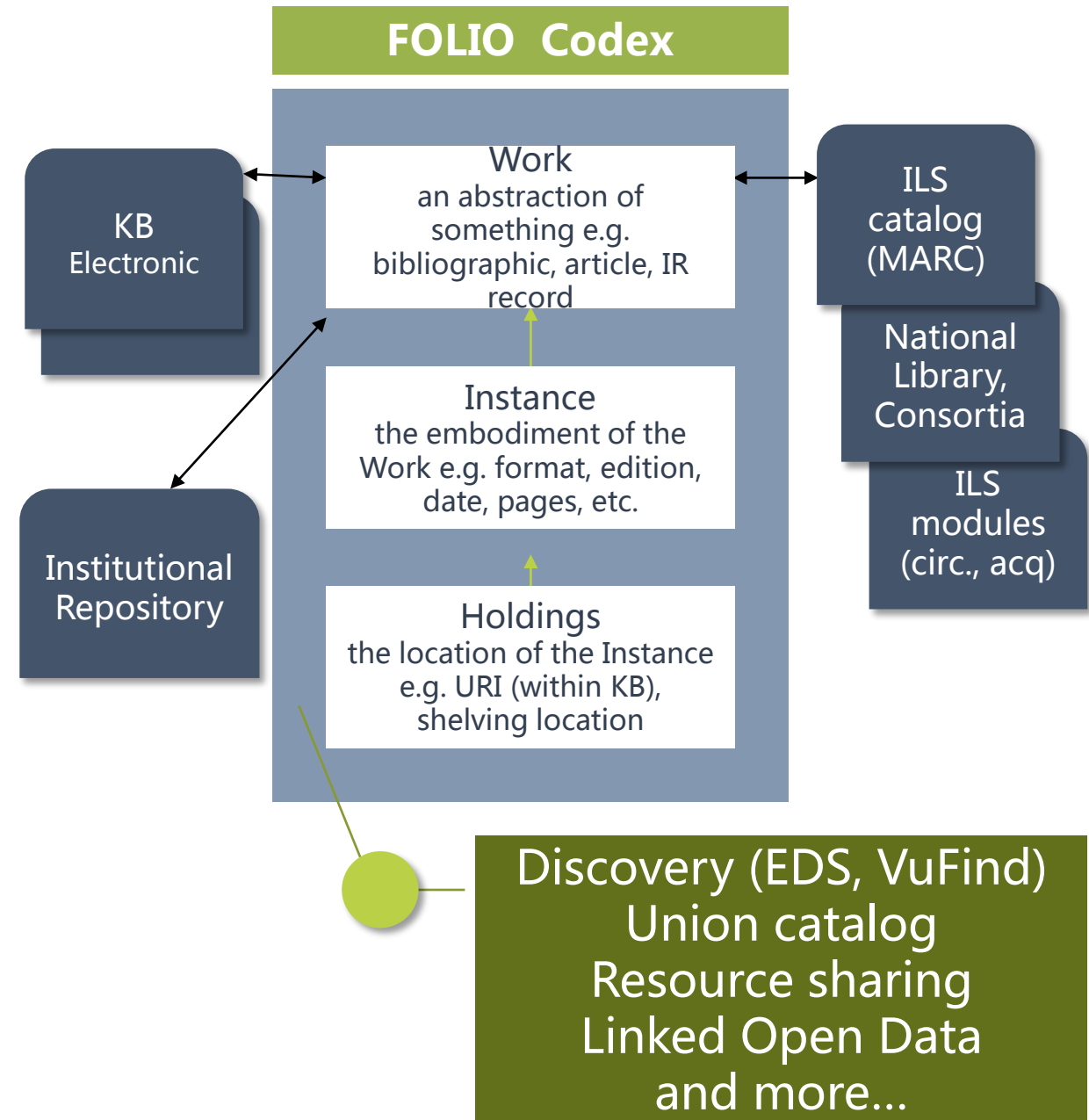


# 以FOLIO架构实现智慧图书馆



# FOLIO Data - Codex

- Data description for both e and print resources, based on BIBFRAME principles ([loc.gov/bibframe](http://loc.gov/bibframe))
- Referential linking to master detail records (no need to copy large data)
- Open unified repository of multiple knowledge bases for a view of the complete library collection



# Interoperability

Semantic  
(data context)

Exchange of data through contexts that are pre-defined and delivered in KOS vocabularies.

Structural  
(data architecture)

Exchange of data through pre-defined data models, data structures, and data schemes.

Syntactic  
(data language)

Exchange of data through common data formats defined for data encoding, decoding, and representation.

System  
(data presentation)

Exchange of data through networks, computers, applications, and web services.

The enabling  
standards and  
Recommendations

ISO 25964

IFLA  
LRM

CIDOC-  
CRM

BibFrame

DCMI  
AM

W3C Semantic Web

RDFS

SKOS

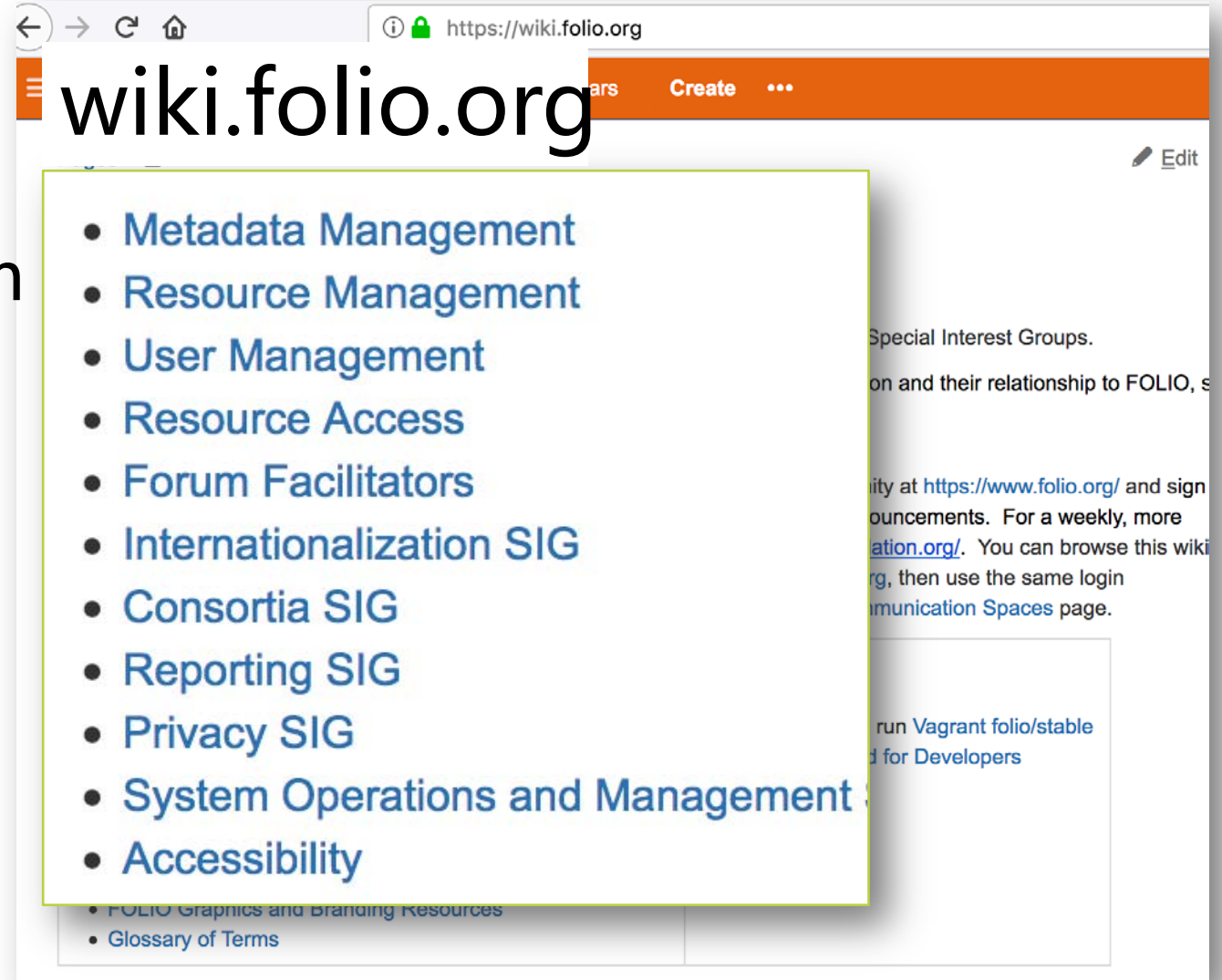
OWL

Web service  
standards

# Special Interest Groups (SIGs)

FOLIO's user experience (UX) is based on input from expert practitioners

Each area of expertise is represented by a Special Interest Group (SIG)





## 上图FOLIO项目各模块小组

- 技术规范组
- 用户及系统管理
- Codex&元数据管理
- 流通模块
- 采访模块
- 编目模块
- 中文发现

## 中国FOLIO技术及应用联盟

- 上海图书馆
- 复旦大学
- 交通大学
- 凯勤
- 仰格
- 科图
- 麦达
- 阿法迪
- 超星
- 嘉图



# FOLIO Communication Tools – All discussions are open!



## Webinars

### Discuss

**FOLIO Project**

Welcome to the FOLIO Project Discussion site. If you are looking to talk about FOLIO, please use the [welcome page](#) to help you get acquainted with the site. If you are used to other discussion sites, please read the [Discussion Guidelines](#), [Code of Conduct](#), [Privacy](#), and [Terms of Service](#).

all categories ▾ Categories Latest New Unread (1)

Category

**Community**

community@discuss.folio.org - At its heart, FOLIO is about the library community joining in partnership to innovate, develop a new open source library services platform, and transform library technology. This Community category is for learning about the FOLIO work, connecting participants with comm.

**Software**

software@discuss.folio.org - The FOLIO platform is extensible at its core, supporting traditional resource management functionality, but focused on the ability to deliver new services. This category has topics for discussing the technical aspects of the FOLIO Library Services Platform.

**Special Interest Groups**

sigs@discuss.folio.org - Core to the FOLIO community is its Special Interest Groups (SIGs). Each SIG has a category under this category for its discussions.

- Authentication/Authorization kabalog
- User Interface / User Experience

**Local**

local@discuss.folio.org - FOLIO is a partnership of library professionals from around the globe, so it is important to offer opportunities for contributors to connect with people in their part of the world. Topics of regional interest can be posted here.

### FOLIO End-of-Year Review

2nd November 2017 Michael Winkler  
FOLIOForums, Functional, Strategic, Technical

Event: FOLIO End-of-Year Review Time: Wednesday, December 13, 2017 at 11:00AM EST / 1600 GMT Recording Here It has been a great year for the FOLIO Project: the community of librarians, designers and developers has grown dramatically; we've seen running code evolve every month into something we recognize as supporting library workflow; and the "buzz" [...]

READ MORE

### FOLIO Development Process: It Takes a Community

2nd November 2017 Michael Winkler FOLIOForums, Functional, Technical

Event: FOLIO Development Process: It Takes a Village Time: Wednesday, November 15, 2017 at 11:00AM EDT / 1600 GMT Recording Here How is the community developing FOLIO? How do we define FOLIO's features and functions? How do we keep track of who is doing what? FOLIO is a huge effort—there is a lot to do [...]

READ MORE

### FOLIO Roadman Update & Demo

Have you given any thoughts on internationalization of the user interface? 7 4d  
Software tag

FOLIO UI: Queue/Task/Request-based Workflows 1 9d  
User Interface / User Experience

How will communication work when we want a more publish/subscribe communication model? 2 13d  
Software tag

Can you say something about how OKAPI differs from microservices orthodoxy? 0 13d  
Software tag

Will modules have access to OKAPI services via protocols other than HTTP? 0



主页 · Confluence

sig.library.sh.cn:8090/#all-updates

Confluence 空间 创建 搜索 登录

发现

所有更新

热门

空间

全部

folio

User Management

Codex & MM

Demonstration Space

上图LSP Wiki

Development Team

Acquisition

Circulation

Inventory

所有更新

cjxia

Codex & MM小组近期调研及实施计划 (2019.3.15-2019.4.15)  
在三月 15, 2019更新 (查看更改)

Codex & MM 近期调研计划 (2019年3月1日-2019年3月15日)  
在三月 15, 2019更新 (查看更改)

bib-1000-qzj-20190312.zip  
在三月 15, 2019添加附件

Folio-Inventory 数据字典(某些元素的取值词表) v1.0.0-20190307.1743.xl  
在三月 15, 2019添加附件

Folio-Inventory 数据结构分析 (数据库表中的元数据元素) .docx  
在三月 15, 2019添加附件

刘鹏

上图LSP 2019年开发计划  
在三月 09, 2019更新 (查看更改)

孙宇

LSP项目组第四次例会 会议纪要\_20190228.docx  
在三月 01, 2019添加附件

刘鹏

OTS-Tech-Debt-Recommendations.xlsx  
在二月 28, 2019添加附件

OTS+Project+Health+Report++DRAFT-原版.doc  
在二月 28, 2019添加附件

OTS+Project+Health+Report++DRAFT-译版.docx  
在二月 28, 2019添加附件

Dashboard / Development Team

技术文档汇总

Created by 刘鹏, last modified on Feb 28, 2019

汇总目前技术相关文档

《OTS+Project+Health+Report++DRAFT-原版.doc》为 Open Tech Strategies (OTS) 对FOLIO开源项目进行了一次评估。我们进行了翻译, 还有我们的一些理解, 放在《OTS+Project+Health+Report++DRAFT-译版.docx》中。

File

okapi.pptx

CQL.pptx

FOLIO.vs.SpringCloud.pdf

RMB开发模式.pptx  
RMB开发

Folio-vagrant 安装示例.docx

OTS+Project+Health+Report++DRAFT-译版.docx

OTS+Project+Health+Report++DRAFT-原版.doc

OTS-Tech-Debt-Recommendations.xlsx

# For developers, code is open

**FOLIO Developer** Source Code Documentation Community Contributing

## Welcome to FOLIO software development

This is the home for developers building FOLIO, a new open source platform designed to facilitate collaboration between disparate development vendors, libraries, tenants, and users to configure their experience. A developer preview of the core SDK is focused on enabling a new set of functions and features. We see FOLIO as an "innovation platform" where developers can work together to imagine and create new kinds of experiences.

Who is the platform for at this stage? Developers with an interest in exploring, and stretching the platform. You can help us shape the future of FOLIO by coming along, or even better, developers interested in building it.

What you will find here is not (yet) a library system, although it is designed to facilitate collaboration between disparate development vendors, libraries, tenants, and users to configure their experience. Over the coming months, we will gradually be adding features to the platform, but we have a ways to go yet. If you would like to explore the conversation over at [folio.org](https://dev.folio.org).

This website brings together the documentation and links that support participation in FOLIO. Though the website is still nascent, we expect it to evolve over the coming weeks.

We hope you will join FOLIO and help us shape the future of libraries.

**FOLIO Developer** Source Code Documentation Community Contributing

## Source Code

The FOLIO project includes server-side and client-side components, and will grow to include library services that run on the platform. Several sample modules exist that use this platform.

Several repositories in the [folio-org](https://github.com/folio-org) GitHub organization host the core project code now. In the future, third-party modules may be hosted elsewhere.

A good starting point for understanding the FOLIO code is [Okapi](#) – specifically the [Okapi Guide and Reference](#), which introduces the concepts and architecture of the FOLIO platform, and includes installation instructions and examples. Okapi is the central hub for applications running on the FOLIO platform and enables access to other components of the system. These repositories fall into three categories:

- Repositories that provide services and the infrastructure that they run on;
- Repositories that provide a framework for using those services from a Web browser; neither of these categories.

FOLIO is a technology preview following the [release early, release often](#) philosophy. We want to hear from you about pull requests, formally filed [Issues](#) and general discussion on the [Stack-based web forum](#).

Okapi is Okapi itself, the FOLIO middleware component that acts as a gateway for access to the platform, sessions, etc. Several modules are also provided in their own repositories, note that these are mostly at the proof-of-concept stage. Some of these modules are [RAML](#), the RESTful API Modeling Language: this process is facilitated by the code [builder](#) repository.

Okapi is a gateway proxy/discovery/deployment service.

Okapi is a framework facilitating easy module creation based on RAML files.

Okapi is a circulation demo based on the rami-module-builder and a set of RAML and JSON files. It provides some of the necessary circulation functionality against MongoDB.

Okapi is a demo acquisitions module, based on the rami-module-builder framework, exposing circulation objects against MongoDB.

Okapi is a demo acquisitions module, also based on the rami-module-builder framework, exposing acquisitions APIs and objects, but implemented with an asynchronous PostgreSQL database.

Okapi is a demo configuration module based on the rami-module-builder and a set of RAML and JSON files. It is led by a MongoDB asynchronous implementation.

Okapi is a demo of a JWT-based authentication/authorization module. Will be superseded by a more robust module handling authentication by various methods, and generalized permissions.

Okapi will work on a FOLIO metadata store and related knowledge base/cataloging concepts.

Okapi will provide the FOLIO functionality as well-behaved web services, UI code can, of course, be provided. However, we will provide Stripes, a toolkit optimized for accessing Okapi-based functionality into convenient modules. We envisage that most FOLIO UI work will be done in the context of Stripes.

**FOLIO Developer** Source Code Documentation Community Contributing

## Folio-Sample-Modules

Copyright (C) 2016 The Open Library Foundation

# 上海图书馆Folio项目测试系统

包含上海图书馆组织翻译的简体中文界面

包含上海图书馆上传的1000个Marc数据

测试账号：diku\_admin / admin

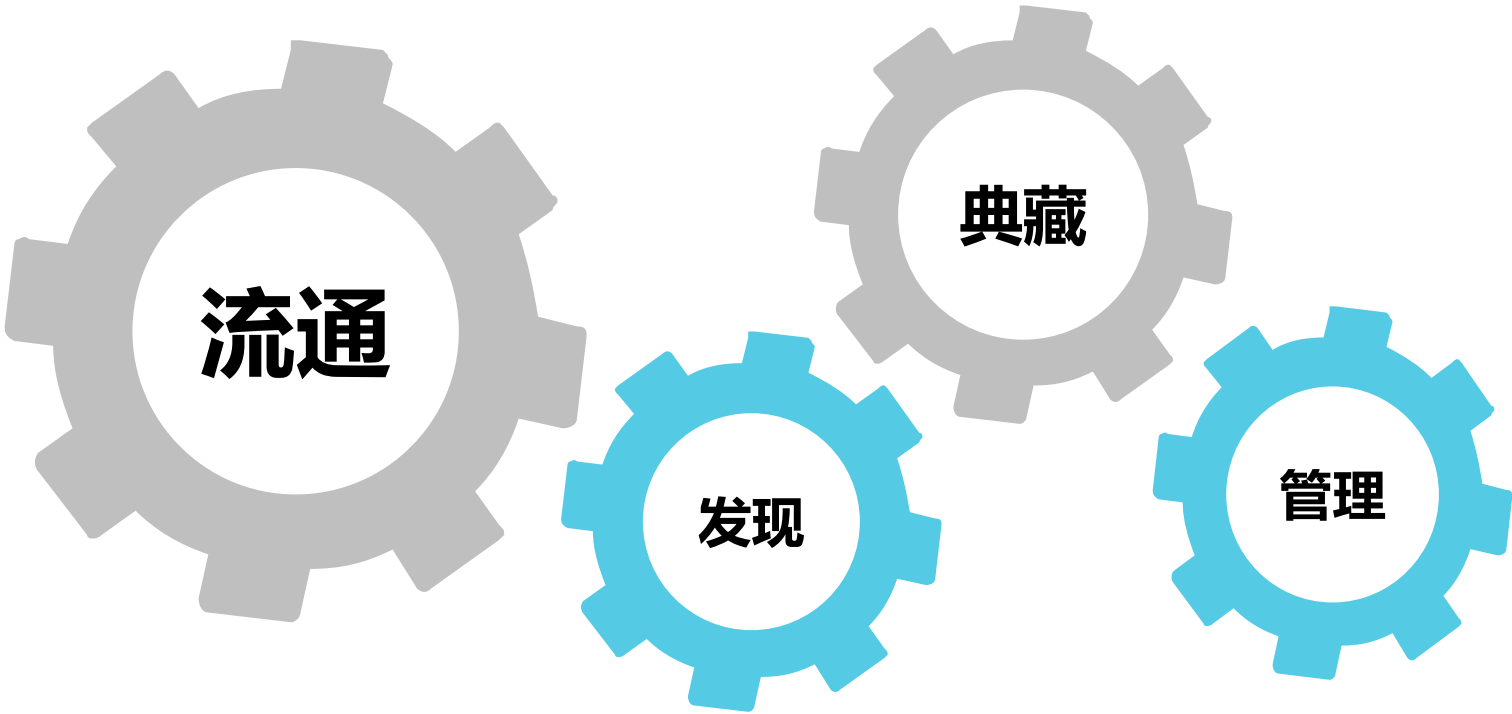
测试系统：

- 最新的snapshot版本：  
<http://demo.folio.library.sh.cn:4000/>
- 2019Q1 release版本：  
<http://demo.folio.library.sh.cn:3000/>





# 上海图书馆Folio项目





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- 靠纸质清单/台账
- 无馆藏资产情况统计
- 无馆藏变动情况跟踪

开源的下一代图书馆服务平台框架

- 业务可管理可跟踪
- 技术自主和开放



## Horizon

声像资料库  
保存本书库  
基藏书库  
航头书库  
世博文献  
视听库乐谱  
萃庄书库  
基藏外文书库



## 未编文献



## 连续出版物装订

书库  
航头书库  
基藏书库



## 古籍

13万种  
( 50万册 )



## 年增长

Horizon 16万  
未编文献 30万  
连续出版物 4万





## 典藏日常业务

- 移交、验收、出入库、移库、剔旧、盘点
- 衔接相关部门流程
- 业务数据更加准确



## 馆藏资产

- 全面掌握（系统内）馆藏资产情况
- 弥补现有图书馆集成系统缺失的资产管理功能



## 馆藏生命周期

- 涵盖馆藏生命周期，编目－验收－盘点等
- 跟踪记录馆藏位置和状态变化



## 数据导入

Horizon、连续出版物的数据初始化  
简编数据导入  
Marc数据导入  
自定义清单导入



## 典藏操作

验收  
出入库  
移库  
盘点  
剔旧



# 典藏App

## 查询和统计

用户  
馆藏  
清单、库



## 系统管理

用户管理  
权限管理



## 开放API

第三方应用  
其他App



1

- 利用Folio技术，前段Stripes、后端Vert.x、数据库PostgreSQL
- 利用Folio已有应用模块，例如User应用模块

2

- 属于下一代图书馆服务平台中的一个应用App
- 连接现存系统（支持这些系统未来迁移到Folio应用App）

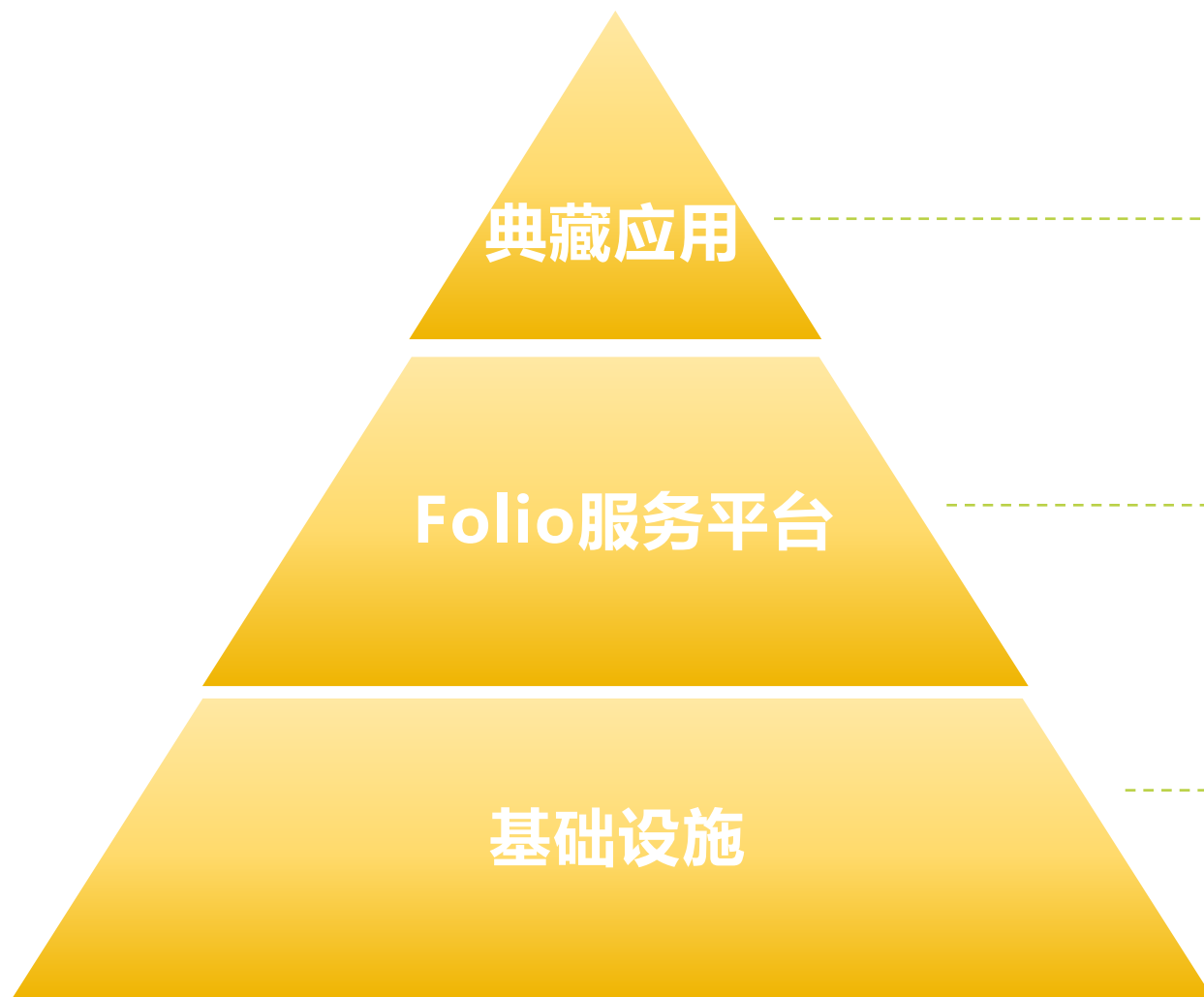
3

- 统一规划元数据，Codex和Inventory
- 符合Folio规范的API，App之间调用

4

- 负载均衡
- 系统安全
- 容器管理k8s

**满足业务要求  
性能稳定  
为其他 App积累经验**



- 馆藏管理

- 数据导入

- 出入库

- 统计

- OKAPI

- Codex、用户

- 数据库连接、日志处理

- 网络

- 物理服务器

- 虚拟机 / Docker



## 数据导入

连续出版物导入  
Horizon数据导入

## 出入库

清单管理  
典藏管理  
出入库

## 盘点

盘点清单管理  
盘点业务管理  
典藏状态管理

1

2

3

4

5

6

## 未编文献验收

未编文献清单导入  
未编文献登记  
清单导入  
未编文献编辑  
采编签收  
审核  
未编文献入库

## 移库

移库单生成管理  
移库单接收管理  
移库处理  
入库处理  
典藏状态管理  
Horizon同步

## 剔旧

剔旧登记  
Horizon确认  
Horizon同步  
典藏状态管理



## 2019年9月

- 详细设计
- 未编文献

## 2018年11月

- 出库入库
- 二次编目
- 盘点



## 2019年10月

- Horizon数据导入
- Horizon验收

## 2019年12月

- 移库
- 剔旧
- 系统测试

**THANKS**

