

软件/控制系统解决方案

SOFTWARE / CONTROLS SOLUTIONS

Version: 3.1.4

Author: Jim.Zhou

系统层次

SYSTEM HIERARCHY

解决方案及产品

SOLUTIONS & PRODUCTS



企业资源计划
Enterprise
Resource
Planning

ERP

仓库管理系统
Warehouse
Management
System

WMS

物流控制系统
Material
Flow Control
System

MFS

可编程序逻辑
控制器
Programmable
Logic Controller

PLC

功能划分

FUNCTIONAL DIVISIONS

- 商业管理、财务及控制
Business administration, finance and controlling
- 材料管理、需求计划及采购
Material management, requirement planning and purchasing
- 销售及配送、提案及发票
Sales and distribution, proposals and invoices
- 货物收据、库存及位置管理
Goods receipts, inventory and location management
- 订单计划、发放及拣选
Order planning and release, picking
- 包装及发货
Packing and shipping
- 全球物流控制
Global material flow control
- 全球物流优化
Global material flow optimization
- 全球输送订单控制
Global transport order control
- 本地物流控制
Local material flow control
- 输送订单执行
Transport order execution
- 元件控制
Element control

解决方案及产品

SOLUTIONS & PRODUCTS

企业资源计划
Enterprise
Resource
Planning

ERP

仓库管理系统
Warehouse
Management
System

WMS

物流控制系统
Material
Flow Control
System

MFS

可编程序逻辑
控制器
Programmable
Logic Controller

PLC

成套集成软件产品包

ONE INTEGRATED SOFTWARE PRODUCT SUITE ...

解决方案及产品

SOLUTIONS & PRODUCTS

企业资源计划（**ERP**）系统
ERP System

企业资源计划
Enterprise
Resource
Planning

ERP

仓库管理器™
WarehouseManager™

仓库管理系统
Warehouse
Management
System

WMS

自动化管理器™
AutomationManager™

物流控制系统
Material
Flow Control
System

MFS

自动化控制器™
AutomationControl™

可编程逻辑控制
器
Programmable
Logic Controller

PLC

单点控制
Single
Point
of
Control
(SPOC)

仓库管理器™

WarehouseManager™

- 从收货至发货的全部物流流程
- 无纸化拣选（无线射频及声控）
- 物料集中、包装及运输
- 订单管理及补货
- 通过人力管理进行资源安排
- 根据库位显示关键性能指标
- 多层用户
- 库区管理
- 特定的客户标签及报表
- 可与多个主机系统接口
- 系统构建基于客户服务器或网站
- 通过**UserExits**自定义

Logistics processes from receiving through shipping

Paper less picking (RF and Voice)

Consolidation, packing and shipping

Order management and replenishment

Resource planning by Labor Management

Visualization of key performance indicators by Cockpit

Multi owner

Yard management

Customer specific labels and reports

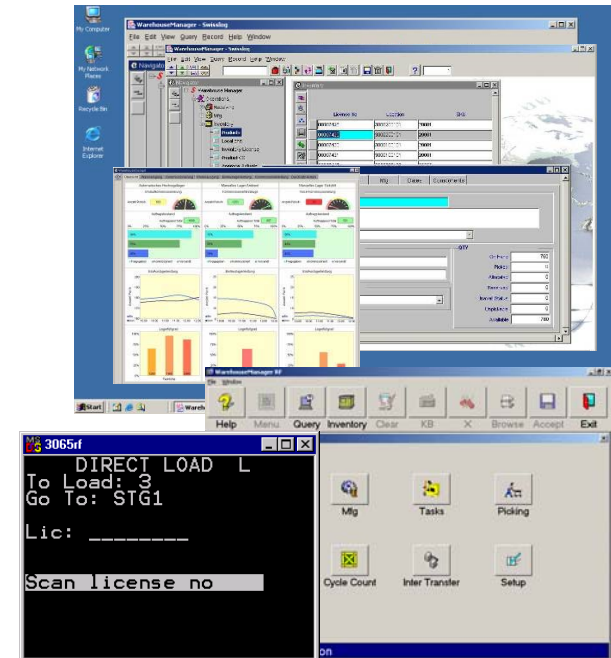
Interface to several host systems

Client Server or Web Based Architecture

Customization through UserExits

解决方案及产品

SOLUTIONS & PRODUCTS



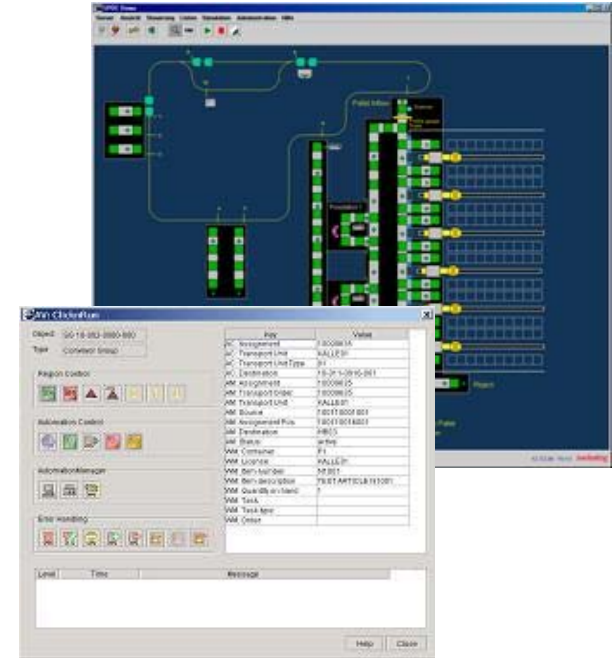
可扩展、可配置的标准软件

Scalable and configurable standard software

AutomationManager™

SOLUTIONS & PRODUCTS

- ## ■ 与子系统之间的标准接口
- Standard interfaces to subsystems



Scalable and configurable standard software

自动化控制器™

AutomationControl™

解决方案及产品

SOLUTIONS & PRODUCTS

■ 涵盖为指定输送系统建立控制系统的基本需求， 如：

Covers the basic needs to set up a control system for a specific transport system application i.e.

- 托盘输送机 Pallet Conveyors
- 轻量货物输送机 Light Goods Conveyors
- 堆垛机 Cranes
- 电动单轨系统 Electrical Monorail

■ 与**Swisslog**自动化方案纵向集成

Vertically integrated to the Swisslog Automation Concept

■ 使用相同基本软件模块及相同开发环境进行横向集成

Horizontally integrated using same basic software modules and same development environment



可扩展、配置的标准软件

Scalable and configurable standard software

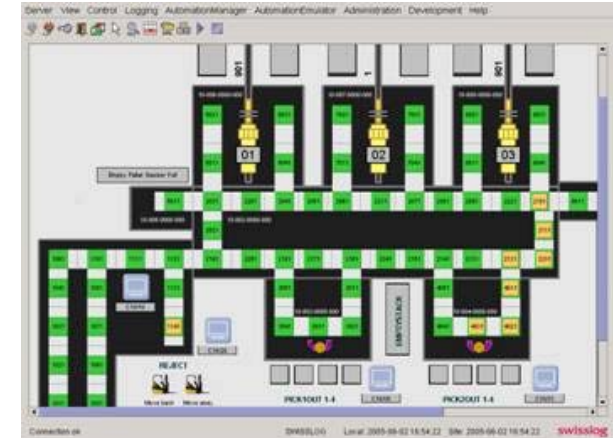
SPOC（单点控制）

SPOC (SINGLE POINT OF CONTROL)

- 企业用户接口
Enterprise User Interface
- 无线射频设备（移动）配有图形用户接口及**ASCII**用户接口
Graphical User Interface and ASCII User Interface for Radio Frequency devices (mobile)
- 可操作用户接口
Operational User Interface

解决方案及产品

SOLUTIONS & PRODUCTS

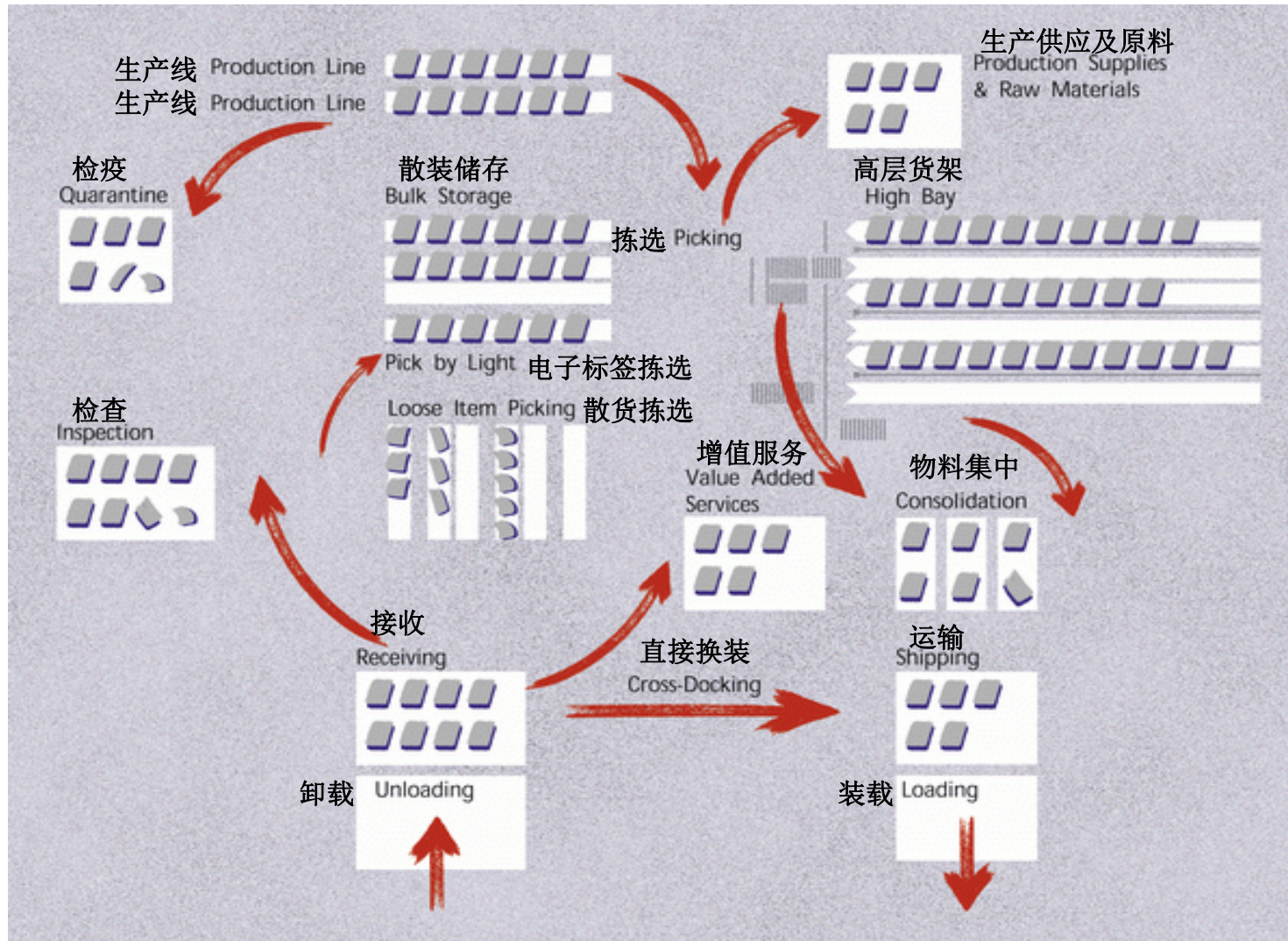


可扩展、配置的标准软件
Scalable and configurable standard software



物流流程 Logistics Processes

LOGISTICS PROCESSES



- 物料接收
Receiving
- 质量控制
Quality control
- 存放
Putaway
- 订单计划
Order planning
- 补货
Replenishment
- 拣选
Picking
- 订单集中
Order consolidation
- 包装
Packing
- 运输
Shipping
- 生产
Manufacturing
- 库区管理
Yard Management

接收 RECEIVING

第三章 Chapter 3

物流流程 Logistics Processes

- 预期收货数据下载
Expected receipts download
 - 无许可要求 non license based
 - 基于**ASN**标准许可 license based (ASN)
- 到货计划
Inbound planning
 - 预约 appointment
 - 指定装卸台 dock assignment
- 收货
Receipts
 - 根据**ER**创建多重收货 create multiple receipts against ER
 - 品项限定收货提示 SKU defined receipt prompts
- 登入
Check-in
 - 预期收货 against expected receipt
 - 临时收货 blind receipts
 - 属性追踪, 如份额、生产日期等 capture tracking attributes such as lot #, mfg date ...
 - 特别指令显示 display special instructions
 - 差异记录 record discrepancies
- 商标
Labeling
 - 使用预先打印商标或根据要求打印 use of pre-printed labels or print label on demand



质量控制

QUALITY CONTROL

第三章 Chapter 3

物流流程 Logistics Processes

■ 初始状态

Initial status

- 外部产品接收
- 生产产品收货

by product for external receiving
by product for production receipt

■ 质检状态

QC status

- 所有库存可用/不可用状态显示
- 不可用状态可定义为质检/受损/等待

all inventory has a status of available or unavailable
unavailable can be customized such as quality hold, damage, pending

■ 状态切换时间

Time holds

- 根据时间状态自动切换

automatic status change to available
based on time

■ Q储存

Qstorage

- 根据物料状态直接存放
- 在一般区域储存Q状态库存
- 在特定区域储存Q状态库存

direct putaway by material status
store Qstatus inventory in general area
store Qstatus inventory in special area



存放 PUTAWAY

第三章 Chapter 3

物流流程 Logistics Processes

■ 存放任务

Putaway task

- 自动创建存放任务
- 分步存放
- 允许操作员撤销

automated putaway tasks creation
multi step putaway
allow operator to override

■ 地点选择逻辑

Location selection logic

- 随机预订地点
- 发送固定拣选地点
- 集中至已有地点

random reserve locations
forward fixed pick locations
consolidate to existing locations

■ 储存定位

Storage mapping

- 根据产品或**UOM**选择存放区
- 根据周转箱或**UOM**选择地点面积
- 溢出存放区
- 自动储存 (**AS/RS**)
- 有害物质或高价值货物存放区

putaway zones by product/UOM
location sizing by container/UOM
putaway zones linked to overflow
automated storage (AS/RS)
putaway zones for hazardous or high-value goods

■ 越库

Crossdock

- 标明越库订单线
- 存放过程中直接换装

mark order lines for crossdock
crossdock during putaway



订单计划

ORDER PLANNING

第三章 Chapter 3

物流流程 Logistics Processes

■ 订单下载及编辑

Order loading and editing

- 数据确认
- 本地编辑信息, 如船期等

data validation

local editing of information i.e. ship date

■ 发货计划

Delivery planning

- 指定运输车辆

assign carrier

■ 拣选

Pick run

- 创建批次
- 单批工作量及资源反馈

create batches

batch workload and resource feedback

■ 预订及分配

Reservation & Allocation

- 库存软分配
- 库存硬分配
- 地点分配
- 根据属性或日期窗口分配

soft allocation of inventory

hard allocation of inventory

location allocation

allocate by attributes or date windows

■ 发放

Release

- 根据订单发放
- 根据拣选操作发放
- 自动发放

release by order

release by pick run

automatic release



补货 REPLENISHMENT

第三章 Chapter 3

物流流程 Logistics Processes

■ 拣选定位

Pick mapping

- 指定固定拣选位
assign fixed location
- 指定拣选区
assign pick zone
- 设定最小/最大拣取量
set min/max levels

■ 拣选位补货

Location replenishment

- 流动选位
float locations
- 动态选址
dynamic locations
- 根据最大/最小拣选量补货
replenish based on min/max model
- 根据需求补货
replenish based on demand
- 根据任务优先权补货
replenish based on task priority
- 拣选线补货
in-line replenishment during picking
- 减少来自缓存的补货
letdown replenishment from buffer
- 接收转补货
replenish from receiving



拣选 (1/2)

PICKING (1/2)

■ 拣选类型

Pick types

- 订单拣选
- 组拣选
- 批拣选
- 区拣选
- 周转箱拣选

order picking
cluster (group) picking
batch picking
zone picking
container picking

■ 拣选方案

Pick options

- 根据路径拣选
- 根据分项物品拣选
- 单个订单使用一个或多个拣选设备
- 分拣箱拣选

pick by path
pick by line item
single or multiple picker per order
pick and pass pick container

■ 拣选设备

Pick devices

- 无线射频拣选
- 声控拣选
- 电子标签拣选
- 清单拣选
- 标签拣选
- 自动拣选
- **GTW**拣选

RF picking
voice picking
pick to light
pick to list
pick to label
automated picking
GTW picking



拣选 (2/2)

PICKING (1/2)

第三章 Chapter 3

物流流程 Logistics Processes

■ 拣选确认

Pick confirmation

- 确认每次拣选
- 扫描物品条码
- 扫描属性条码
- 自动化接口

confirm each pick
scan item barcode
scan attribute barcode
automation interface

■ 拣选商标

Pick labels

- 已打印许可盘
- 根据要求打印商标

pre-printed license plates
print label on demand

■ 拣选库存

Pick inventory

- 实时更新
- 许可盘跟踪

updated in real-time
tracked by license plate

■ 拣选监控器

Picking monitor

- 根据订单
- 根据批次 (拣选操作)
- 完成比率

by order
by batch (pick run)
percentage of completion



订单集中

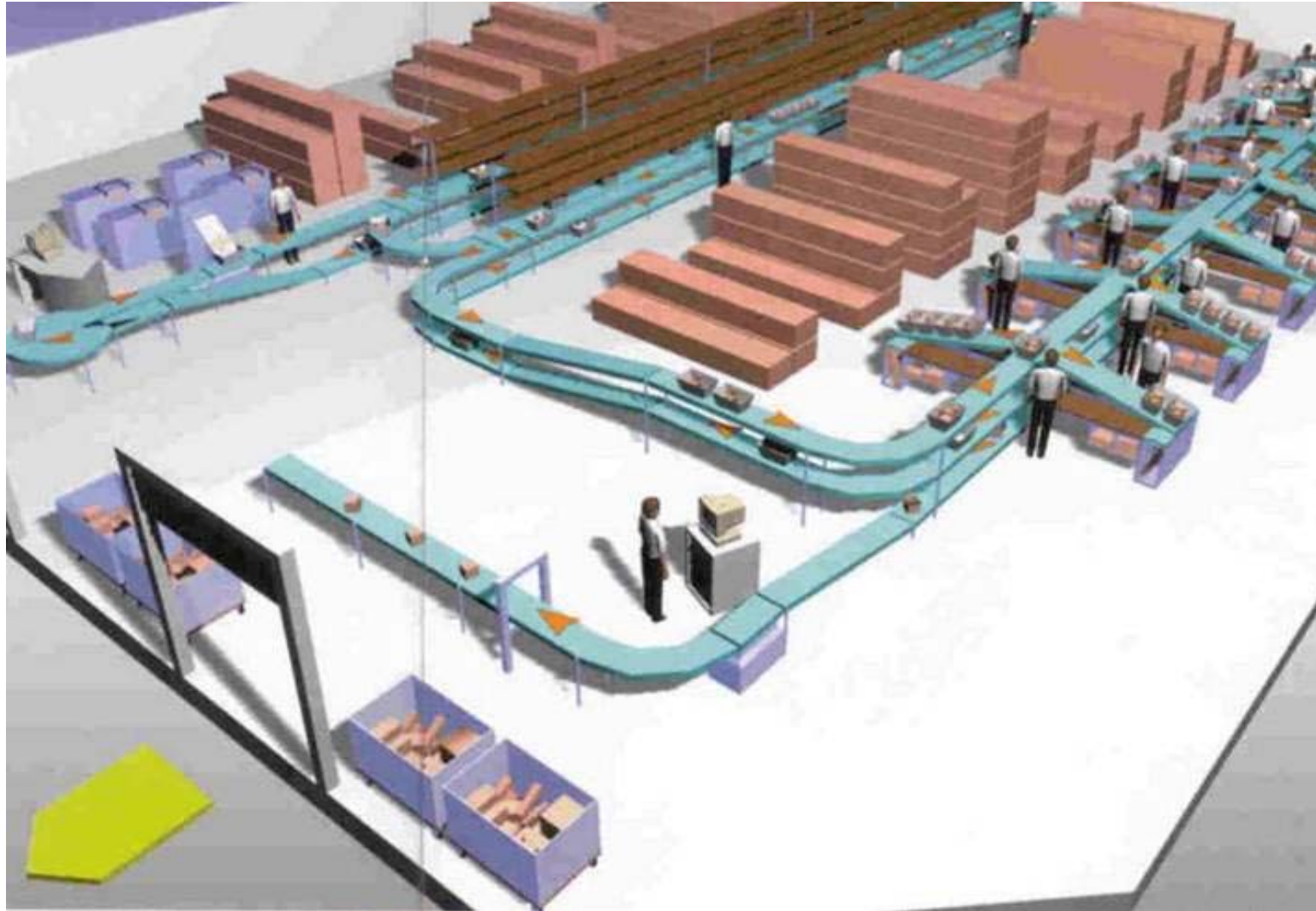
ORDER CONSOLIDATION

第三章 Chapter 3

物流流程 Logistics Processes



- 根据订单人工集中
Manual consolidation by order
- 根据指定的固定运输线或动态运输线自动集中
Automated consolidation by fix shipping lane assignment or dynamic lane assignment



■ 包装库存

Packing inventory

- 计算大箱面积及重量
calculate carton cube and weight
- 跟踪许可号码
track by license number

■ 标签

Labels

- 打印运输商标
print shipping labels
- 客户定制商标
customer defined labels

运输 SHIPPING

第三章 Chapter 3

物流流程 Logistics Processes

- 运输文件
Shipping paper work
 - 装货单 bill of loading
 - 包装清单 packing list
 - 证明 manifest
- 出货安排
Outbound scheduling
 - 预订显示屏 appointment screen
 - 指定装卸台出口 dock door assignment
- 装载
Loading
 - 良性装载扫描确认 scanning for positive load verification
 - 订单直接装载至卡车 directed truck loading by order
 - 分站装载 load by stop
- 运输确认
Ship confirmation
 - 承运人直接确认 immediate ship confirmation to host
 - 整车/订单运输 ship by trailer/order
 - 转运至其他建筑 ship to other buildings



生产 MANUFACTURING

第三章 Chapter 3

物流流程 Logistics Processes

- 任务顺序
Work orders
- 物料清单
Bill of material
- 工具
Kitting
- 拣选组件
Pick components
- 发放组件
Issue components
- 生产收货
Production receipt
- 生产日期
Manufacturing date
- 储存方案
Storage options
- 各类生产收货
Miscellaneous production receipt



库区管理 YARD MANAGEMENT

第三章 Chapter 3

物流流程 Logistics Processes



- 库区空拖车及装卸台跟踪
Track empty trailers in yard, docks
- 拖车登入/登出
Check-in/out trailers
- 库区操作功能以移动空/满拖车
Yard jockey functions to move full/empty trailers
- 跟踪拖车滞留时间、状态
Track retention time, status of trailers
- 指定空/满拖车至装卸台
Assign empty/full trailers to dock
- 记录/跟踪预订装置
Record/track appointment compliance



物流功能

Logistics Functionalities

物流功能

LOGISTICS FUNCTIONALITIES

第四章 Chapter 4

物流功能 Logistics Functionalities

- 用户管理 User Management
- 任务管理 Task Management
- 库存管理 Inventory Management
- 多站点 Multi-Site
- 人力管理 Labor Management
- 仓库区域 Warehouse Cockpit
- 集中错误恢复功能 Integrated Error Recovery Functionality
- 跟踪和追溯 Tracking & Tracing
- **21 CFR Part 11**
- 主机通讯 Host Communication
- 在线帮助 Online Help
- 自动化仿真程序 AutomationEmulator



用户管理

USER MANAGEMENT

第四章

Chapter 4

物流功能

Logistics Functionalities



- 用户
Users
- 安全
Security
- 作用
Roles
- 语言
Language
- 常量和默认值
Constants and defaults

任务管理

TASK MANAGEMENT

第四章 Chapter 4

物流功能 Logistics Functionalities

- 工作区域分配 Work Area Assignment
 - 系统向工作区域分配工人
system assigns worker to work area
 - 系统将工人运送至工作区域
system moves worker to new work areas
- 任务类型选项 Task Type Options
 - 依照轮循顺序或优先级顺序选择任务
select tasks in round robin or just priority sequence
- 优先级升级 Priority Escalation
 - 提升任务优先级
raise task priority over time
- 邻近检查 Proximity Check
 - 循环临近区域寻找任务
rotate through nearby zones to look for tasks
- 监控和生产力 Monitor and productivity
 - 监控开放任务的进度
monitor progress of open tasks
 - 维护每个工人的生产力
maintain productivity data per worker



库存管理

INVENTORY MANAGEMENT

第四章 Chapter 4

物流功能 Logistics Functionalities

- **产品配置** Product configuration
 - 品项控制器本地和/或主机维护 SKU item master maintained locally and/or from host
 - 分配产品属性 assign product attributes
 - 保质期及过期时间视窗 shelf life and expiration window
 - 重量和体积信息 weight and cubing information
 - **UOM树** UOM tree
- **产品属性** Product attributes
 - 用户自定义产品属性, 诸如批号、实际称重等 user defined product attributes such as lot #, catch weight ...
 - 默认值和限制值列表 default values, restricted list of values
 - 依据公式自动定义 auto define by formula (l.e. date/location)
- **调整** Adjust
 - 安全控制 security controlled
 - 原因代码, 暂停待确认 reason codes, suspend for approval
- **循环计数** Cycle count
 - 根据调度程序生成 generated by scheduler
 - 根据差别生成 by discrepancy
 - 根据实测库存量生成 physical inventory
- **追踪空箱** Track empty containers



多站点 MULTI-SITE

第四章 Chapter 4

物流功能 Logistics Functionalities

- 提供现场登录
Provide login by site
- 登录站点过滤器视图和功能
Filter screen views and functions to the login site
- 由1+仓库组成的站点
Site consists of 1+ warehouses
- 分配用户至站点
Assign users to site
- 根据现场情况维系规则
Maintain rules by site
- 依据站点创建唯一的位置/区域/打印机
Create unique locations/ zones/ printers by site
- **By instance** 维护产品/订单/UOM
Maintain products/orders/UOM by instance
- 分配**ETR**/订单至站点
ER/Orders assigned to a site
- 产品/**ER**/订单仍由客户定义
Product/ER/orders are still defined by owner
- 局限于站点/仓库的订单分配
Order allocation/replenishment limited to the site/warehouse
- 保留现有内部输送和全球库存功能
Retain current inter-transfer and global inventory functionality



劳动力管理 (1/2)

LABOR MANAGEMENT (1/2)

第四章 Chapter 4

物流功能 Logistics Functionalities

■ 资源优化意味着制定最佳执行计划

Resource Optimization means to set-up an optimal execution plan

- 依据制定好的工作量以及工作区的人员配置优化劳动力单元向资源的分配
Optimizes the allocation of labor units to resources according to the planned work load and staffing of work areas
- 图解显示规划结果并提供修改参数的方法（分派时间和可用资源）
Graphically visualizes the planning results and provides means to modify parameters (dispatch time and available resources)

■ 实时监控执行计划

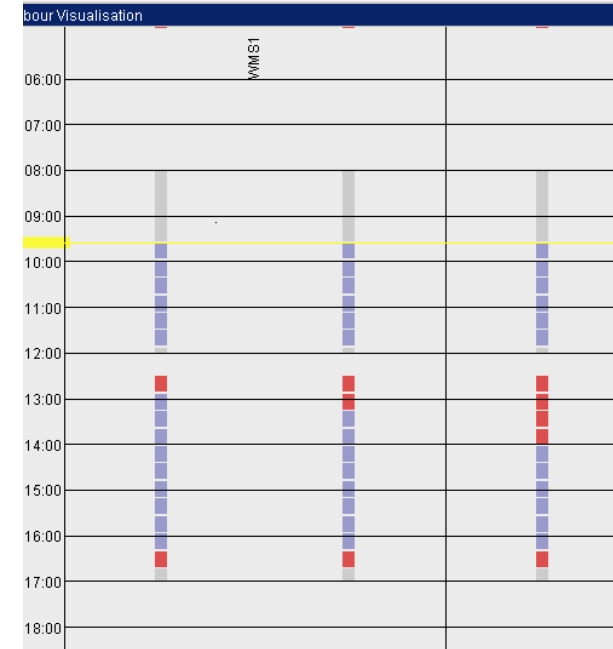
Real-time monitoring and controlling of the execution plan

- 实际工作荷载自动连续优化
Automatic and continuous optimization of the actual work load
- 优化工作单元向工作区域的释放
Optimized release of work units to the work areas
- 潜在问题可视化
Visualization of potential problems
- 解决问题的方法
Means to resolve the problems

■ 不同仓库操作的标准化执行

Standard implementation for different warehouse operations

- 通过**Pick-run** 拣选订单
Order picking by pick-runs
- 用来集成项目特定劳动力类型的**API**
API to integrate project specific labour types
- 其它操作的设计模式
Design patterns for other operations


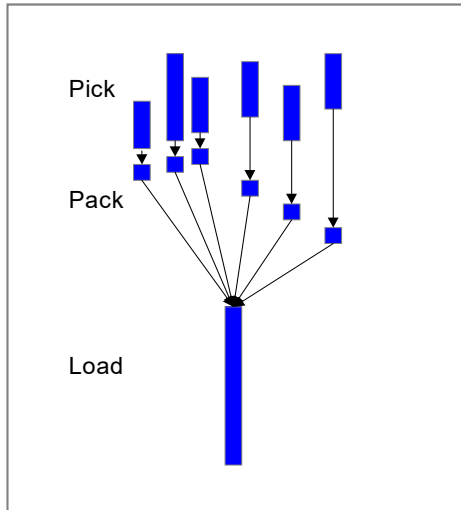


劳动力管理 (2/2)

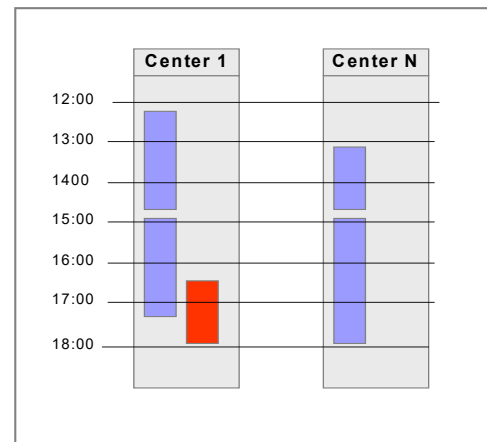
LABOR MANAGEMENT (2/2)

第四章 Chapter 4

物流功能 Logistics Functionalities



	Area 1	Area 2	...	Area 3
10:00				2
10:30				2
11:00				2
11:30				2
12:00				2
12:30				2
13:00	5			2
13:30	5			2
14:00	5	10		2
14:30	5	10		2
15:00	5	10		2
15:30		10		2
16:00		10		2
16:30				2
17:00				2



- **WM自动创建劳动力单元**
WM creates the labor units automatically
- **操作员分配资源至工作区域**
Operator assigns resources to work areas
- **劳动力优化算法分配劳动力单元至可用资源同时优化起始时间**
The labor optimization algorithm assigns the labor units to the available resources while optimizing the starting times
- **结果可视化**
Visualizing of results
- **继续释放下一个劳动力单元**
Next labor units are released continuously

仓库COCKPIT

WAREHOUSE COCKPIT

第四章 Chapter 4

物流功能 Logistics Functionalities

■ 主要性能指标（KPI）实时可视化

Real-time visualization of key performance indicators (KPI)

- 用于显示KPI的用户可自定义仪表板
User configurable dashboard to display KPI
- 交通灯可视化目标值
Target values for traffic light visualization
- 多种可视化方式（量规和图表）
Various visualization means (gauges & diagrams)

■ 历史数据分析

Analysis of historical data

- 历史数据特别询问和图解可视化
Ad-hoc queries and graphical visualization of historical data
- 自动捕捉、合并和删除历史数据
Automatic capturing, consolidation and deleting of historical data
- 用户可自定义捕获和延时间隔
User configurable capture and retention intervals

■ 七组标准KPI包括：

Seven groups of standard KPI including

- 收货、拣选、装运统计
Receiving, picking and shipping statistics
- 任务执行、位置和库存统计
Task execution, location and inventory statistics
- 运行性能统计
Operations performance statistics

■ API集成项目特定KPI

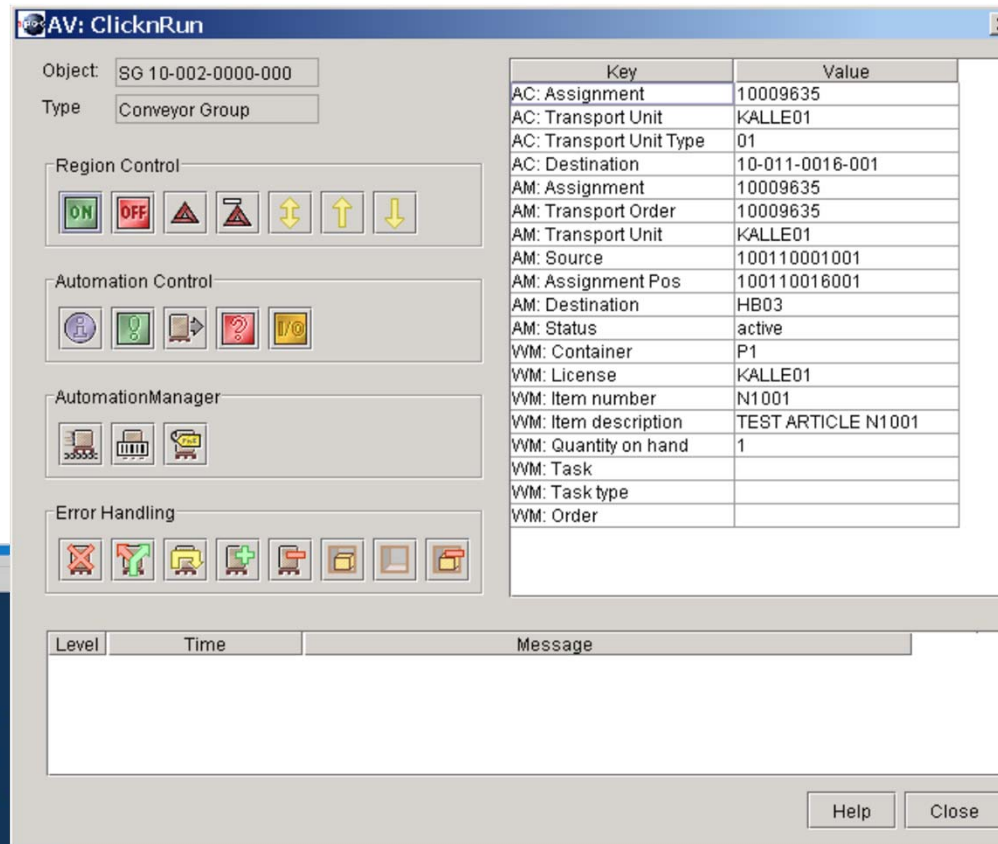
API to integrate project specific KPI



集中错误恢复 INTEGRATED ERROR RECOVERY

第四章 Chapter 4

物流功能 Logistics Functionalities



- 穿过所有系统的信息
Information across all systems
- 高层恢复功能
High Level recovery functions
- 错误信息和恢复步骤说明
Error information & recover procedures description

跟踪和追溯

TRACKING & TRACING

第四章 Chapter 4

物流功能 Logistics Functionalities

■ 一对一处理 1-to-1 Processes

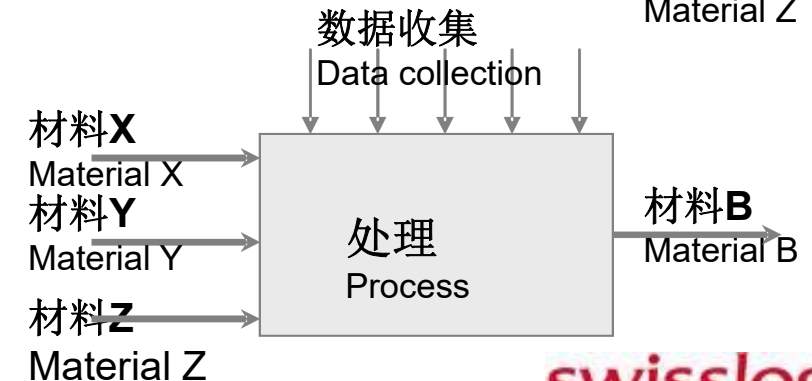
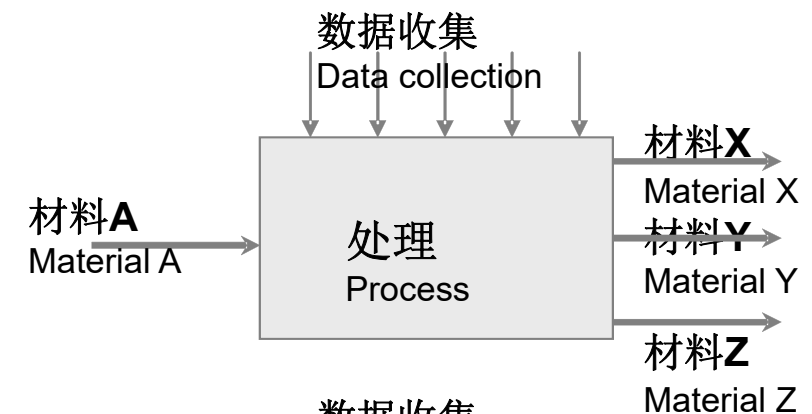
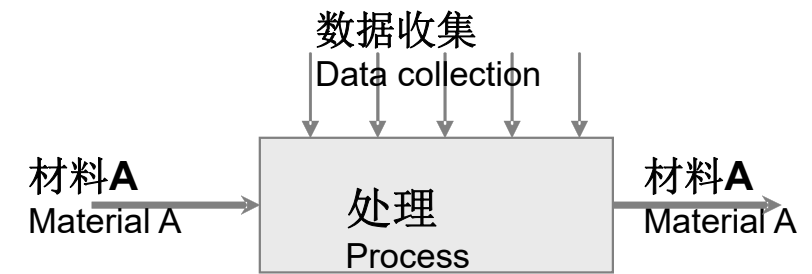
- 收货 Goods receiving
- 物料搬运 Material movement
- 孵化 Incubation

■ 发散处理 Diverging Processes

- 屠宰 Slaughtering
- 提炼 Refining

■ 集中处理 Converging Processes

- 包装 Packaging
- 混合 Blending
- 订单拣选 Order Picking



21 CFR PART 11 (确认)

21 CFR PART 11 (VALIDATION)

第四章 Chapter 4

物流功能 Logistics Functionalities

- **21 CFR Part 11** 为一种控制状态，在该状态下可认为电子记录/电子签名等同于书面记录 and 手写签名

21 CFR Part 11 is the regulation under which the agency considers ER/ES equivalent to paper records and handwritten signatures

- 电子记录和签名
Electronic Records & Signatures
- 封闭系统控制
Control of closed Systems
- 开发和项目实施方面的人员培训
Training of people in development and project realization

- 锁定帐户（永久性，及在登陆失败后）
Account locking (permanent and after unsuccessful login)
- 一段时间不使用后自动注销
Automatic logout after a period of inactivity
- 密码过期
Password ageing and expiration
- 密码历史
Password history
- 密码复杂度验证
Password complexity verification



业绩: SAP R/3 集成

REFERENCES SAP R/3 INTEGRATIONS

第五章 Chapter 5

物流功能 Logistics Functionalities

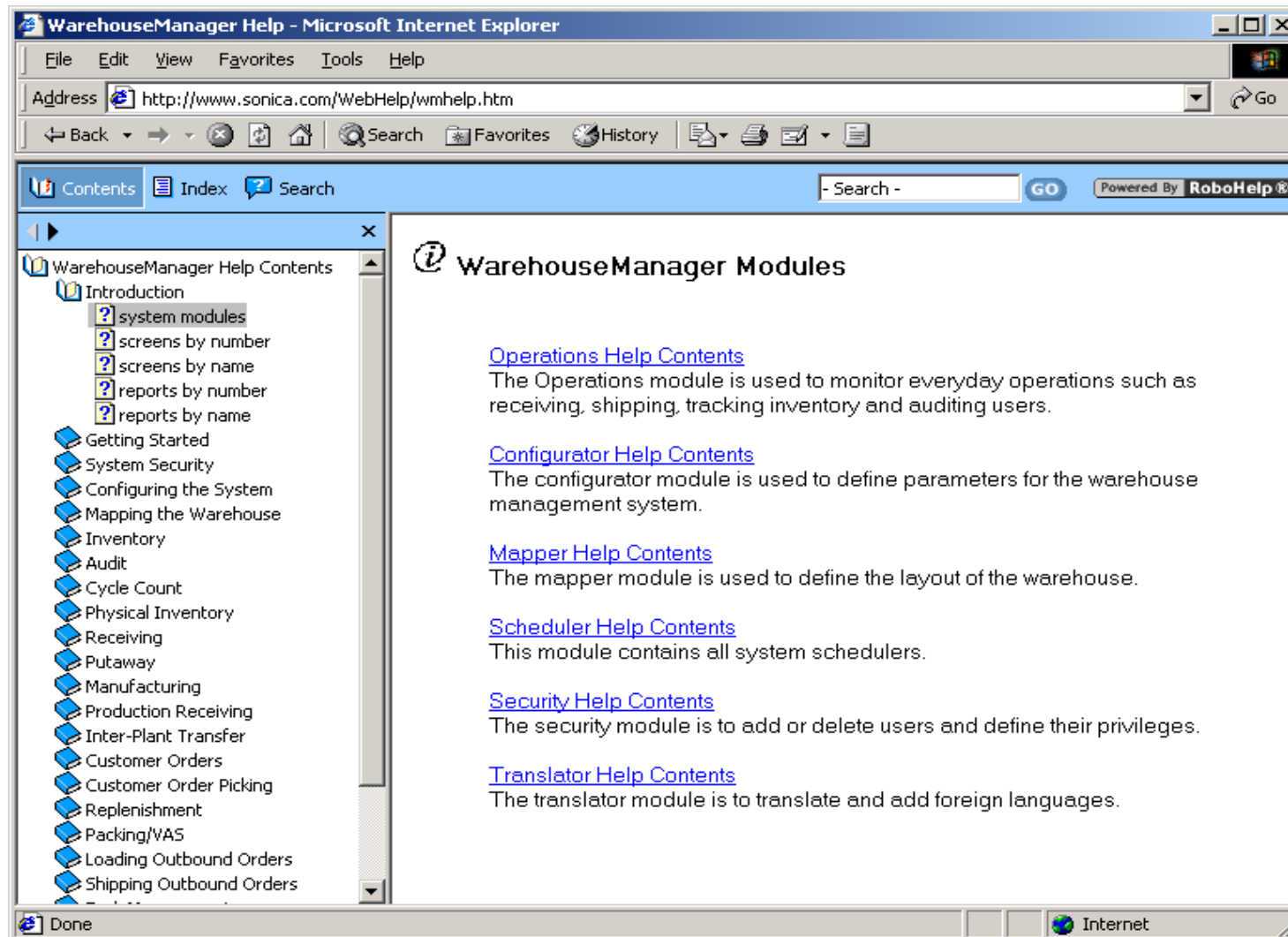
- **Actebis, 索斯特**
Actebis, Soest (德国)
(D)
- **Antalis, Lupfig**
Antalis, Lupfig (瑞士)
(CH)
- **博世 (Bosch), 卡尔斯鲁厄**
Bosch, Karlsruhe (德国)
(D)
- **B. Braun, Melsungen**
B. Braun, Melsungen (德国)
(D)
- **CPC, 买泽纳**
CPC Maizena (德国)
(D)
- **GlaxoSmithKlyne**
GlaxoSmithKlyne (德国)
(D)
- **Hauni, 汉堡**
Hauni, Hamburg (德国)
(D)
- **Rolex / Genex, 日内瓦**
Rolex / Genex, Genf (瑞士)
(CH)
- **Swisscom, 伯尔尼**
Swisscom, Bern (瑞士)
(CH)
- **Tehalit, Heltersberg**
Tehalit, Heltersberg (德国)
(D)
- **Wacker Chemie, 博格豪森**
Wacker Chemie, Burghausen (德国)
(D)
- **Zumtobel Licht, Dornbirn**
Zumtobel Licht, Dornbirn (奥地利)
(A)
- ...



在线帮助 ONLINE HELP

第五章 Chapter 5

物流功能 Logistics Functionalities



自动化仿真器™ (1/2)

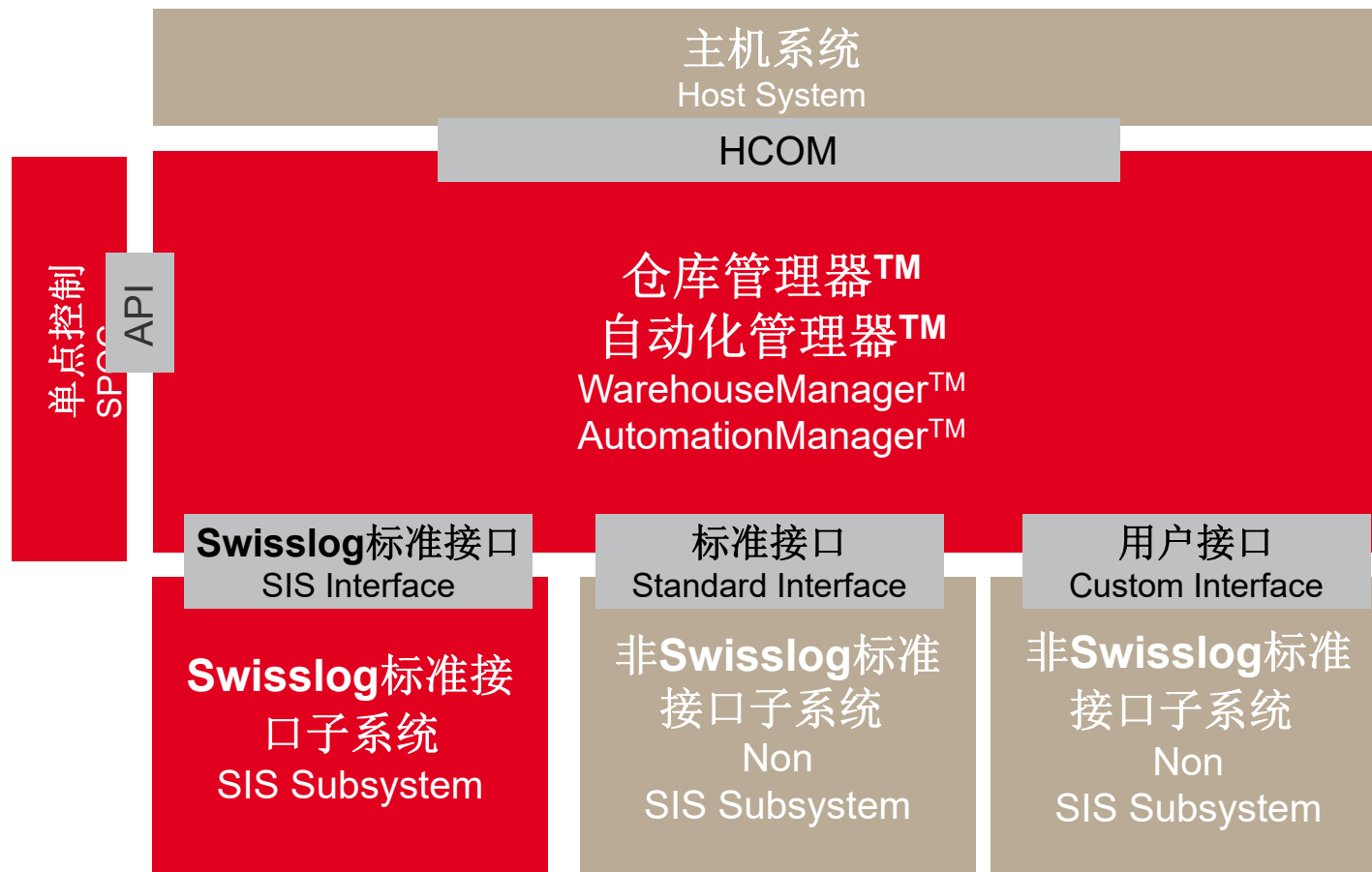
AutomationEmulator™ (1/2)

第五章
Chapter 5

物流功能
Logistics Functionalities

■ Live System系统结构

System Architecture of a 'Live System'



自动化仿真器™ (2/2)

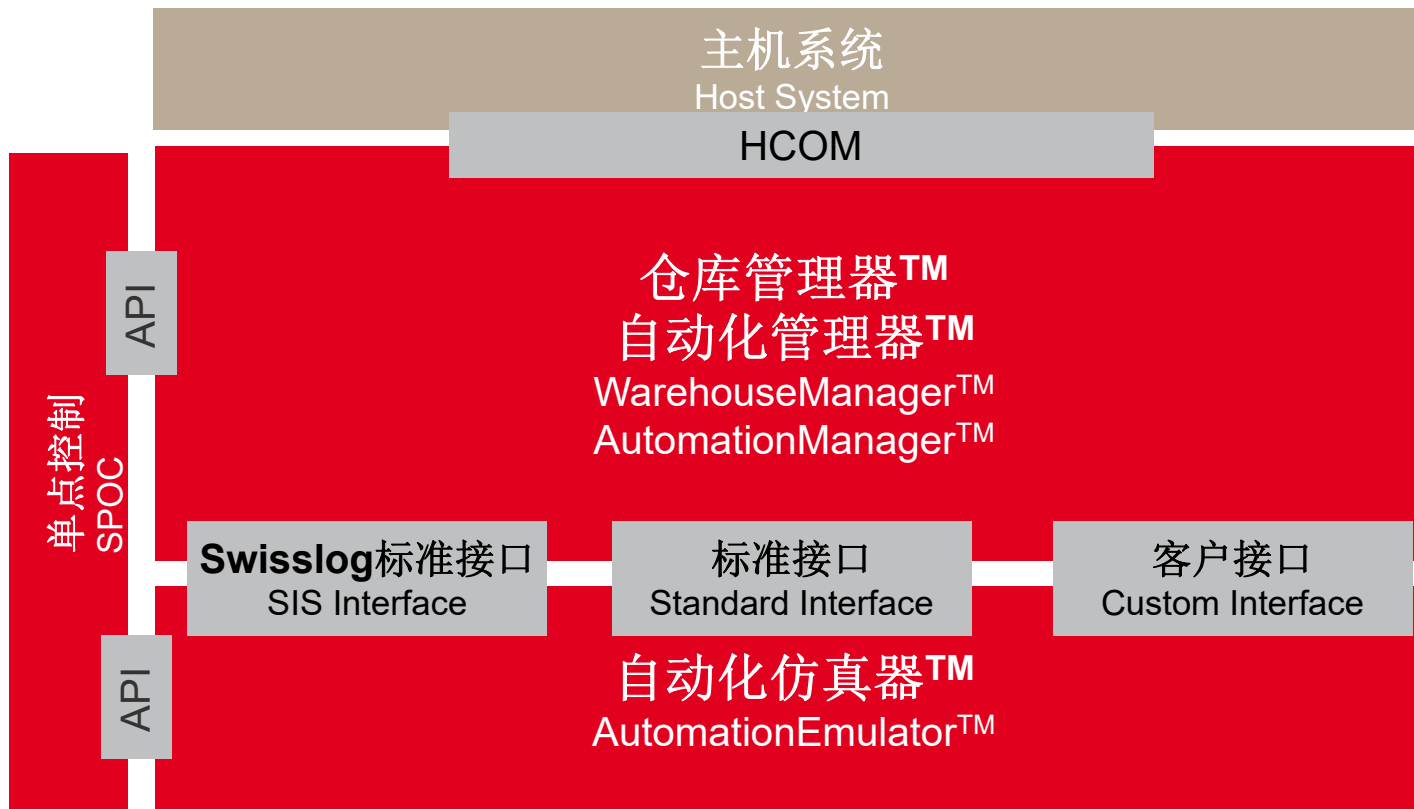
AutomationEmulator™ (2/2)

第五章
Chapter 5

物流功能
Logistics Functionalities

■ 带有AutomationEmulator™的系统结构

System Architecture with
AutomationEmulator™





硬件及软件要求

Hardware & Software Requirements

■ Oracle 支持

Oracle Support

- **Oracle 数据库10g及Oracle数据库9i**
Oracle Database 10g, und Oracle Database 9i
- **Oracle 应用服务器10g(供网络用户使用)**
Oracle Application Server 10g (for web based clients)
- **Oracle 表格和报告6i(Fat client)**
Oracle Forms and Reports 6i (for fat clients)

■ Microsoft Windows2003, IBM Unix, HP AIX

■ IT 结构

IT Architecture

- 客户服务器
Client Server
- 网络n-tier
Web Based n-tier

■ 对于其它系统的开放界面

Open Interface to other systems

- IDOC
- tRFC
- EDI
- TCP/IP
- IBM MQseries
- ...