



主题

1. 特灵ICS简介

2. ICS控制网络结构

3. 互操作性

4. 特灵空调自控应用介绍

- 冷源中心控制
- 空气末端控制

5. RMU远程监视服务

6. 实时功能演示

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1. 特灵ICS简介

ICS是BAS的一种

什么是BAS?

协调楼宇设备运转的逻辑

BAS 子系统类型

- HVAC 控制系统
- 照明控制系统
- 给排水监控系统
- 变配电监视系统
- 电梯运行监视系统
- 巡更监视系统

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HVAC 控制系统

HVAC系统组成:

Chiller Plant

冷冻机房

Cooling Tower System

冷却塔系统

Boilers

锅炉

Heat Exchange

热交换系统

Air Handling Units

空调机单元

Fan Coil Units

风机盘管单元

VAV Boxes

变风量箱

Electric Heaters

电加热

Exhaust & Ventilation Fans

送排风

Pumps

泵

Etc.

等等

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HVAC 控制系统

50%-70% 的 BAS 是 HVAC 控制系统
Direct Digital Controls (DDC) – 直接数字控制
基于微处理器的控制提供了灵活性
能和其它楼宇系统作接口

◆ 名称：

◆ 集成舒适系统 ----- ICS

为什么叫ICS?

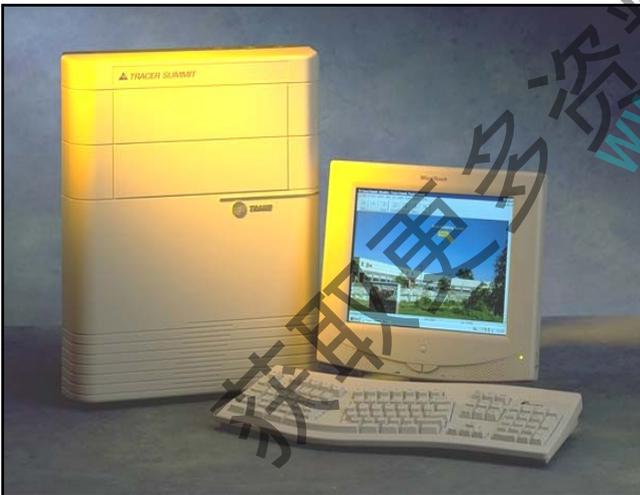
Integrated Comfort Systems
Equipment

集成舒适系统
设备 (空调设备)

- + Unit Controllers 单元控制器
 - + System Controllers 系统控制器
 - + Field Operational Excellence 现场操作优点
 - + Services 维修服务
-
- = ICS

ICS 能把特灵和非特灵的设备连接合并成一个有效的舒适系统

ICS 部分设备一瞥





Trane (ICS)的发展

1978年在美国St.Paul成立自控部门
从事楼宇控制器的研制和生产

1981年至今，共研制成三代Tracer产品
Tracer 1000, Tracer 100, Tracer Summit

20年实现美国BA市场占有率排名第三

1998年进入中国市场
已有100多个工地使用Tracer Summit
成为解决空调系统问题的最好途径

工地名称（北京及北区）控制案例

钓鱼台	冷水机房控制
八一大楼	冷水机房控制
军事博物馆	冷水机房控制
SOHO现代城	冷水机房控制/BA接口
世界金融中心	冷水机房控制/BA接口
国贸一期	冷水机房监控/蓄冰系统/BA接口
中国大饭店	冷水机房控制/蓄冰系统/BA接口
国贸二期	冷水机房监控/蓄冰系统/BA接口
国土资源部	冷水机房控制
农业银行	冷水机房控制
人民银行	冷水机房控制
北京铁路局	冷水机房控制
云湖度假村	楼宇自控(主机、风柜、VAV)
有研硅谷	楼宇自控(主机、风柜、照明)
北京广播器材厂	楼宇自控(开力主机、风柜)
嘉和丽园	楼宇自控(水源热泵)
青岛四方铁路	楼宇自控(Rooftop、VAV、风柜)
青岛海尔	楼宇自控(Rooftop)
天津博孚制药	楼宇自控(主机、风柜、锅炉)
天津史克	冷水机房控制
大连新玛特商场	冷水机房监控/蓄冰系统
大连同泰医院	冷水机房控制
...	...

2.特灵ICS控制网络结构

▲ ICS网络结构

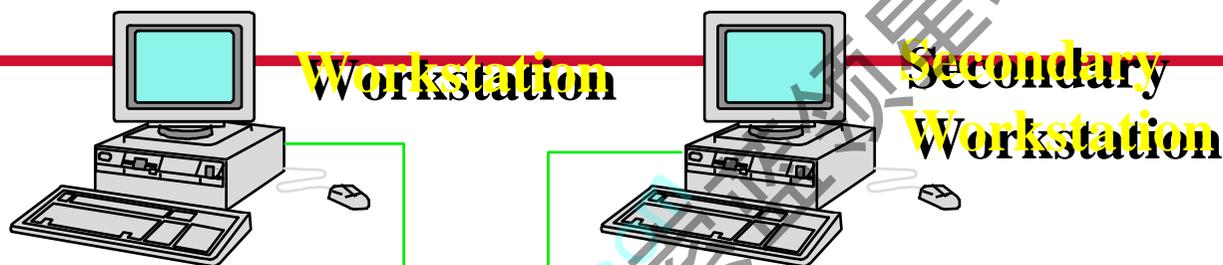
▲ 硬件

▲ 软件

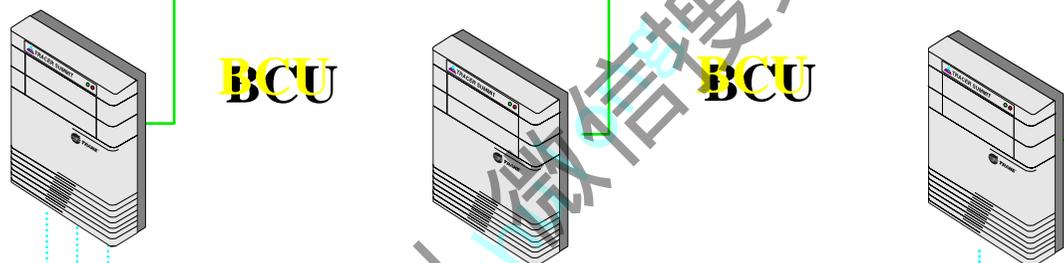
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ICS 网络结构

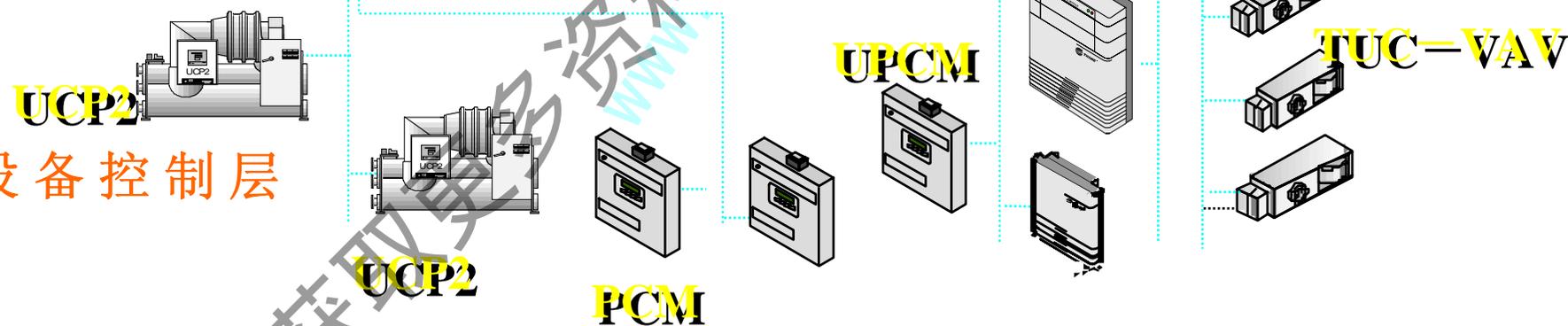
用户控制层



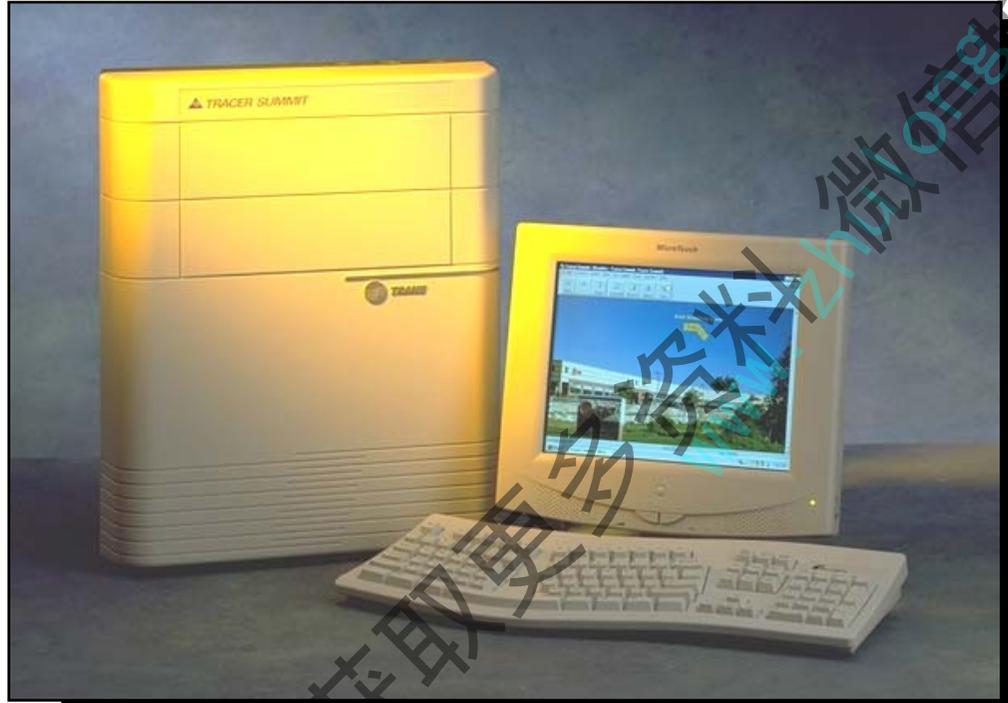
楼宇控制层



设备控制层



PC 工作站



- 用户图形界面
- 显示状态信息
- 改变设定值
- 设备强制操作
- 互联网浏览

楼宇控制器 (BCU)



- 触摸屏显示器
- 集中监控
- 连接现场控制器UCM
- 独立运行

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Tracer 控制器

MP581/MP580

MP501

MP503

AH541/AH540

ZN511/ZN510

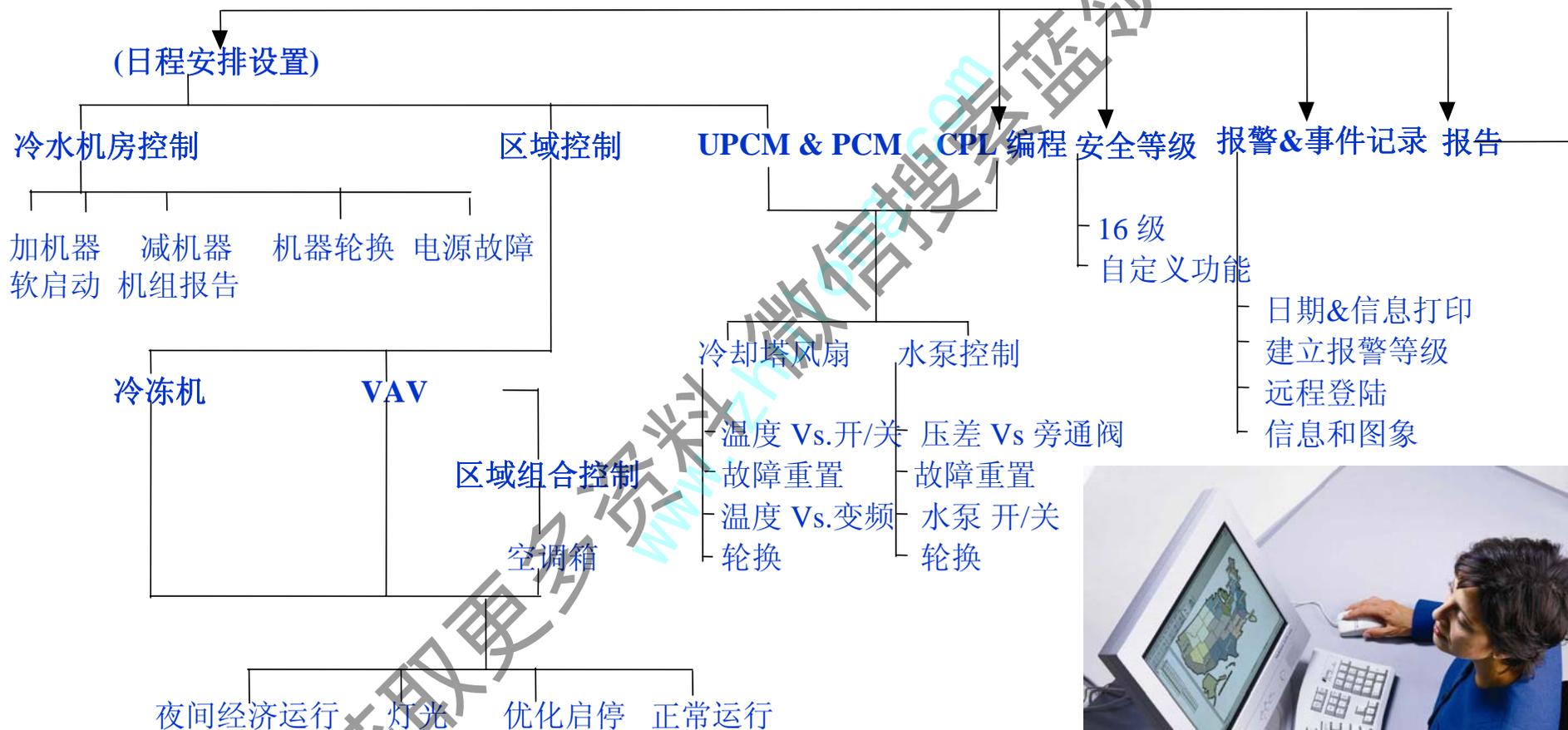
ZN521/ZN520

都基于 LonTalk!





Tracer Summit 软件系统



3. ICS的互操作性



BACnet



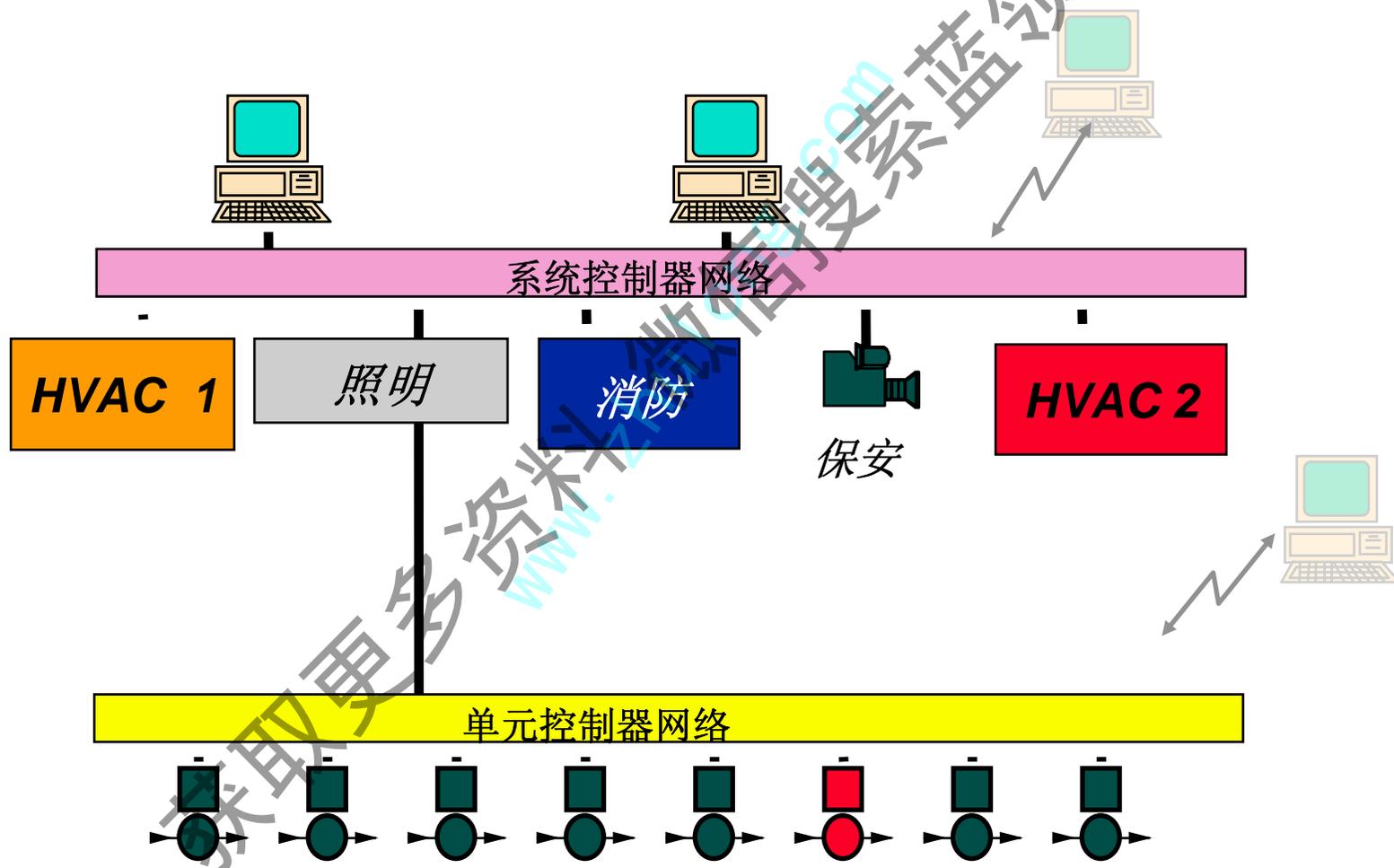
LONMARK®



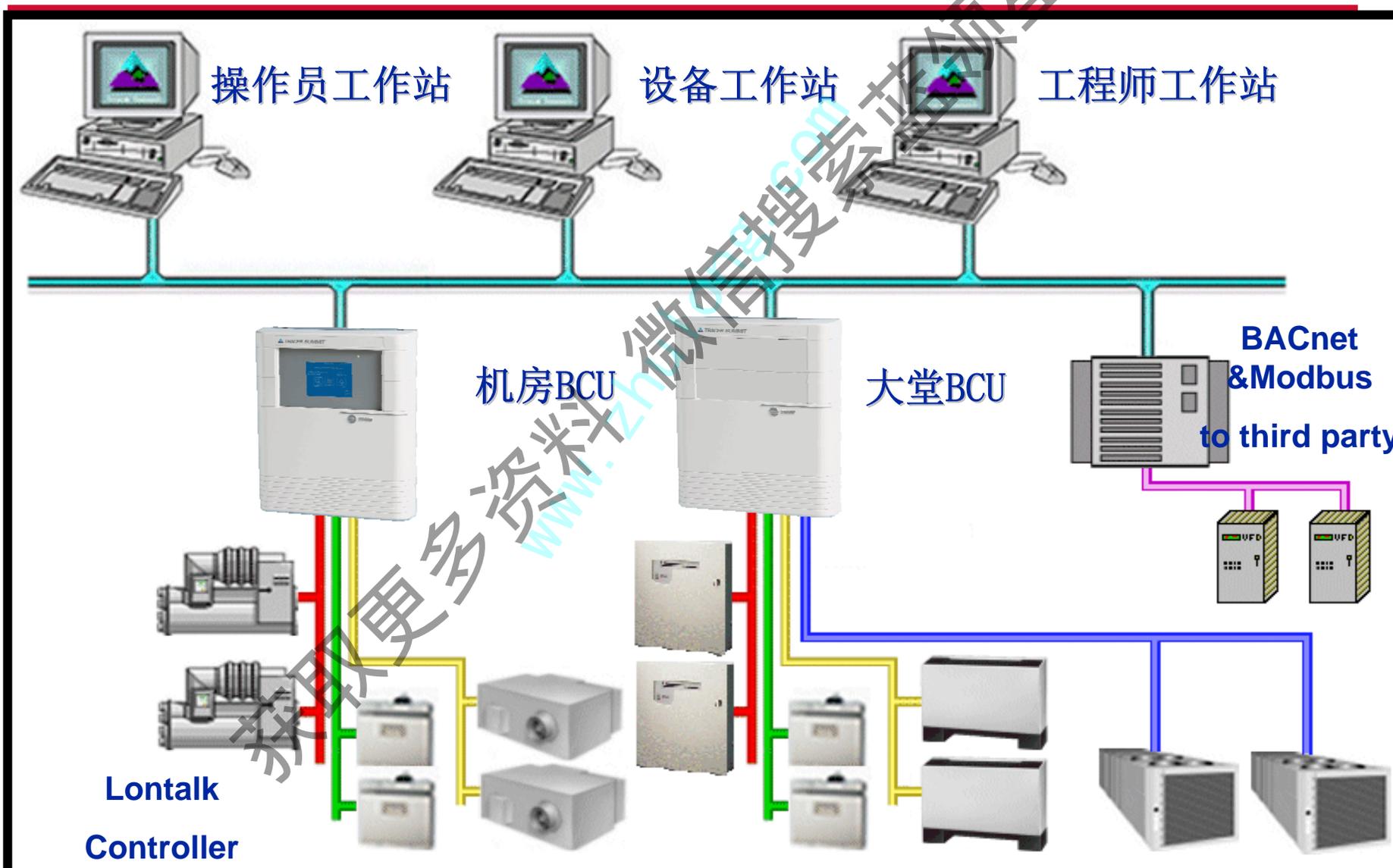
TRANE™

Building Automation Systems Division

互操作性



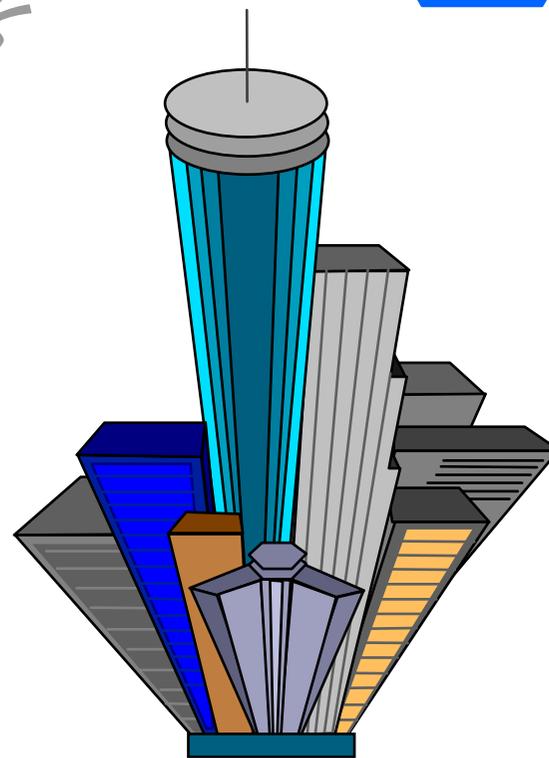
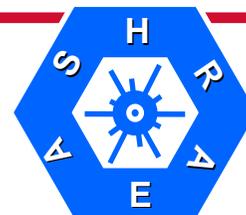
网络结构示意图



开放的BACnet协议

采用标准的楼宇控制协议

- 霍尼维尔(Honeywell)
- 江森(Johnson Controls)
- Satchwell
- 兰第司(Landis&Gry)
- ...



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Tracer Summit 案例

Tracer Summit 中央空调接口系统在中国中部地区	
工地名称	接口方式
八一大楼	Andover Interface/Chiller Plant Control
国贸二期	Andover Interface/Chiller Plant Control
国贸一期	CIN Interface/Chiller Plant Control
世界金融中心	Johnson Interface/Chiller Plant Control
SOHO现代城	Johnson Interface/Chiller Plant Control
北京铁路局	Alerton Interface/Chiller Plant Control
新世界中心二期	Johnson Interface/Chiller Plant Control
白石桥数据中心	Johnson Interface/Chiller Plant Control
富国广场	Johnson Interface
以色列大使馆	Siemens Interface
许昌卷烟厂	Siemens Interface
民政局	Siemens Interface
清华同方大楼	Johnson Interface
哈尔滨电力大楼	Honeywell Interface

Tracer Summit 可集成第三方设备

已成功连接的厂家:

- 变频器 - Square D, ABB, Danfoss
- 计算机房空调器 - Liebert, Airflow
- 水泵控制器 - Bell & Gosset
- 锅炉控制器 - Fireye
- 照明箱 - Square D
- 烟橱和压力显示器 - TSI, Tek-Air
- 能量测量设备 - Veris, Square D

4.特灵ICS空调自控应用介绍

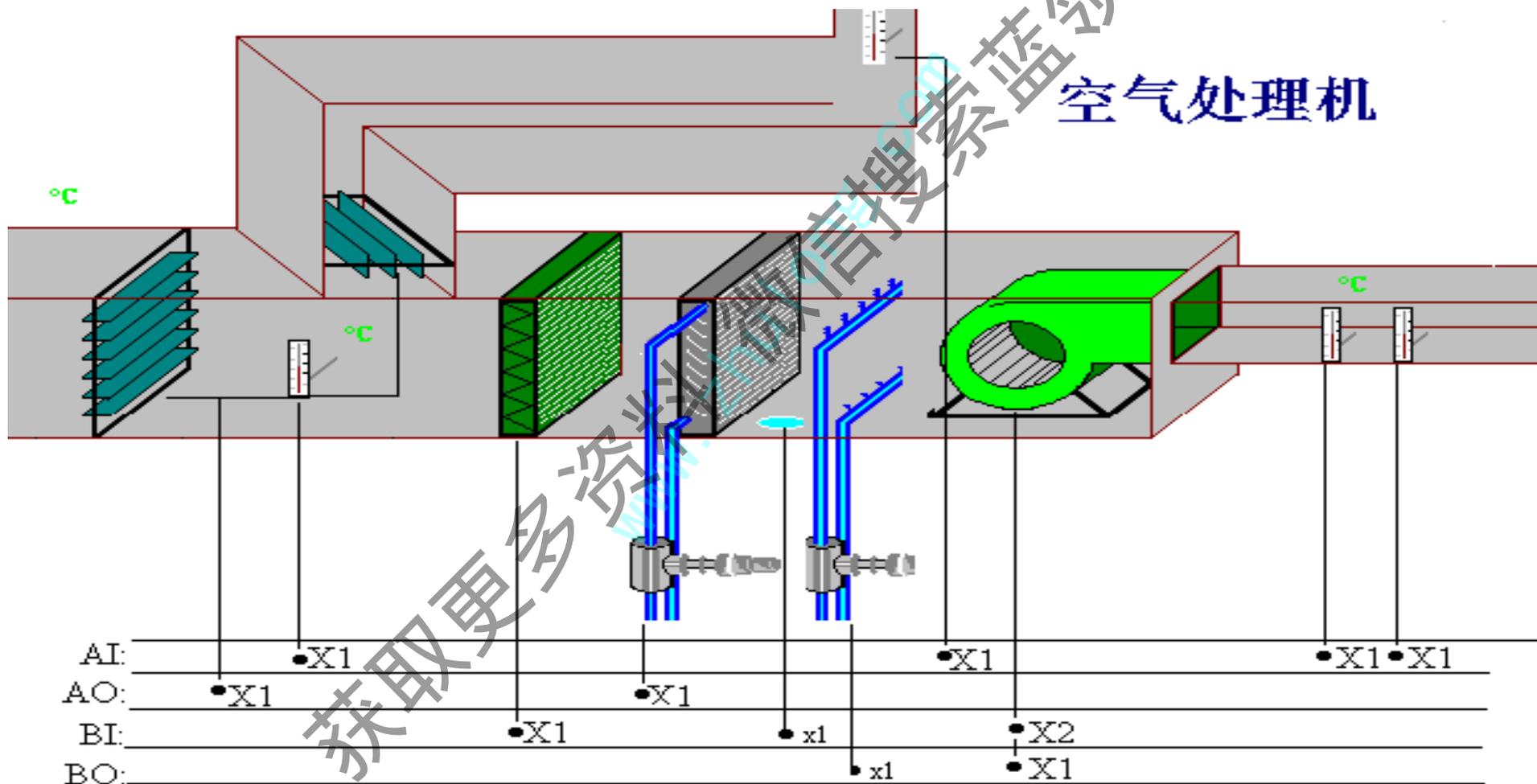
▲ 末端控制

▲ 冷源中心控制

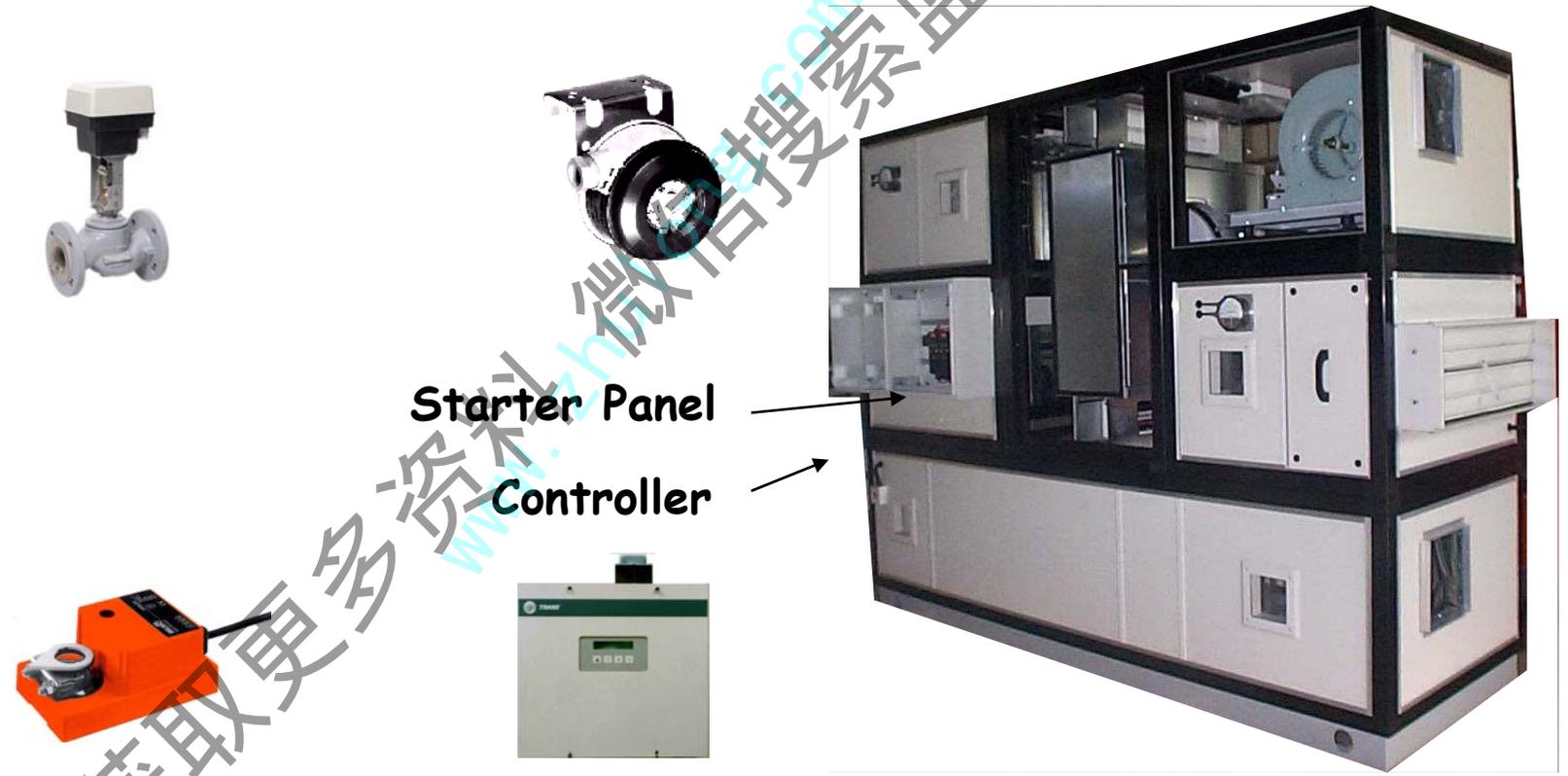
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空气处理机

空气处理机



工厂整装, 独立运行



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蓝领星球

AHU: 案例

上海斯伦贝谢智能卡

上海Krupp 不锈钢

扬州二电

南京电子网板厂

北京有研硅谷工厂

北京SOHO现代城

天津博福制药厂

青岛四方铁路工厂

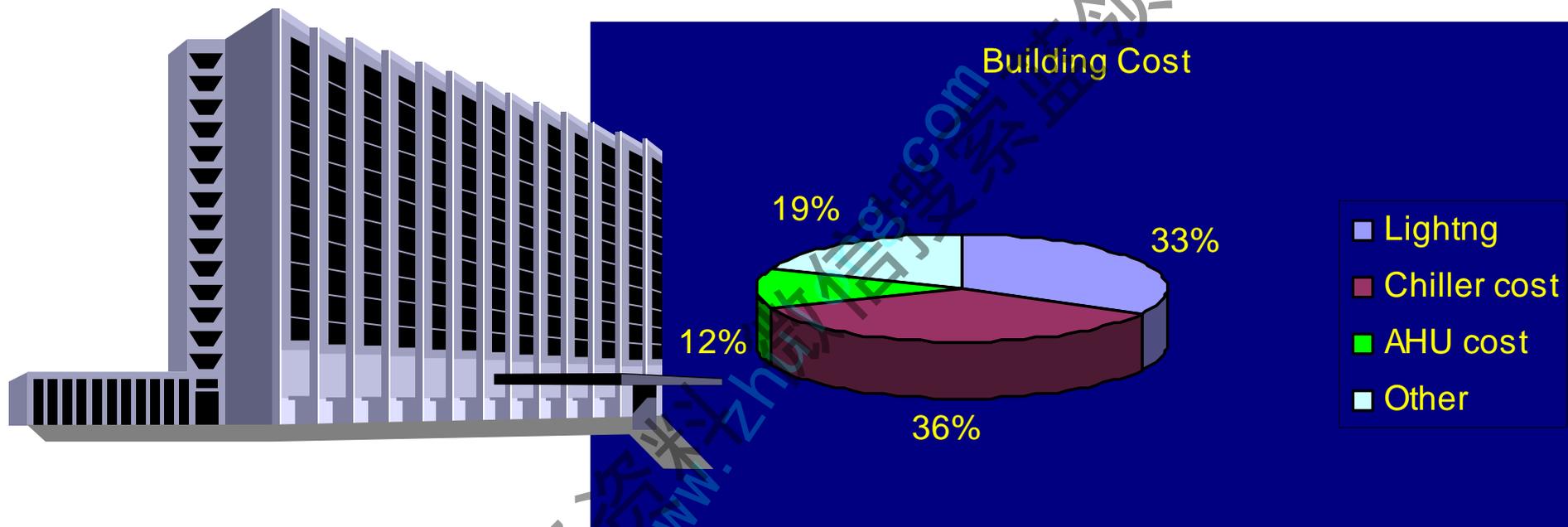
厦门Dell电脑

深圳华英电子厂

中山市电讯局网管中心

中山西区邮电局

冷水机房自控



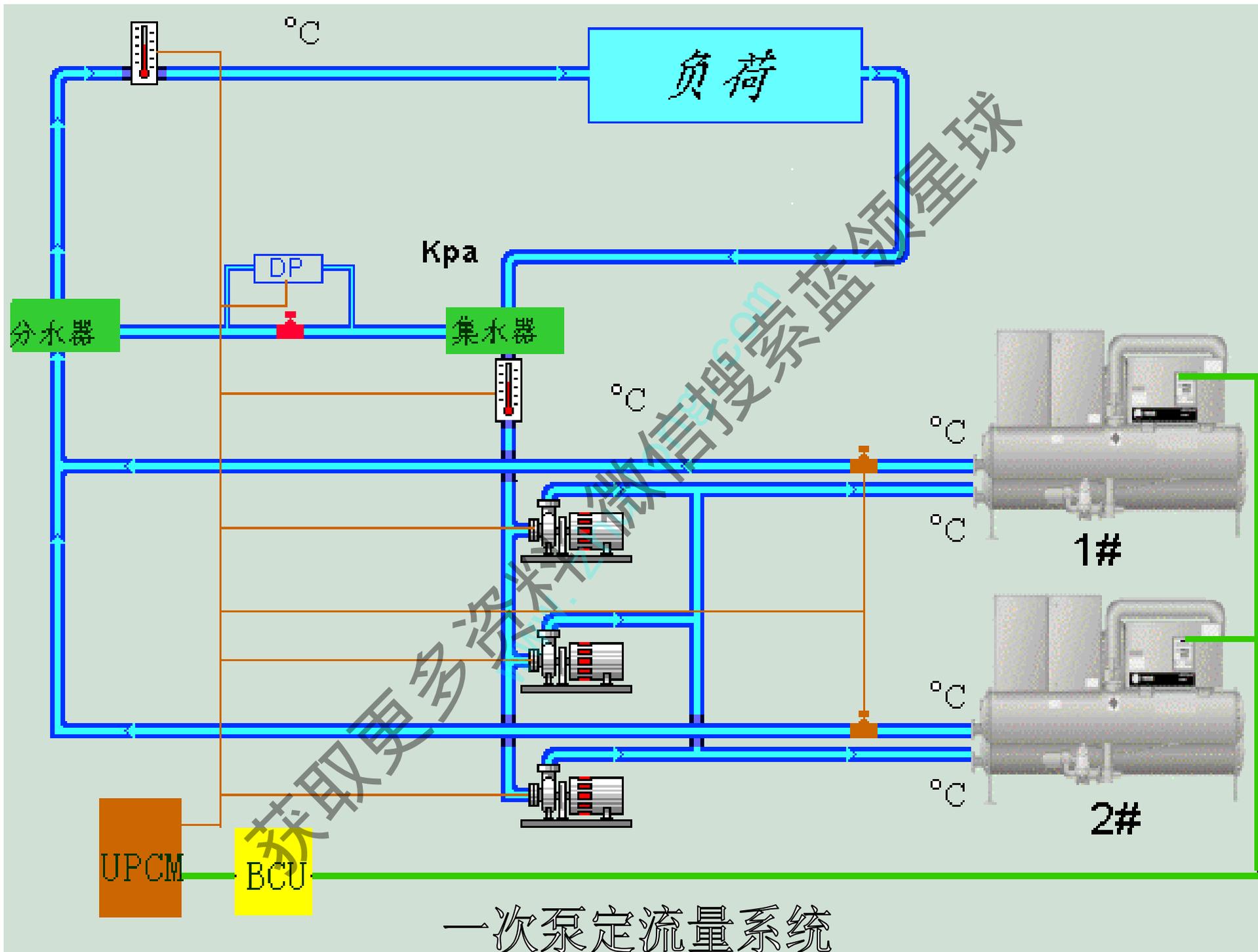
空调用电是大楼用电的一半，而主机用电又占空调用电的70%

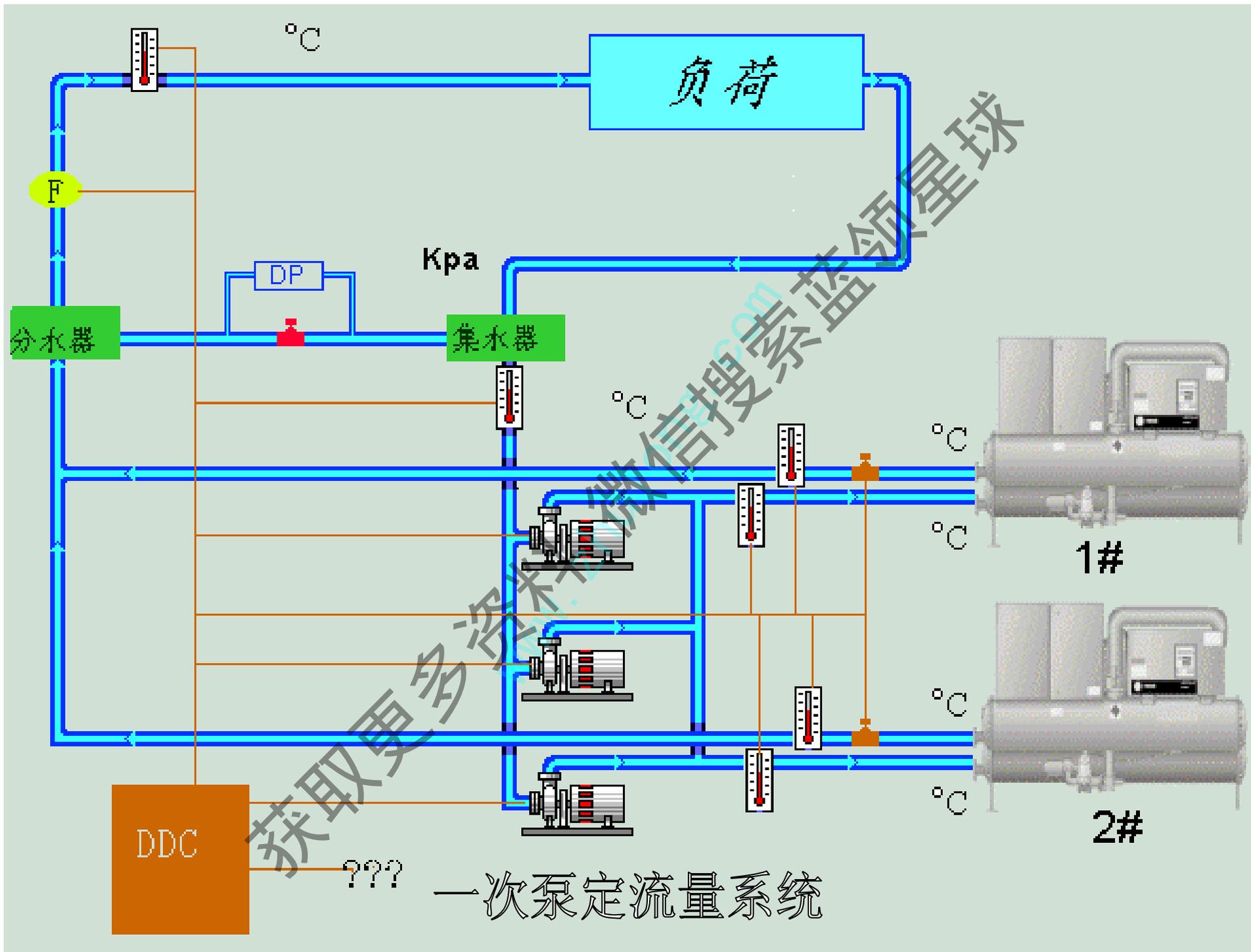
怎样能更好的控制冷源中心才是一个最重要的问题

冷水机房智能化的概念

- 单机控制
- 机房群控系统--大楼节能重点
- 数据集成
- 远程监控

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负荷

F

DP

Kpa

分水器

集水器

°C

°C

1#

°C

°C

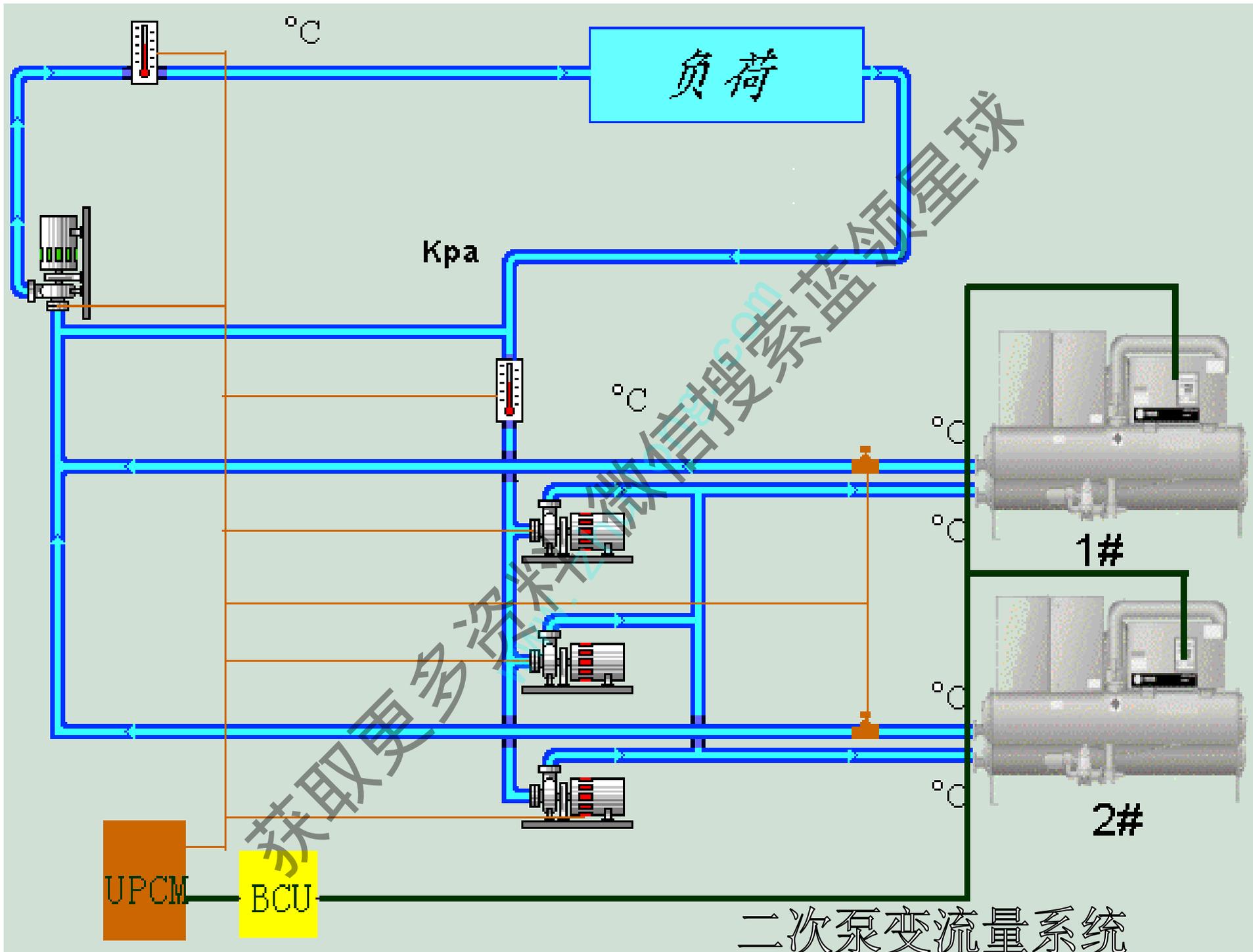
2#

°C

DDC

???

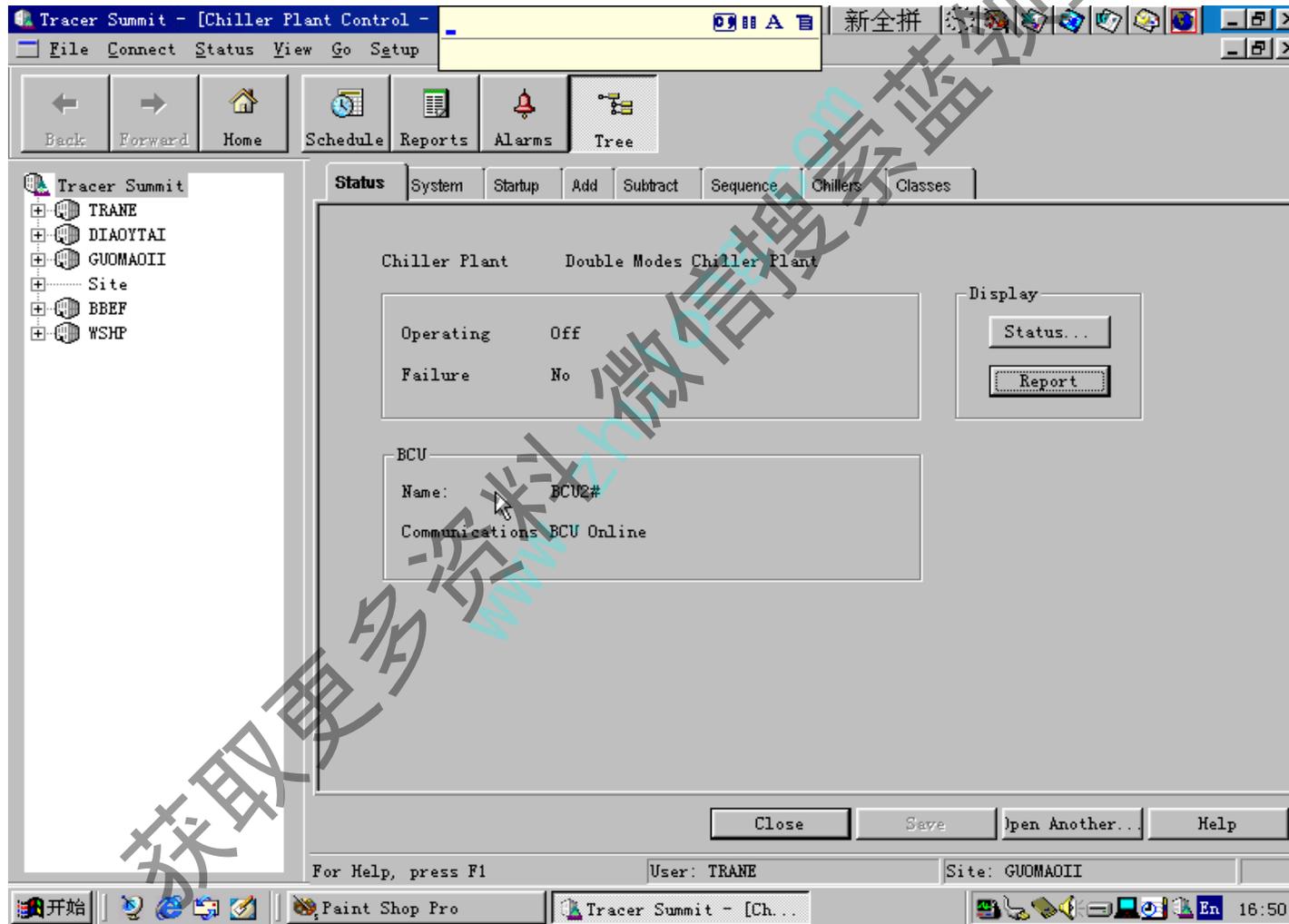
一次泵定流量系统



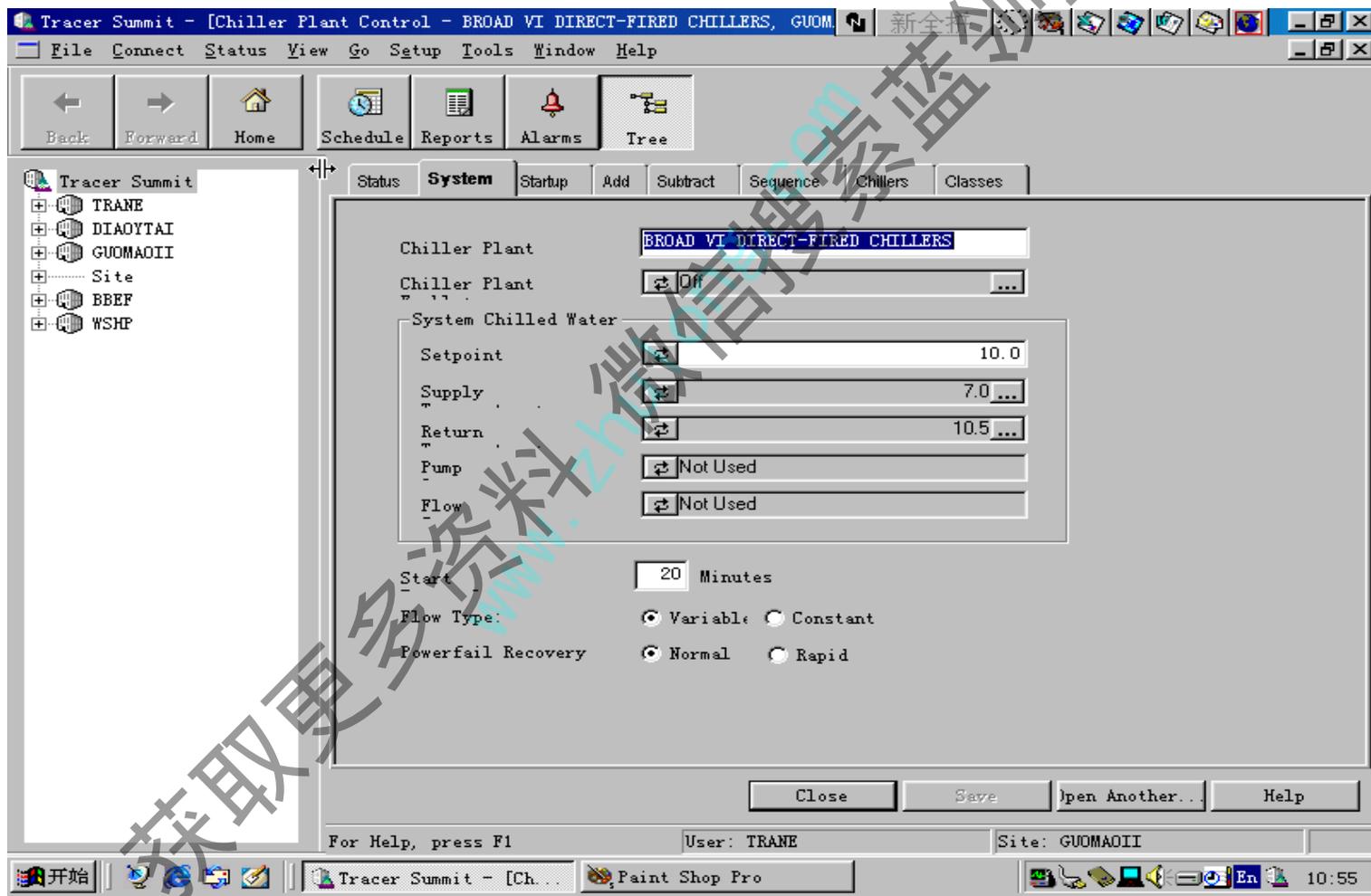
功能

- ◆ 支持**25**台冷水机组
- ◆ 自动加载、减载
- ◆ 软启动、停机
- ◆ 机组轮循顺序表
- ◆ 监测机房群控状况
- ◆ 故障报警、恢复
- ◆ 运行报告
- ◆ 监测冷机内达**200—300**项数据
- ◆ 与水泵、水塔联动控制

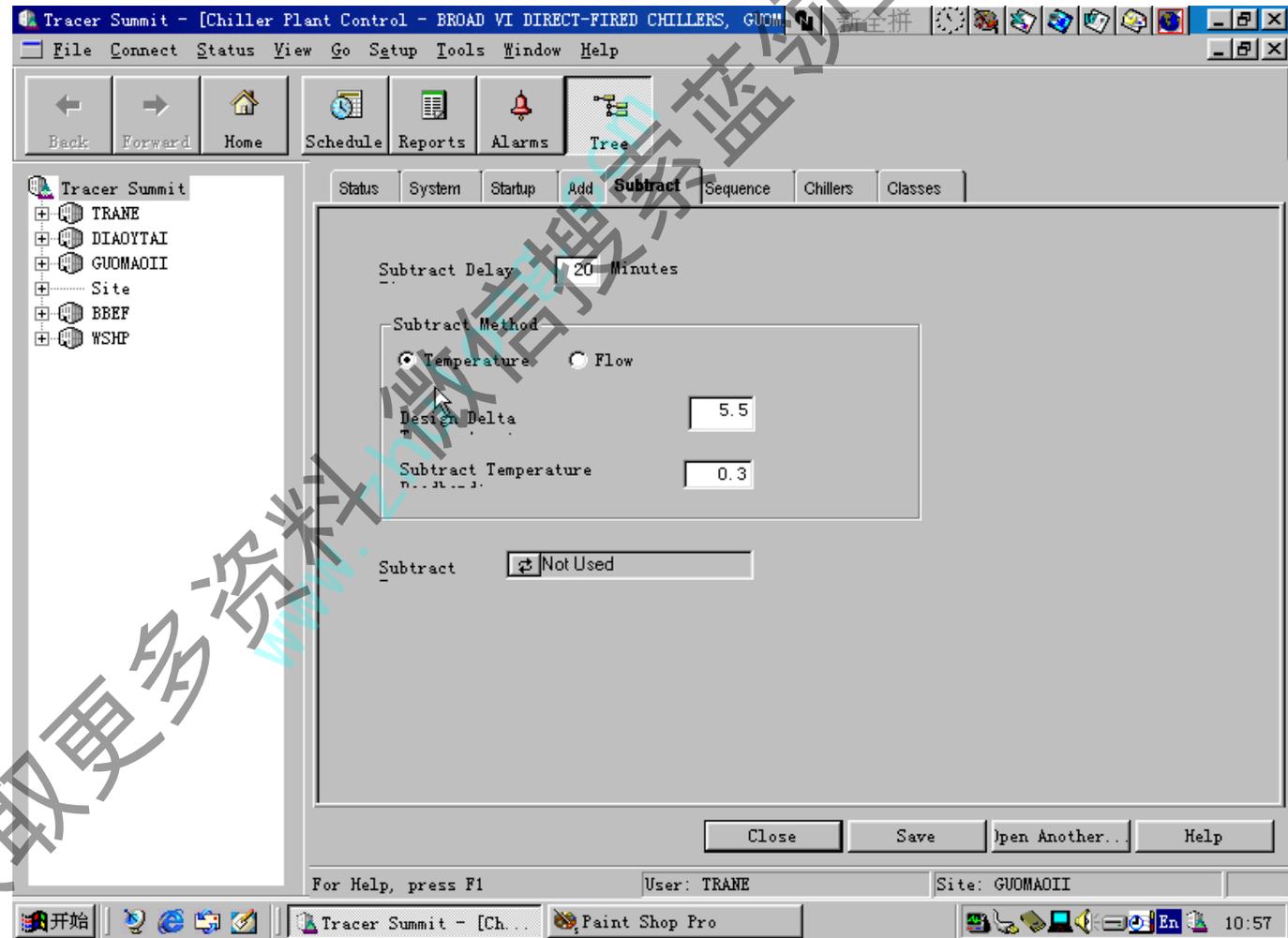
冷水机房智能化的概念



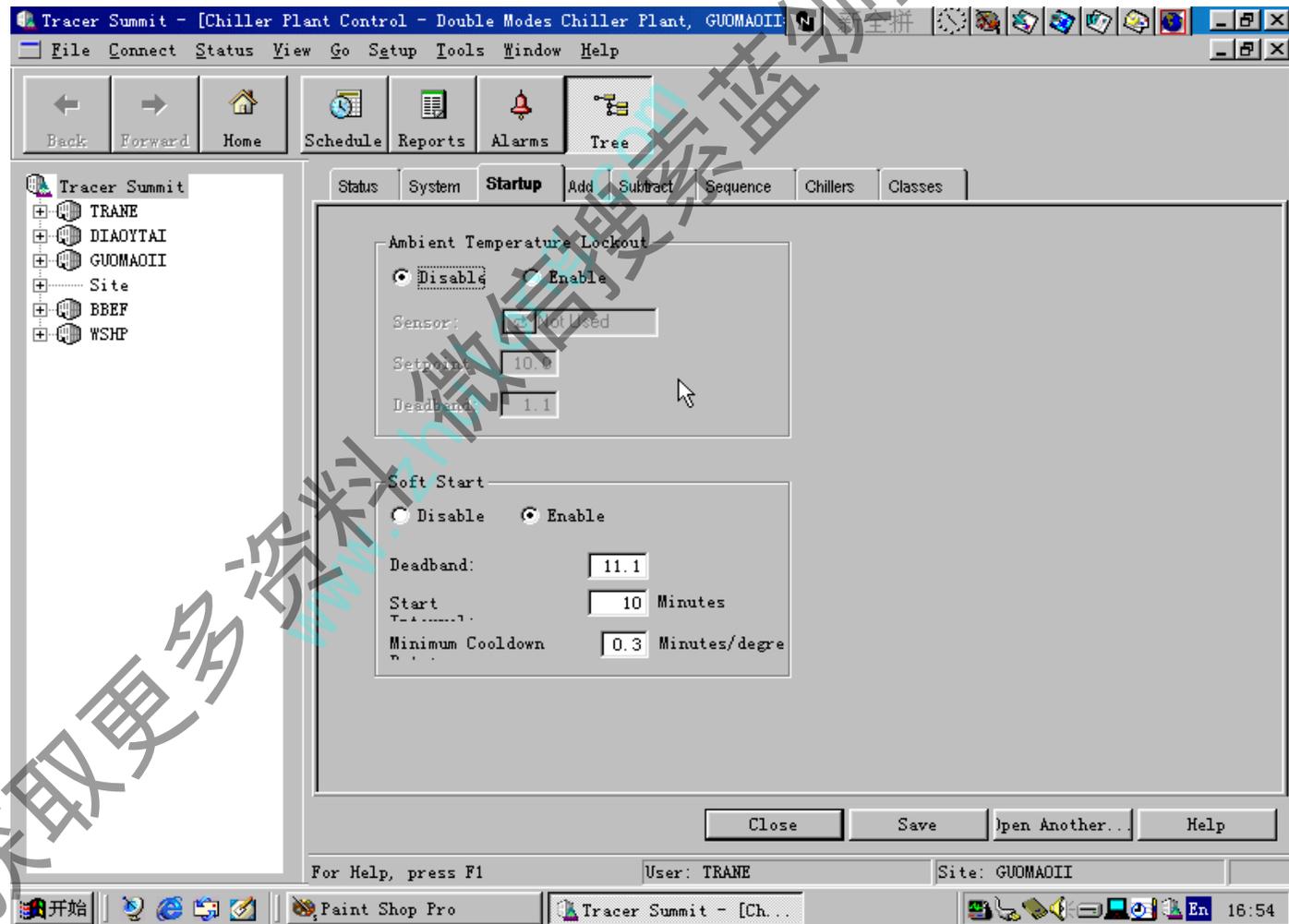
冷水机房软件包



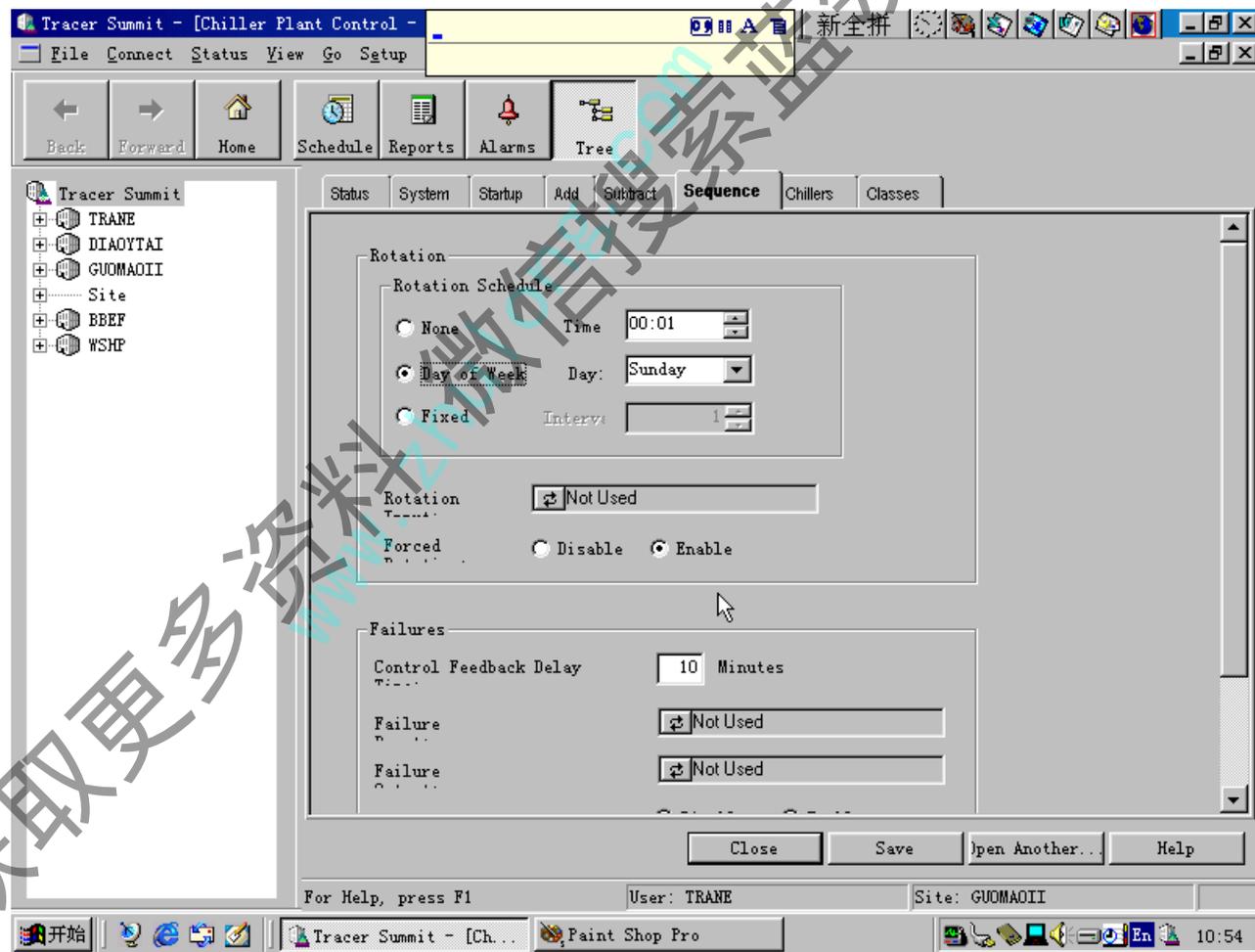
自动加/减载



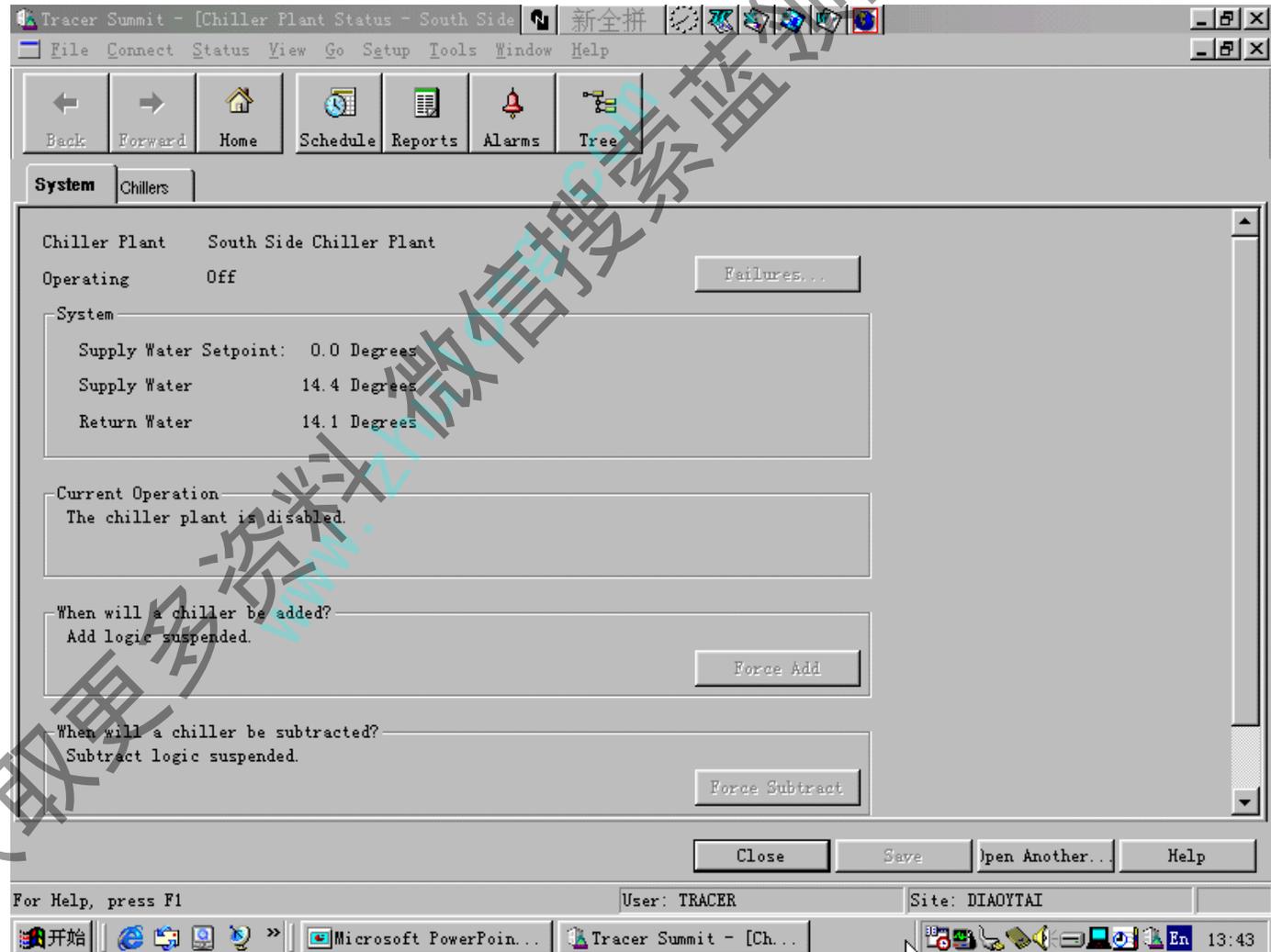
软启动/停机方式



机组轮循顺序



监测机房群控状态



The screenshot displays the Tracer Summit software interface for monitoring a chiller plant. The window title is "Tracer Summit - [Chiller Plant Status - South Side". The interface includes a menu bar (File, Connect, Status, View, Go, Setup, Tools, Window, Help) and a toolbar with buttons for Back, Forward, Home, Schedule, Reports, Alarms, and Tree. The main content area is divided into sections:

- System:** Chiller Plant: South Side Chiller Plant; Operating: Off; Failures... button.
- System:** Supply Water Setpoint: 0.0 Degrees; Supply Water: 14.4 Degrees; Return Water: 14.1 Degrees.
- Current Operation:** The chiller plant is disabled.
- When will a chiller be added?:** Add logic suspended; Force Add button.
- When will a chiller be subtracted?:** Subtract logic suspended; Force Subtract button.

At the bottom, there are buttons for Close, Save, Open Another..., and Help. The status bar shows "For Help, press F1", "User: TRACER", and "Site: DIAOYTAI". The Windows taskbar at the bottom shows the Start button, several application icons, and the system tray with the time 13:43.

事件和报警记录

The screenshot displays the 'Tracer Summit - [EventLog]' application window. The interface includes a menu bar (File, Connect, Status, Edit, View, Alarm, Go, Setup, Tools, Window, Help), a toolbar with navigation buttons (Back, Forward, Home, Schedule, Reports, Alarms, Tree), and a tree view on the left showing a facility hierarchy. The main area contains a table of event and alarm records.

Date/Time	Event Type	Detail	Ack Req'd	Priority-Operator	From	Site
11/24/99 8:47 AM	User Log On	TRACER on Operator's Workstation	--			TRANE
11/23/99 3:38PM	User Log Off	TRACER on Operator's Workstation	--			TRANE
11/23/99 3:38PM	User Log On	TRACER on Operator's Workstation	--			TRANE
11/23/99 3:38PM	User Log Off	TRACER on Operator's Workstation	--			TRANE
11/23/99 3:34PM	User Log On	TRACER on Operator's Workstation	--			TRANE
2/2/99 10:06AM	User Log Off	Pete on Operator's Workstation	--			TRANE
2/2/99 10:00AM	Normal to Alarm	Dirty Filter Alarm	--		BCU #1	TRANE
2/1/99 3:01PM	Normal to Low Alarm	AHU #1 Discharge Air Temp 0.00	Yes		BCU #1	TRANE

Below the table are buttons for 'Acknowledge Alarm', 'Silence Alarm', 'Refresh', 'Close', and 'Help'. The status bar at the bottom shows 'User: TRACER' and 'Site: TRANE'.

报警处理

The screenshot displays the Tracer Summit software interface. The title bar reads "Tracer Summit - [Graphic - Exp Msg:filter alarm, TRANE]". The menu bar includes "File", "Connect", "Status", "View", "Go", "Setup", "Tools", "Window", and "Help". Below the menu bar is a toolbar with icons for "Back", "Forward", "Home", "Schedule", "Reports", "Alarms", and "Tree".

The main window is divided into two panes. The left pane shows a hierarchical tree view of the building's structure, including areas like "AMS Roo", "Receptor", "Billing VAV", "Confere", "Finance V", "Main Entr.", "West Entr.", "Customer Sup", "Customer", "Cust_Sup", "Engineering A", "Manufacturing", "Marketing Are", "Training Area", and "Chiller Plant".

The right pane displays a "Dirty Filter Alarm" notification. It features a video player showing a technician in a blue shirt standing in a mechanical room, gesturing towards the equipment. Below the video, the "Action Items" section lists the following steps:

1. Check required filter size and quantity
2. Turn off Air Handling Unit
3. Locate the filter section of Air Handling Unit
4. Replace filters, shut panel door and start AHU

The status bar at the bottom of the window shows "For Help, press F1", "User: TRACER", and "Site: TRANE".

报告

Tracer Summit - [Reports - Centrifugal UCP2 Diagnostic Report, TRANE*]

File Connect Status View Go Setup Tools Window Help

Back Forward Home Schedule Reports Alarms Tree

Print Next Page Prev Page Web Page Zoom In Zoom Out Close

AMS Roo
Reception
Billing VA\
Conferenc
Finance V
Main Entr.
West Entr
Customer Sup
Customer
Cust_Sup
Engineering A
Engineerir
Engineerir
Engineerir
Engineerir
Manufacturing
AHU #1 C
AHU #2 C
Marketing Are
IAQ System
Marketing
Applicatio
Communic
Marketing
Training Area
Chiller Plant
60 ton Scroll C
90 ton RTAA
Centrifugal Ch

Centrifugal Chiller with UCP2
Standard Diagnostic Report

11/26/09
1:30:25 PM

Model Number:
Serial Number:

	Current Value
Chiller Name	Centrifugal Chiller
Present Value	???
Operating Mode	???
Refrigerant Type	???
Communications:	
State	???
Link	2
Address	36
Chilled Water Setpoint - deg F	???
Chilled Water Setpoint Source	???
Current Limit Setpoint - % RLA	???
Current Limit Setpoint Source	???
Compressor/Motor Data	
Compressor Running?	???
Number of Starts	???
Compressor Run Time - hrs	???
Current Draw - % RLA	???
Discharge Refrio Temp - deg F	???
Comp Bearing Temp #1 - deg F	???
Comp Bearing Temp #2 - deg F	???
Oil Temperature - deg F	???
Oil Pressure: Low Side - psia	???
Oil Pressure: High Side - psia	???

Close Save Open Another... Help

Page 1 User: TRACER Site: TRANE



自控与手动控制比较

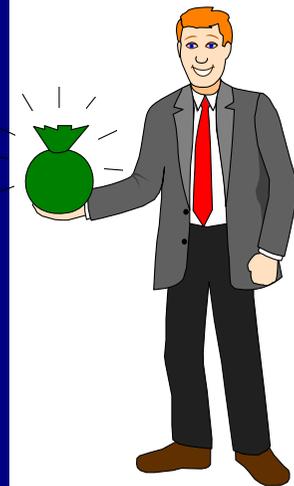
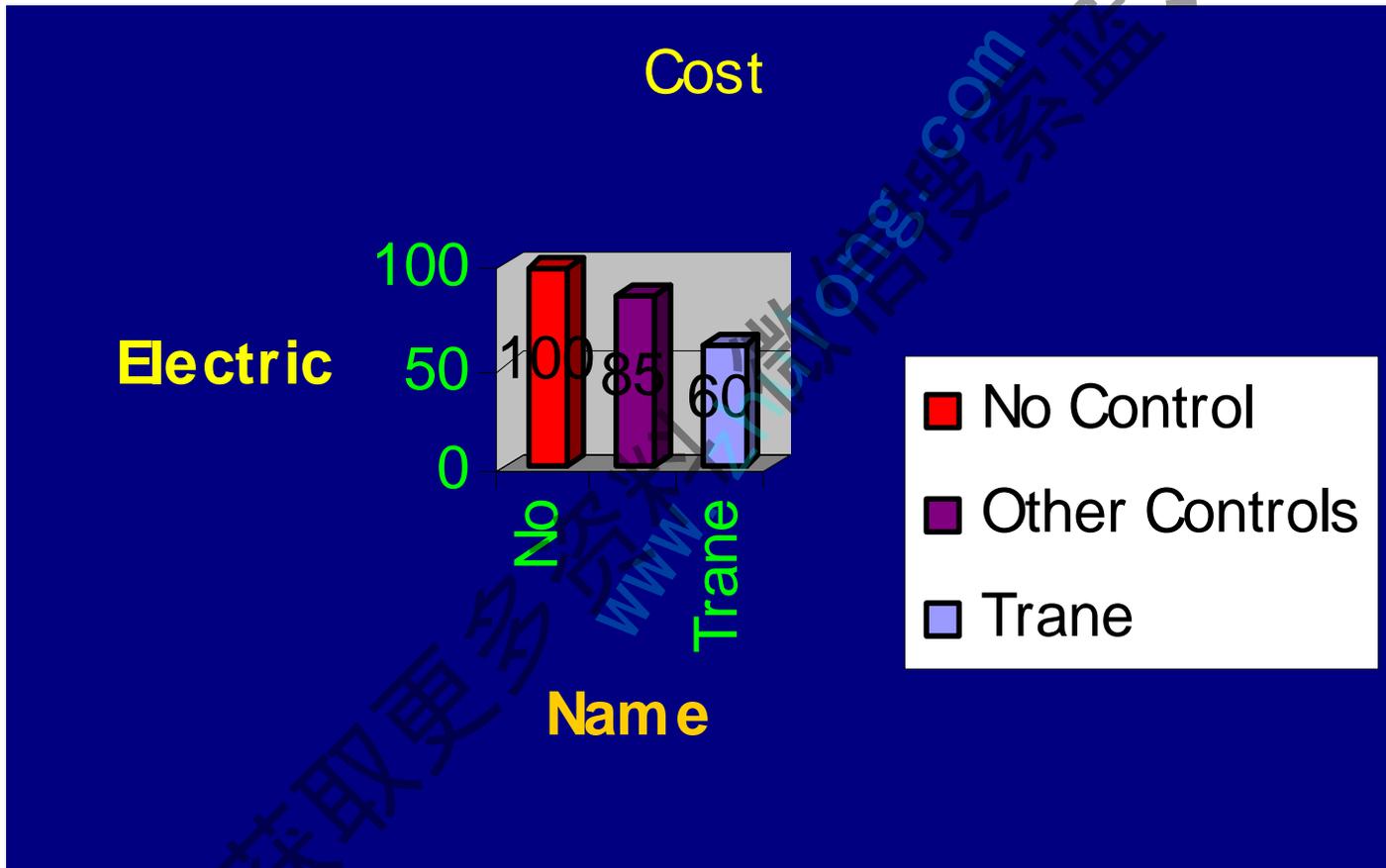
	采用中央空调监控系统	不采用中央空调监控系统
初次投资成本	略高	低
节约能源	佳	不佳
人工成本 (保养人员)	低	高
故障报警	佳	不佳
资料管理	佳	不佳
系统管理	容易	困难
故障记录	容易	困难
保养费用	略高	一般
系统整合 (不同区域条件要求)	容易	困难
技术人员要求	略高	一般



TRANE 与其他厂家比较

	特灵	其他牌
使用 Windows (中文版)操作系统	是	是
动态图形界面	是	是
在线参数设定, 修改	是	是
原厂服务 (与冷水机组同一品牌)	是	否
读取所有主机讯息	是	否
冷水机组警报同步打印 (包括设备编号及显示原因)	是	否
原厂提供冷水机组最佳化管理软件 (固定程序, 使用方便)	是	否
资料报告, 追踪	是	否
带有可编程软件	是	是
远程监控功能	是	是
系统扩充性	是	是

节能! 省钱!



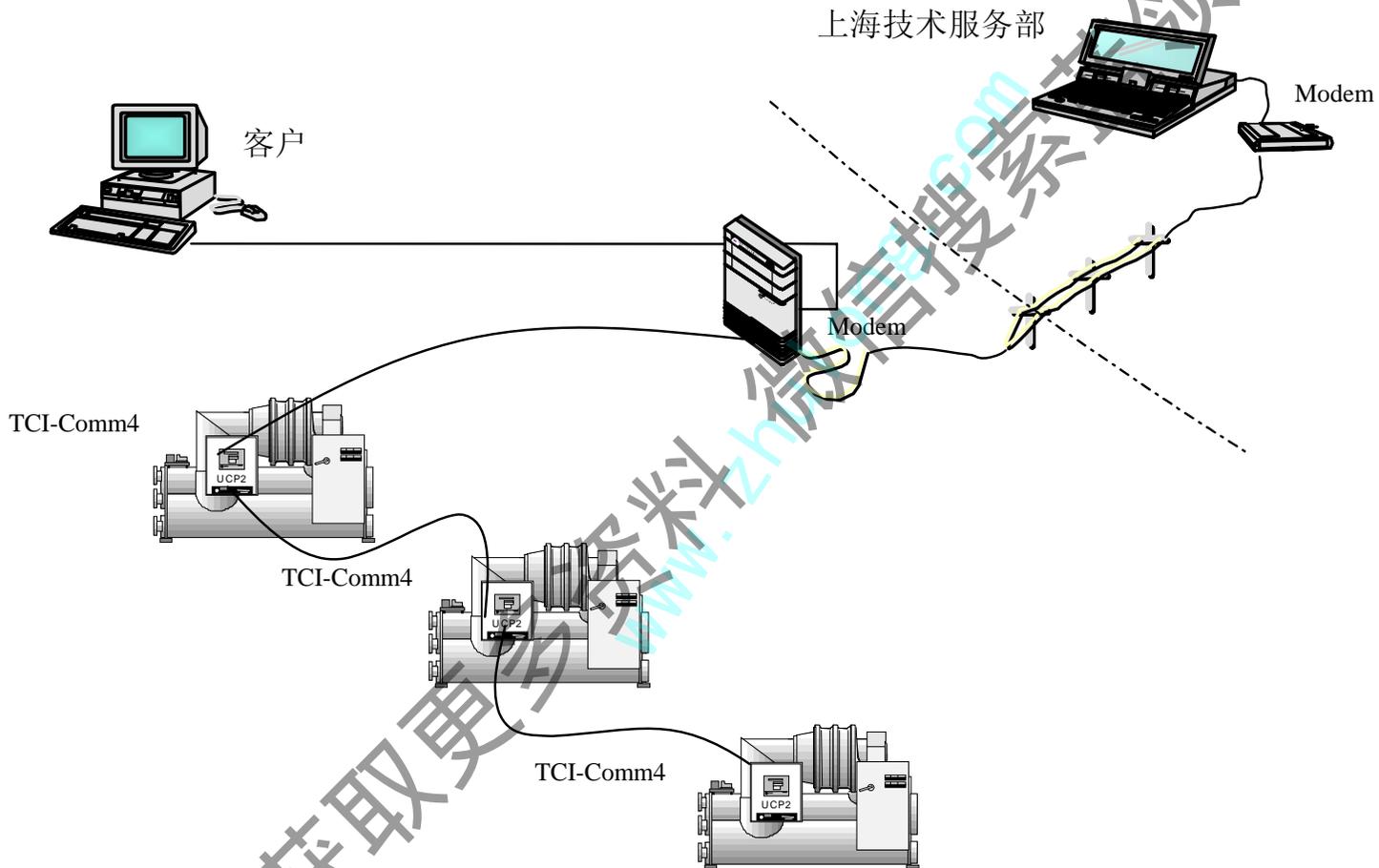
5. RMU远程服务

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您发生过以下情况或疑问吗?

- 有人说不冷有人说很冷?
- 是不是该做保养了?
- 系统是不是可以更省电?
- 主机跳脱后无法将实际状况告知TRANE人员而延误故障排除时间?

远程通讯结构图



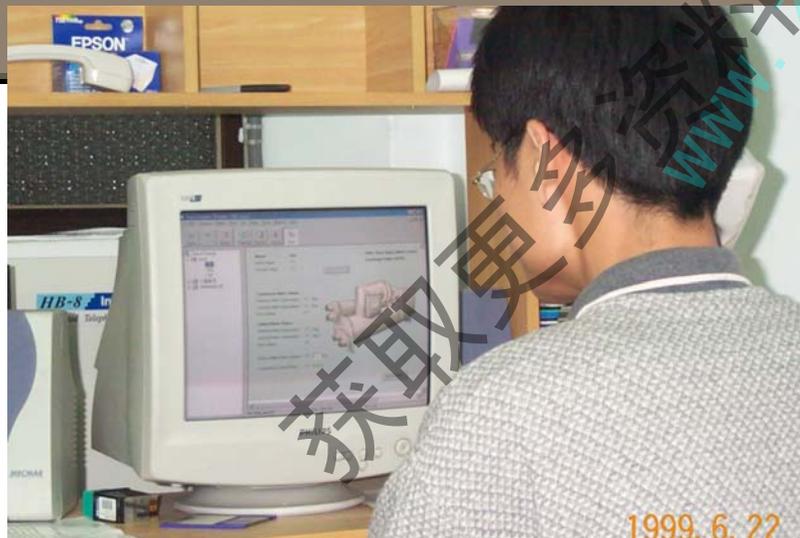
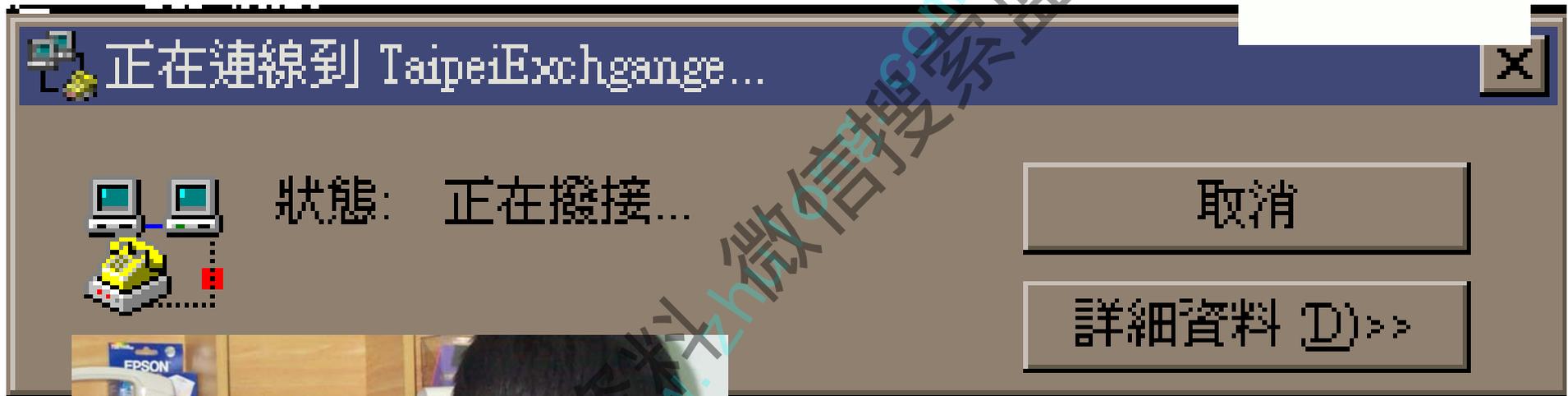
获取更多资料: www.zhibo.com 微信号: 领星球

远程控制所需设备

- ◆ 一根电话线
- ◆ 一个**RMU + 调制解调器 (Modem)**

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維修部的工作



连线报告一

Tracer Summit - [Graphic - Centrifugal Chiller (UCP2)-1-34, 六福皇宫]

File Connect Status View Go Setup Tools Window Help

Back Forward Home Schedule Reports Alarms Tree

Tracer Summit
AAA
六福皇宫
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WNERSHOW

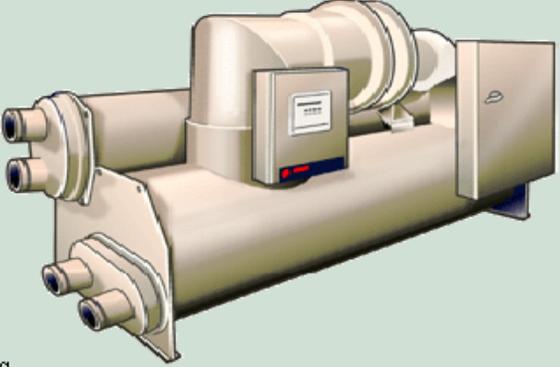
Name: Centrifugal Chiller (UCP2)-1-34
CVHE, Three Stage, Water Cooled Centrifugal Chiller (UCP2)

Active Mode: Auto
Present Value: Occupied

Condenser Water Status:
Entering Water Temperature: 28.2 Deg
Leaving Water Temperature: 33.0 Deg
Flow Status: Yes

Chilled Water Status:
Entering Water Temperature: 9.1 Deg
Leaving Water Temperature: 6.1 Deg
Flow Status: Yes

Active Chilled Water Setpoint: 6.0 Deg
Compressor Current Draw: 81.9 % RLA



PM 07:37

设备运转状况报告

Chiller Report	Data	
Active Chilled Water Setpoint F ^o /C ^o	45	Normal
Evap. Entering Water Temp. F ^o /C ^o	55	Normal
Evap. Leaving Water Temp. F ^o /C ^o	45	Normal
Evap Approach Temp F/C	9	趨近溫度過大,檢查冷煤含水量等...
Cond .Entering Water Temp. F ^o /C ^o	85	Normal
Cond .Leaving Water Temp. F ^o /C ^o	100	Low cond GPM, please check.
Cond. Approach Temp F/C	14	趨近溫度過大,檢查冷凝器熱交換狀況
Active Current Limit Setpoint %	90	Normal

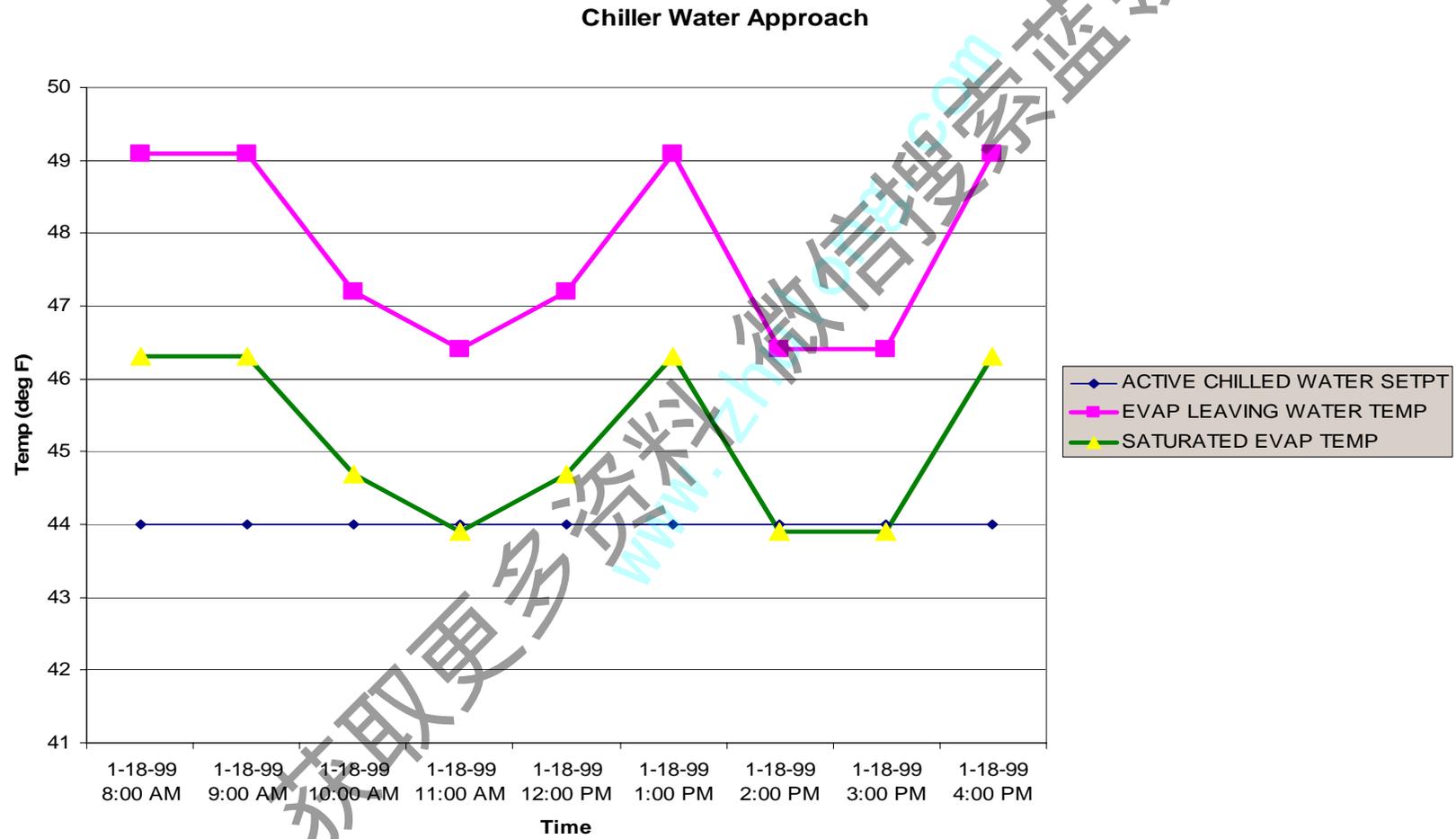
压缩机报告

Compressor Report		Data	Diagnostic
Comp phase Current % RLA	A		
	B		
	C		
Comp phase Current AMP	A	150	Normal
	B	160	
	C	160	
Comp phase Voltages	A-B	385	Normal
	A-C	380	
	B-C	390	
Motor Winding Temp F ⁰ /C ⁰	W1	150	Normal
	W2	150	Normal
	W3	150	Normal
Motor bearing Temp F ⁰ /C ⁰	Bearing # 1	165	检查冷冻油系统及轴承温度是否正常
	Bearing # 2	150	Normal
Comp Starts & Running Time	Number of Start		
	Running Time		

冷媒报告

Refrigerant Report	Data	
Evap. Refrigerant Pressure Psig/Kpa	66	Normal
Cond. Refrigerant Pressure Psig/Kpa	150	Normal
Saturated Refrigerant Temp F ^o /C ^o	36	冷媒温度过低，趋近温度过大
Saturated Cond. Temp F ^o /C ^o	116	冷媒温度过高，趋近温度过大
Oil Sump Pressure Psig/Kpa	-8	Normal
Oil Sump Discharge Pressure Psig/Kpa	8	Normal
Oil Differential Pressure Psi/Kpa	15	Normal
Oil Sump Temperature F ^o /C ^o	150	Normal

趋势图一



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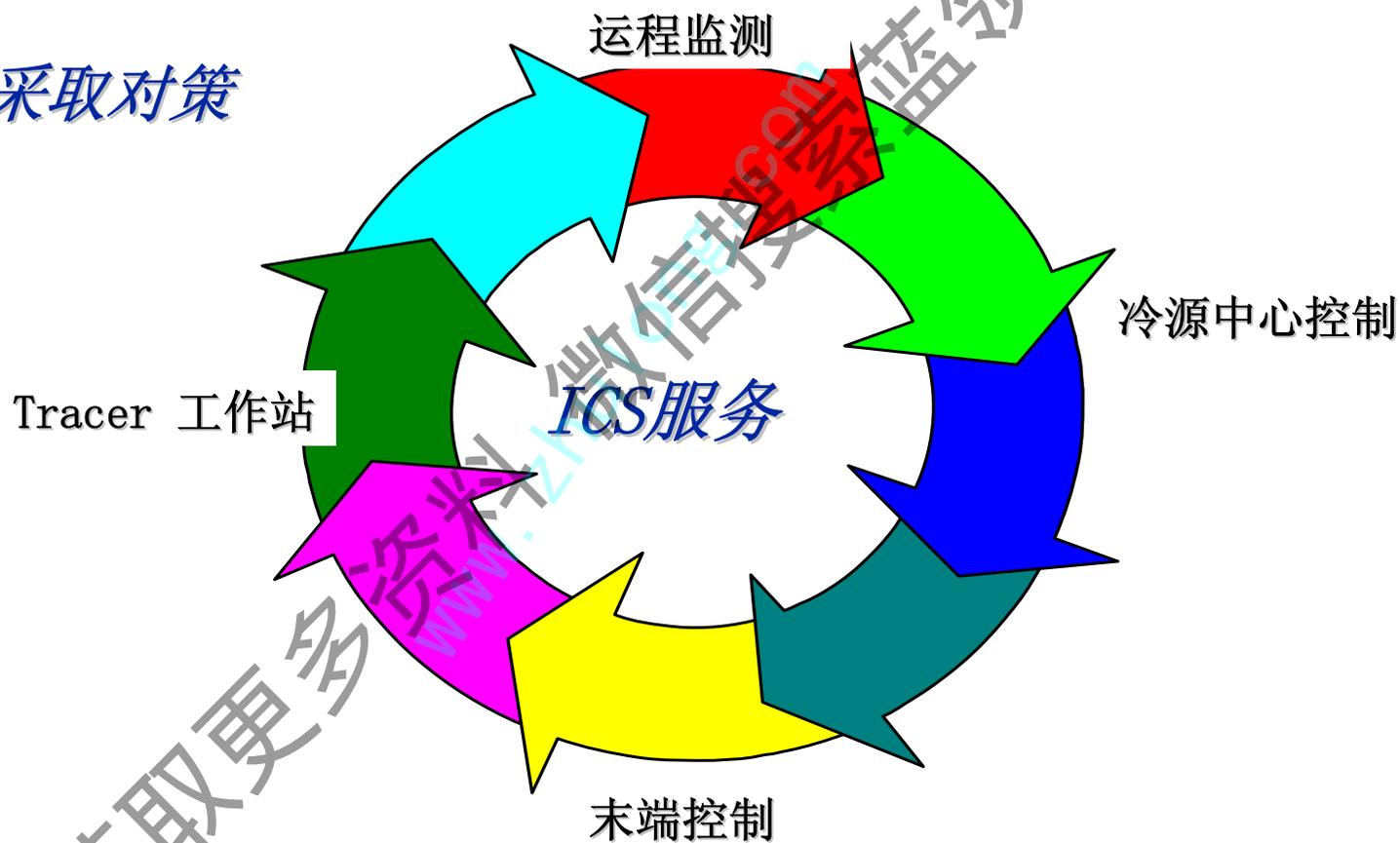
免费赠送RMU给与TRANE有三年保养合同的客户



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小结

业主能采取对策



6.功能演示

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笔记

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