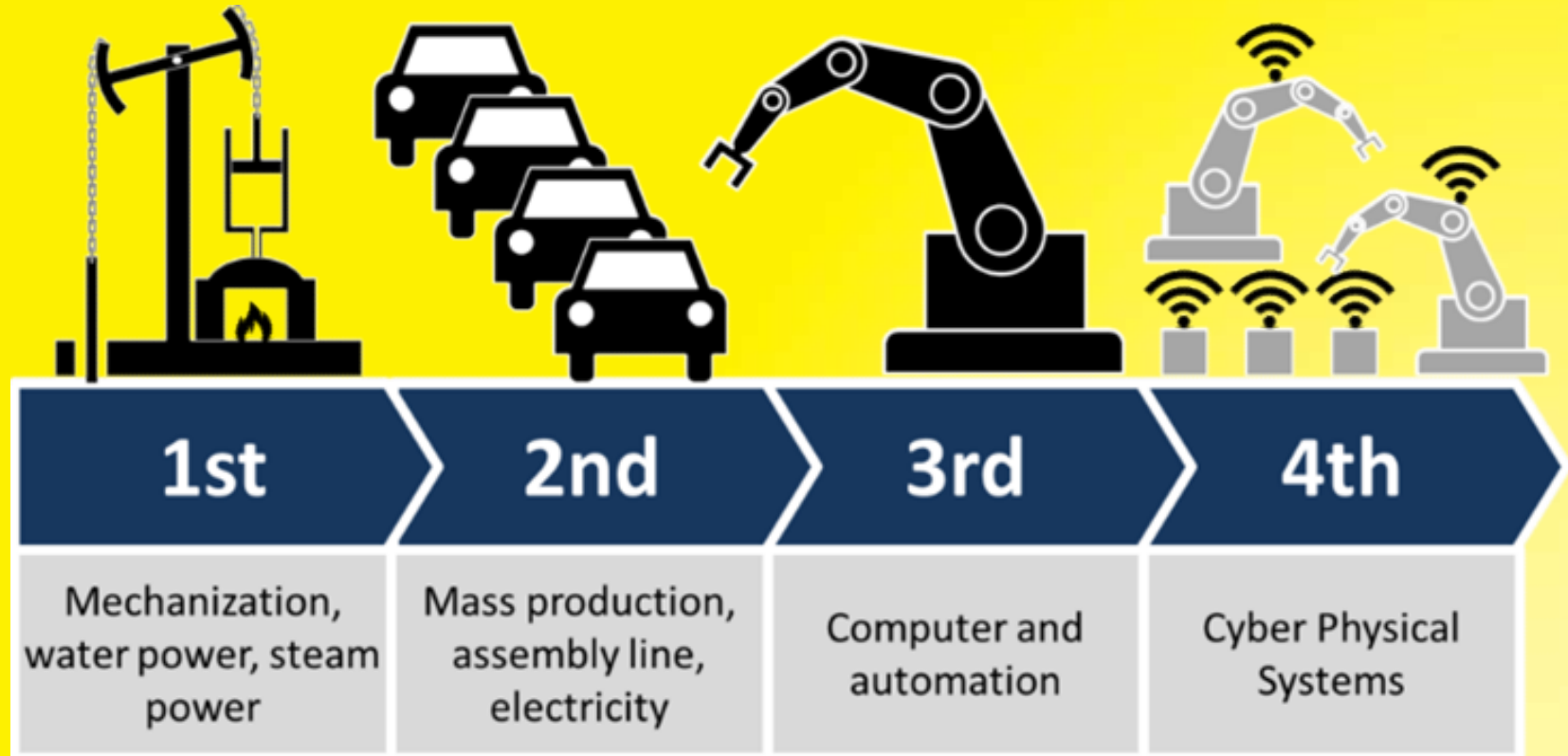




= ***Connectivity***

# Industrie 4.0

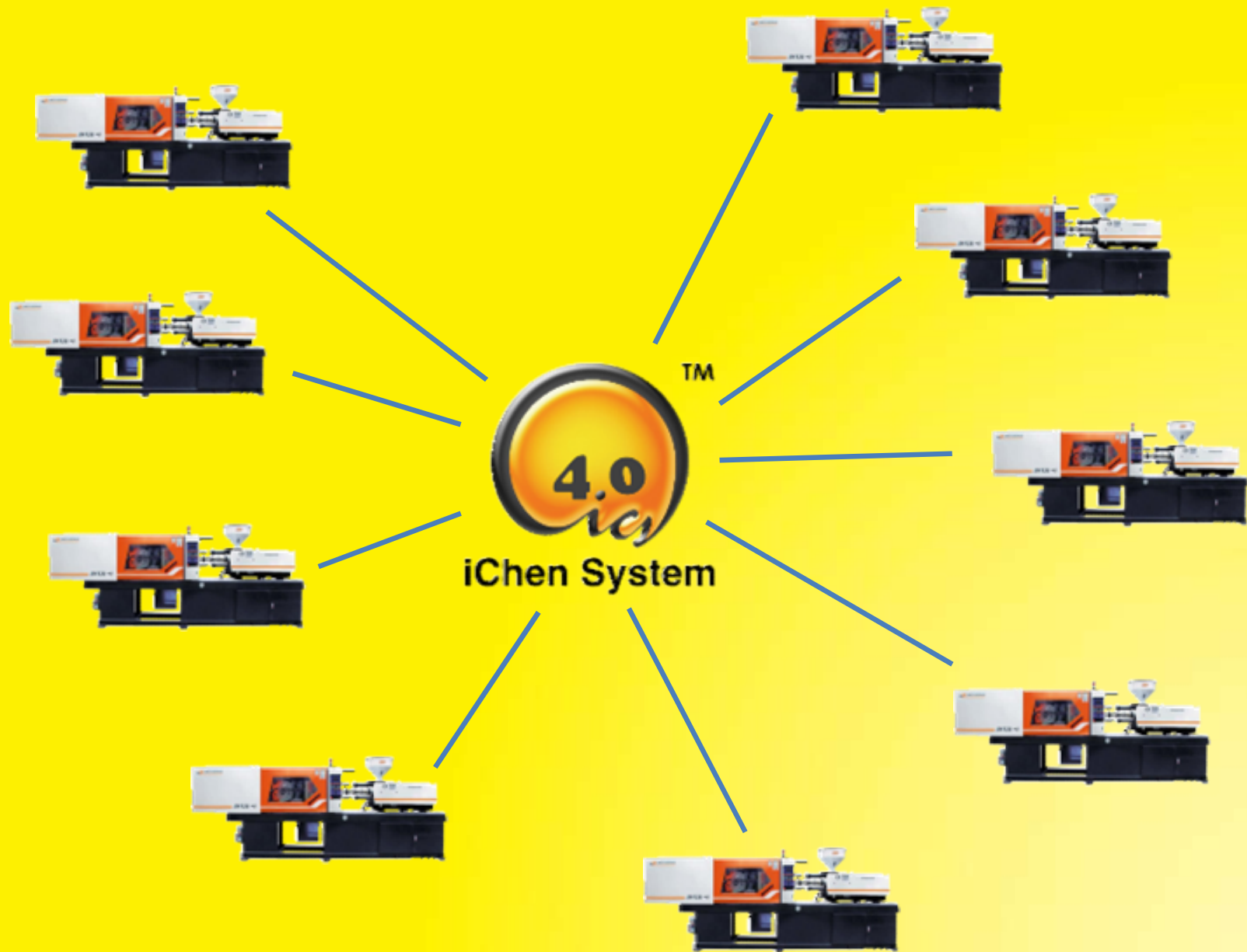


# Definitions of Industrie 4.0

- Interoperability
- Virtualization
- Decentralization
- Real-Time
- Service Orientation
- Modularity

# No Machine Shall Be An Island





 **The Chen Hsong Group**

Injection molding machine



# Monitoring

**Data collected** by  
iChen<sup>®</sup> System:

- Machine status
- Operator info
- Cycle data
- Audit trail
- Alarms



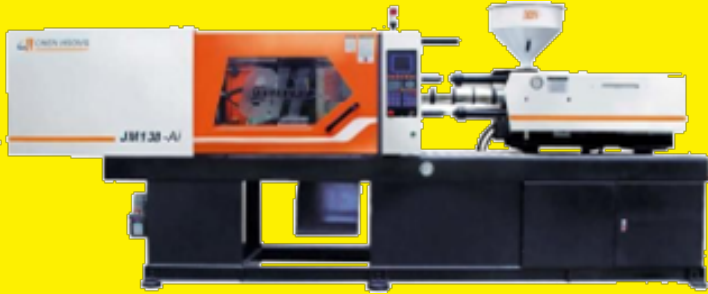
TM

Display screen showing  
**iChen<sup>®</sup> Terminal<sup>TM</sup>**

- Display machine status
- Alarms & alerts
- Update cycle data
- Update job status
- Configurable
- Layout on floor-plan



*Injection molding machine*



# Data Collection and Storage

**Data collected** by  
iChen® System:

- Machine status
- Operator info
- Cycle data
- Audit trail
- Alarms

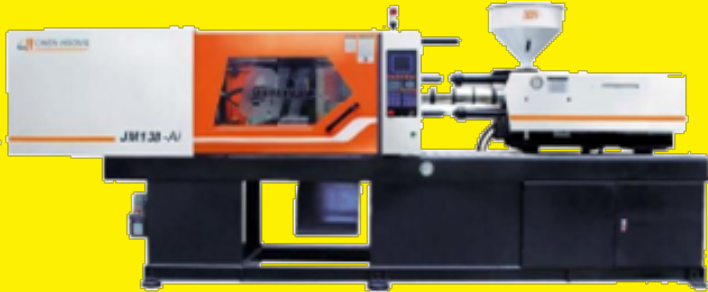


## Chen Hsong Cloud Database

- Scalable cloud storage
- Secured
- Redundant backup
- All client data isolated
- On-line reports
- Access from anywhere



Injection molding machine



# Private Data Storage

**Data collected** by  
iChen<sup>®</sup> System:

- Machine status
- Operator info
- Cycle data
- Audit trail
- Alarms



## Enterprise Private Database

- Store data locally
- Handles own security
- Mix with data from other equipment





Injection molding machine



# Managing Molds

**Load Mold Settings** from the iChen® System:

- Integrated with job cards
- Different settings for each machine
- Eliminates errors

**Save Mold Settings** onto the iChen® System:

- Separate by mold name
- Store **unlimited** number of molds
- **Multiple settings for each mold for different machines**
- Eliminates errors



Injection molding machine



# MIS Integration

## MIS integration:

- Operator access control
- Integrated security
- Job scheduling
- Mold data settings

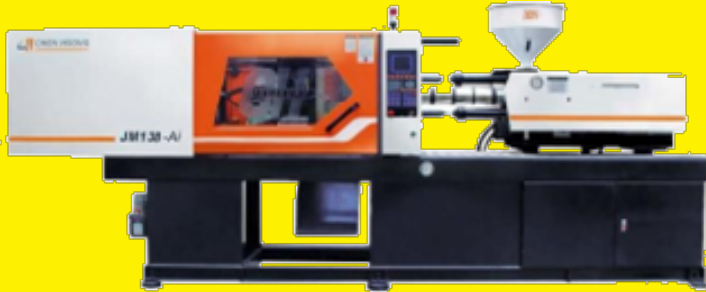


Open Protocol™



MIS (Manufacturing Information System)

*Injection molding machine*



# Open Source

iChen® System manages security and controls access

**Data collected** by  
iChen® System:

- Machine status
- Operator info
- Cycle data
- Audit trail
- Alarms



**iChen System**

TM



**Third-Party  
Software**

**Open Protocol™**

- Open and free to use
- Fully documented
- Open Source
- Code libraries and examples provided



# OPC UA

(Unified Architecture)



# What is OPC?

- **OPC Foundation** started in 1994 by major industrial players around the globe
- Specifies the OPC (OLE for Process Control) standard, which is *de facto* for communications with industrial equipment
- The original OPC standard (*OPC Classic*) – C++ and Windows®-based – started showing age in the new, Internet-connected world of today
- The OPC Foundation specified the new **OPC UA** (Unified Architecture) framework as a replacement for *OPC Classic*
- **OPC UA** will replace *OPC Classic* in the near future as the backbone of tomorrow's intelligent factories



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# Why OPC UA?

- **OPC UA** is...
  - platform-independent, vendor-independent
  - extensible, service-oriented
  - programming language-independent
  - built-in security features
  - integrates all functionalities of *OPC Classic*
- **OPC UA** is usually considered a cornerstone of Industrie 4.0.

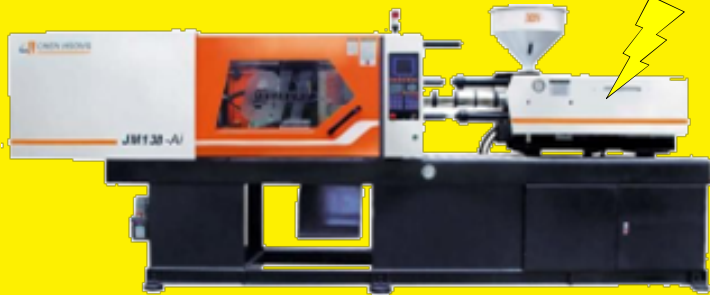




# Full OPC UA Support

- **OPC UA** is fully supported:
  - Data acquisition (read/write)
    - Machines and parameters exposed as standard nodes in the address space
  - Subscriptions (change notifications)
  - Alerts, Alarms and Events (A&E)
  - All common communication models
    - TCP/IP, HTTP/WS, HTTPS, etc.
  - All common security models
  - Seamlessly interoperates with all other OPC UA-enabled equipment and systems

Injection molding machine



3G/4G  
Mobile

# Look, No Wires!

3G/4G

Internet



Monitoring

Internet

Analytics



3G/4G

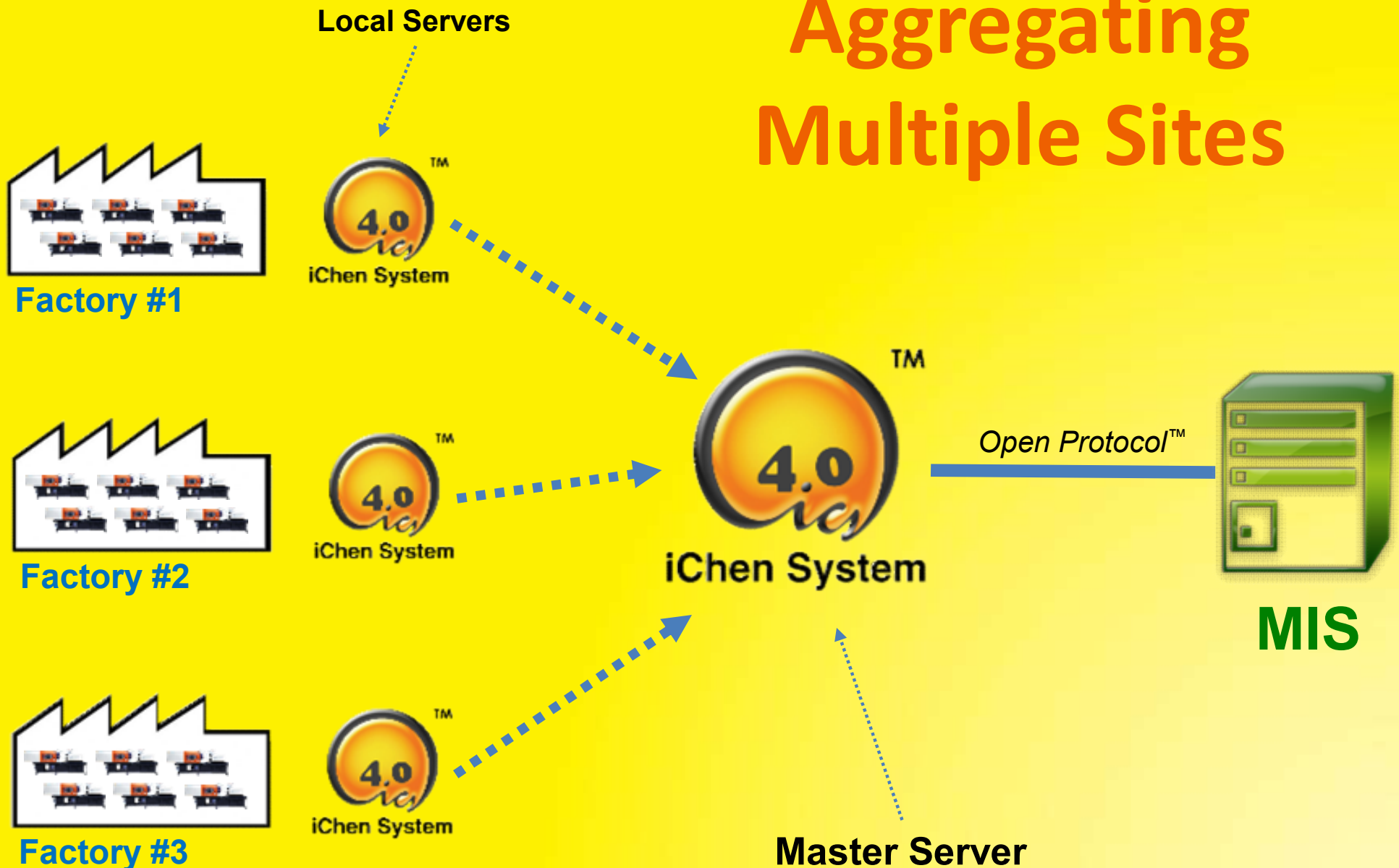
Data Access



Chen Hsong  
Cloud

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# Aggregating Multiple Sites



# Supported Controllers

## Nippobatta

- Ai-01
- Ai-11
- Ai-02
- Ai-12
- CPC-6.0
- MPC-6.0

## CDC

- CDC3000
- CDC2000WIN

## Beckhoff®

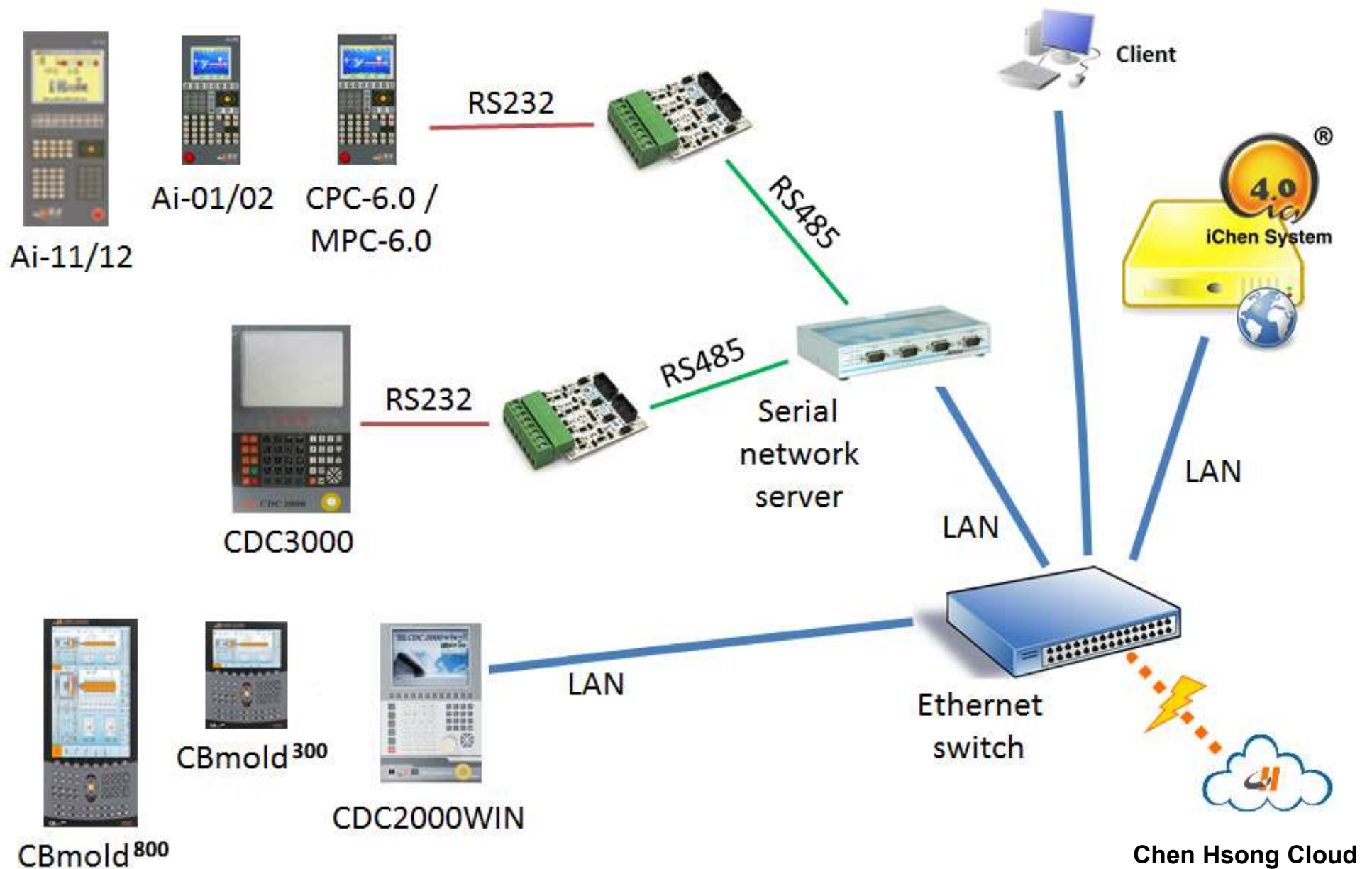
- CBmold<sup>300</sup>
- CBmold<sup>800</sup>

## Others

Integrate with provided C++ code library.



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# Types of Data Available

## Machine Status

- **Operating Mode:** Manual, semi-automatic, automatic
- **Job Mode (user defined):** Active production, mold trial, samples, scheduled maintenance etc.

## Operator

- Operator identity and access level

## Cycle Data

- Cushion position, injection time, max. injection speed, clamp open position, cycle time, good-part count etc.

## Alarms & Warnings

## Audit Trail

- All setting changes on machine, with time-stamp and operator ID



# MIS Integration

## Centralized Security

- **Lock down** all machine access with local passwords
- Centrally-administer operator accounts, passwords and individual access levels
- **Disable access** centrally as operator resigns or transferred

## Centralized Job Scheduling

- **Schedule** production orders among machines
- Automatically load **mold settings** data
- **Restrict** workload of machine
- Automatically **stop production** when quantity reached

# Data Access



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Cloud Database**



Smartphones



Tablets



Desktop PC's



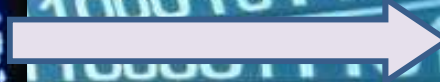
# Leverage BIG DATA on the CLOUD



Chen Hsong  
Cloud Database



Reports



Alerts &  
Alarms



Analytics



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**For More Details...**

**[cloud.chenhsong.com/iChen](http://cloud.chenhsong.com/iChen)**