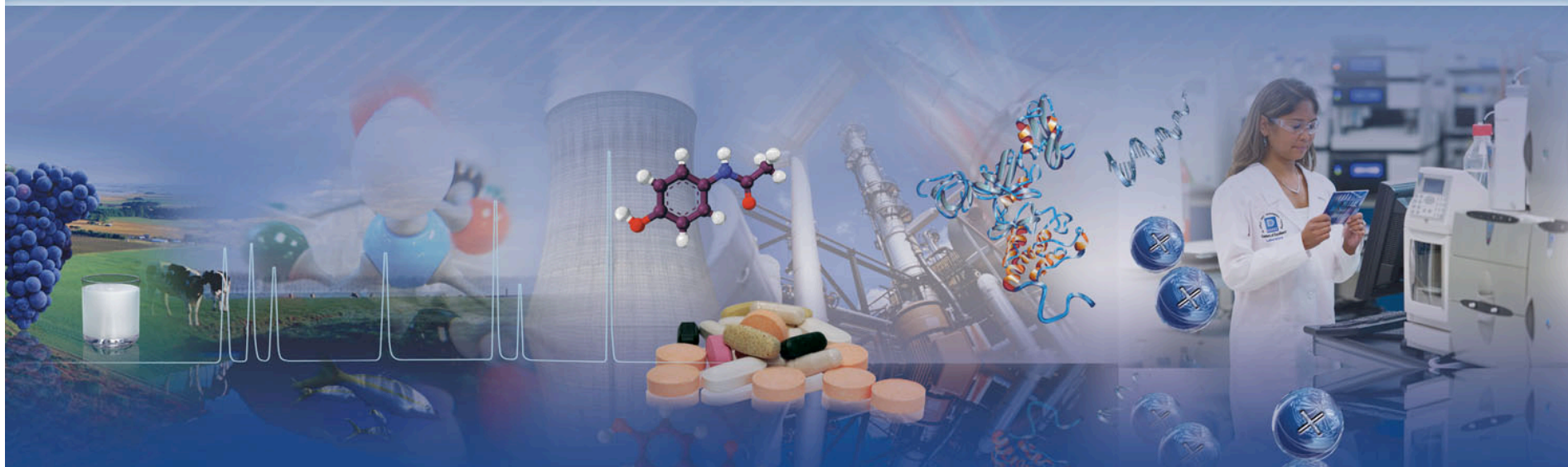


# Integral™

## On-line IC for the Power Generation Industry



# Integral On-line IC for Power Generation

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- Prevent damage to your generation equipment
  - On-line monitoring of corrosive ions
  - Alert before equipment is damaged
- Increase your operating efficiency
  - Monitor water purification operations
  - Detect resin breakthrough in near real-time
  - Regenerate resins when needed; not based on time

# Dionex: Over 25 Years of On-Line IC/HPLC Experience

1984

Model 8000

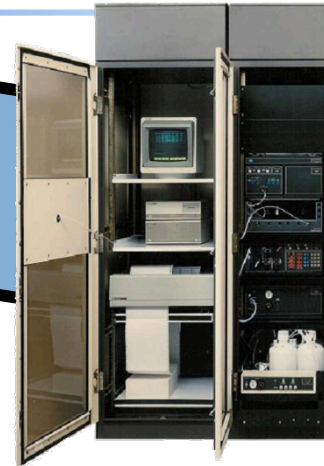
Model 8100

*Integral*

2009

Model DX-800

Model 8200



# Dionex Process Analytical Technology Products



- Integrated hardware/software solutions
- Unmatched versatility
- Serving multiple industries:
  - Electronics
  - Chemical
  - Pharmaceutical/biopharmaceutical
  - Food and beverage
  - Power generation
  - Environmental
  - Utilities

# Integral for Unmatched Versatility

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- Instrument options for IC, RFIC<sup>®</sup>, HPLC, or UPLC
  - Isocratic or gradient
  - Single or dual channel systems
  - Multiple detection options:
    - UV-VIS, conductivity, electrochemical, RI, fluorescence, Charged Aerosol Detector
- Modular design for flexible system configuration
  - Configure for process development lab, pilot plant, or factory floor
  - Invest in industrial enclosure only when necessary
- Perform on-line IC in your lab or on the power plant floor
  - *Integral Migration Path*<sup>™</sup> design for on-line LC whenever and wherever needed

# The Integral Migration Path™

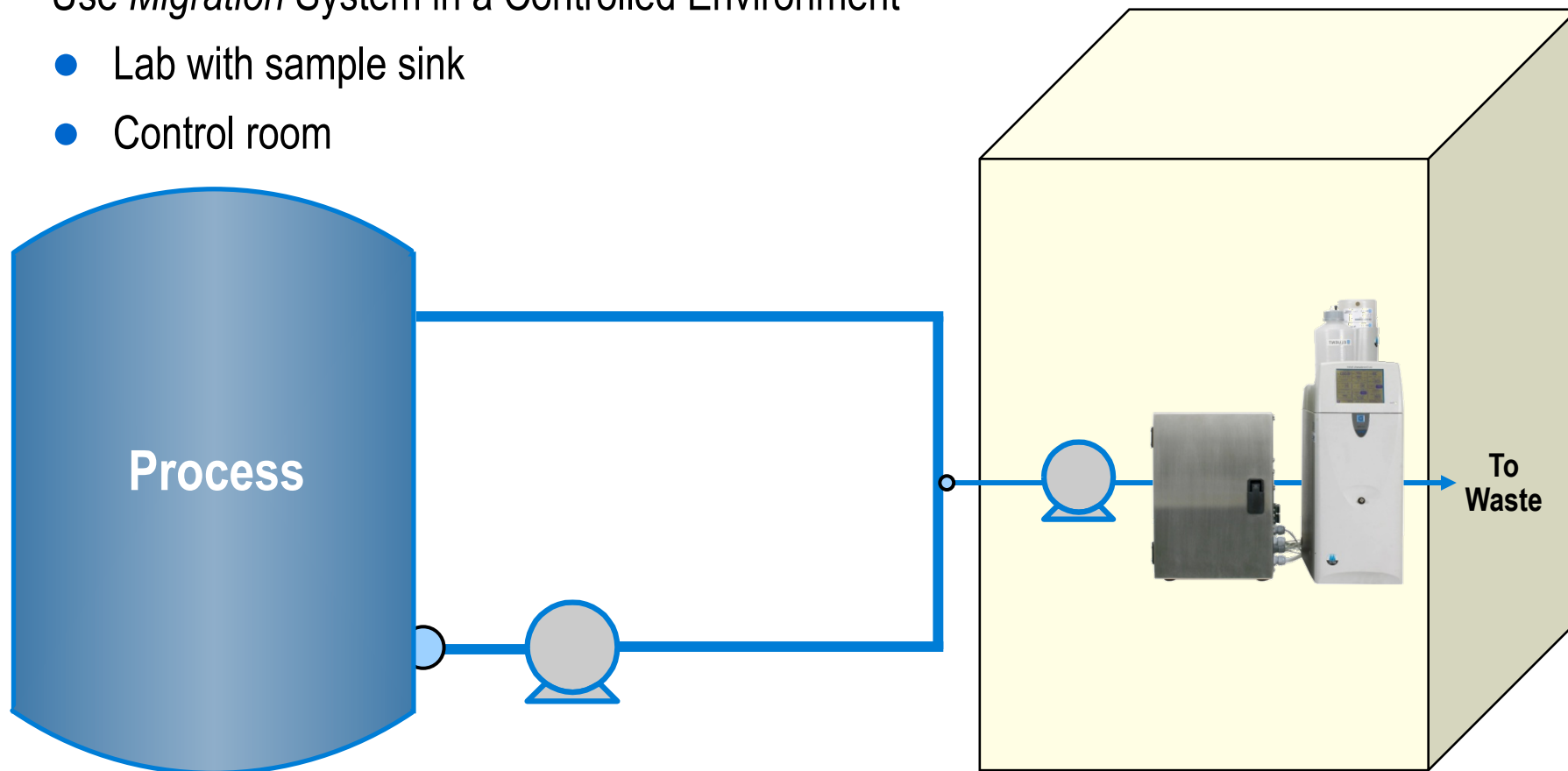
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- Not all applications require a protective enclosure
  - Installations in controlled environments
    - Use a lab system with SP Sample Preparer and no industrial enclosure
  - Example controlled environment applications:
    - “Wet labs” in water utilities, power plants, etc.
    - Control rooms
    - Analyzer Houses
  - Lower initial investment, higher customer value

# On-line IC with Integral Migration System

Use *Migration* System in a Controlled Environment

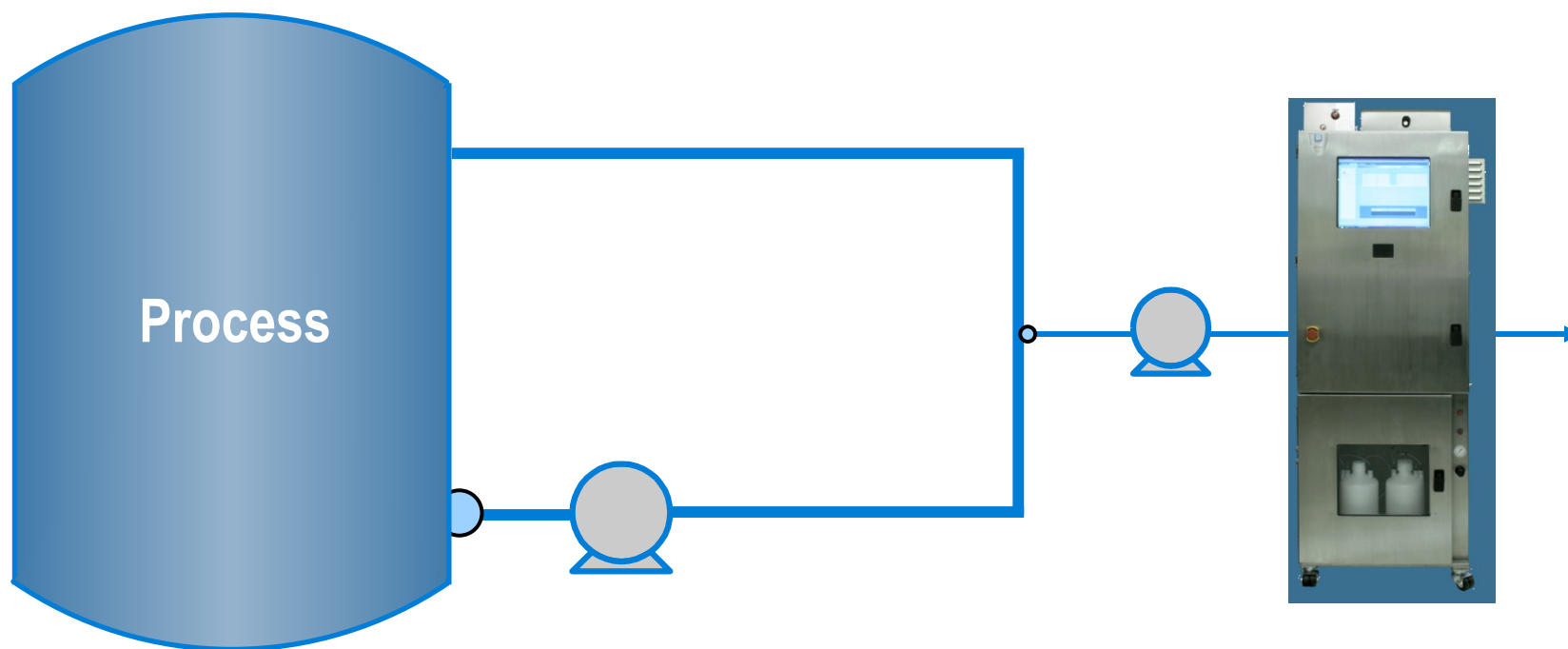
- Lab with sample sink
- Control room



# On-line LC with Integral Enclosure System

Use *Enclosure System* in an uncontrolled environment

- Integral enclosure systems provide their own environment



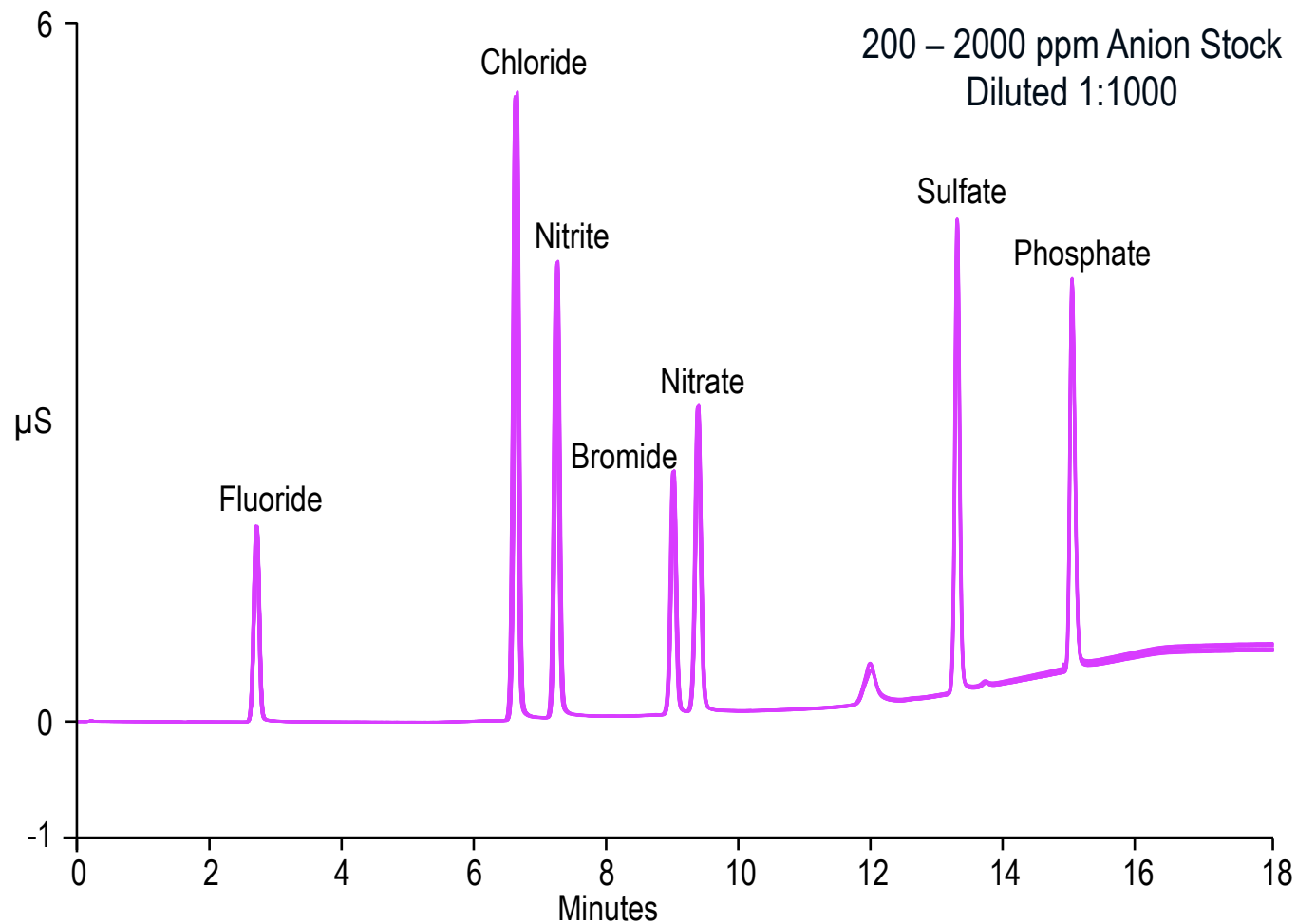


# Modular Design for Flexible System Configuration

- Stream Selector Module
  - Multiplex up to 21 sample streams to 1 analyzer
    - Reduce cost by sharing analyzer across multiple streams
- Sample Preparer Module
  - Totally automated, unattended operation
    - Sampling
    - Dilution
    - Reagent addition
    - SPE for analyte isolation / pre-concentration
    - Single or multi-point calibration
    - System suitability execution and evaluation



# SP Performance Data – Sample Dilution



## SP Performance Data – Sample Dilution

Peak Name	Peak Area RSD	Retention Time RSD
Fluoride (200 ppb)	0.423%	0.277%
Chloride (1000 ppb)	0.377%	0.180%
Nitrite (1000 ppb)	0.391%	0.145%
Bromide (1000 ppb)	0.399%	0.082%
Nitrate (1000 ppb)	0.474%	0.074%
Sulfate (1000 ppb)	0.391%	0.034%
Phosphate (2000 ppb)	0.383%	0.027%

1:1000 Dilution, Overlay of 30 Consecutive Runs  
< 0.5% RSD for Area

# Integral On-line IC Instrument Options

- ICS-5000
  - Single or dual channel
  - Isocratic, gradient, RFIC
  - Micro or standard bore
  - Conductivity, IPAD, UV-VIS



Dual channel  
ICS-5000 Migration System

- ICS-2100
  - Single or dual systems
  - Isocratic, RFIC
  - Micro or standard bore
  - Conductivity



Dual ICS-2100  
Enclosure System



ICS-2100 Migration System

# Integral Enclosure Options

**AE**  
Analytical  
Enclosure

**LE**  
Liquids  
Enclosure



Enclosed PC  
Controller

17" LCD screen  
and touch pad  
mounted in door

# Integral Enclosure System with ICS-3000



ICS-3000 Dual Channel System

External  
SP Sample Preparer

# Dual Channel IC Options

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- Configure for increased information
  - Dual system with complementary determinations
    - Example: anions and cations in HPW
- Configure for increased speed
  - Tandem configuration (2-pumps, 1-detector)
    - Regenerate one column while performing separation on other
  - Parallel configuration (2 complete LC systems) w/ same assay
    - Sample analysis frequency increased 2X
- Configure for increased selectivity (IC X IC)
  - Channel 1 isolates sample; Channel 2 provides increased resolution

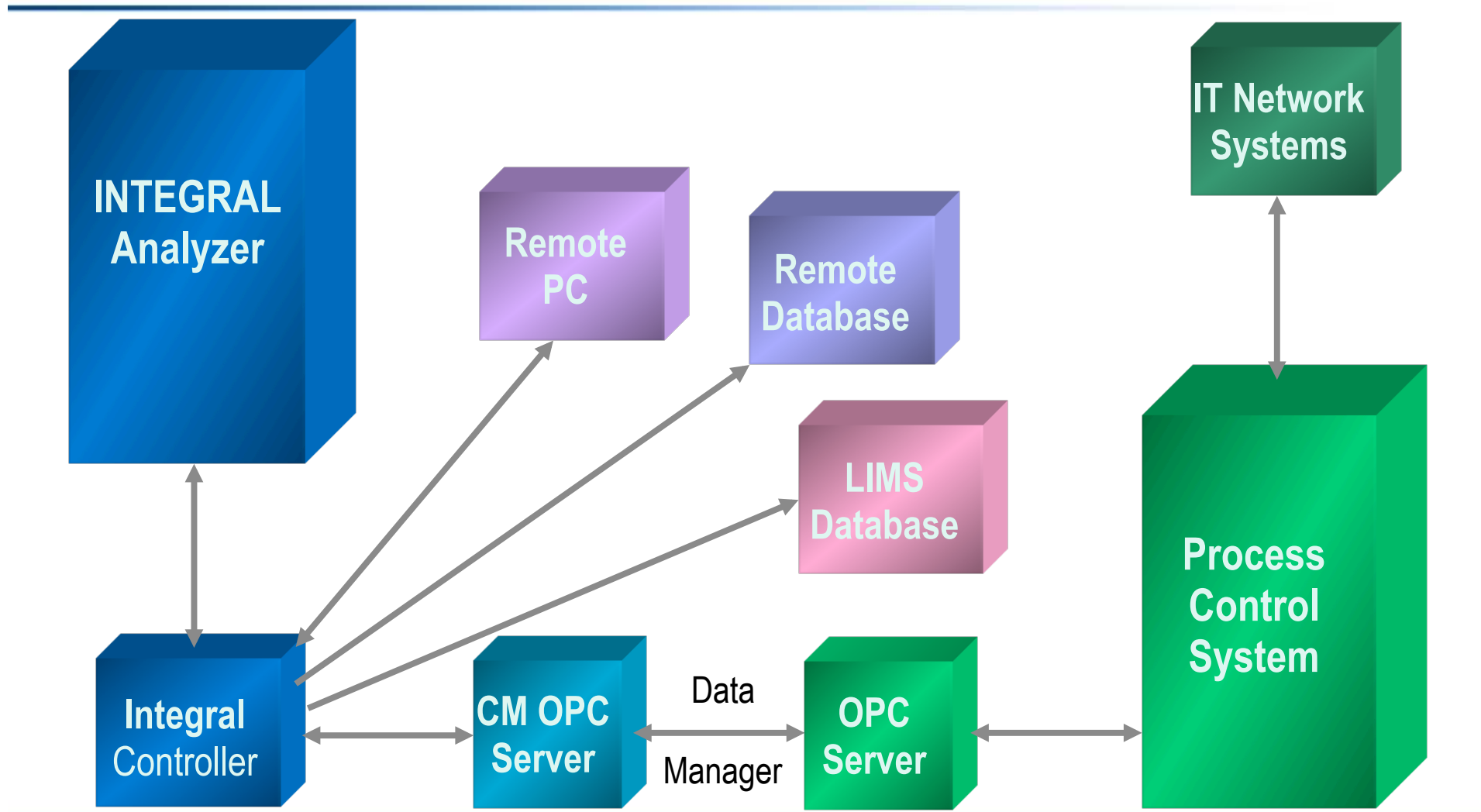
# Chromeleon PA Process Analytical Software

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- User customizable options
  - Control panels, reports, trend plots, alarms, alarm actions
- Provides intelligent, results-based analyzer control
  - Change sample prep programs, sampling order, sampling frequency
- Validated, secure operating environment
  - Multiple levels of security, e-signatures, audit trail
- Automated System Suitability
- Integrate results with process control systems using OPC



# CM-PA: Designed For Integration



# Integral On-line IC Summary

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- Over 25 years of on-line IC experience
- Uses latest Dionex IC/HPLC technology
  - ICS-5000 or ICS-2100 for IC / RFIC, UltiMate® 3000 for HPLC
- Increased customer value
  - Optional industrial enclosure; add when necessary
  - Single or dual-channel capabilities in one enclosure
- Unmatched versatility
  - Both IC and HPLC options
  - *Integral Migration Path: on-Line LC whenever and wherever needed*
- Numerous examples of successful on-line LC applications
  - Significant return on investment being generated

Thank You!

