



think simulation

getting the chemistry right

Make OLI your strategy

Getting maximum value from your OLI investment

January 2019

Discussion outline

Individual introductions & company updates

Current OLI capabilities and review of your license

Applications in scaling, corrosion & water treatment

Feedback from you / where we can do better

Individual and company introductions

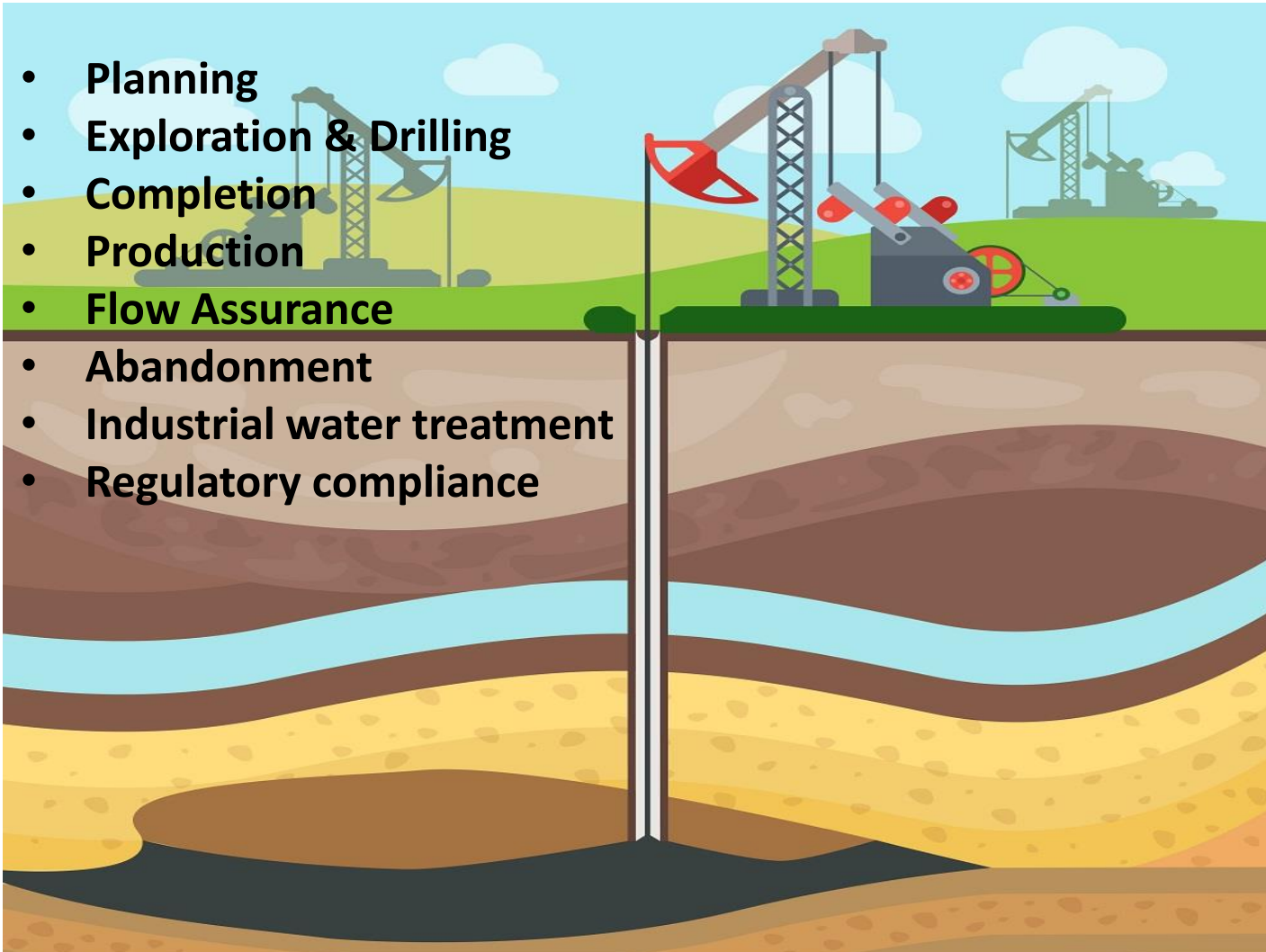


Individual introductions
Your group
Your simulation interest

OLI Systems

- ✓ Global thought leader in electrolyte chemistry
- ✓ Simulation software for water chemistry processes
- ✓ 48 years specializing in electrolyte science
- ✓ Active in oil & gas, chemicals, power generation, & mining

OLI simulations for upstream oil & gas



Simulations

- Mineral scale prediction
- Well profile scaling scenarios
- Reservoir mixing
- Injection water compatibility
- Gas lift
- Facilities modeling
- MEG, MeOH regeneration
- Water treatment processes
- Discharge limits
- Screening alloys
- Design of experiments for corrosion testing using autoclaves

OLI simulations for midstream, downstream

Simulations

- **Desalter** mineral scale, pH control
- **Heating** hydrolysis / HCl formation
- **Distillation** org acid condensation
- **Condensation** amine HCl corrosion
- **H₂O, H₂S, HCl, NH₃** processing
 - Sulfur recovery
 - NH₃ and H₂S emissions
 - NH₃ and CO₂ emissions
- **Sour water** strippers
- **MEROX** process / mercaptans
- **Gas sweetening**
- **Dehydration** / condensate formation



Simulation power

OLI^s
studio

OLI^e
engine

OLI^t
tools

Focus laboratory and pilot plant tests

- ✓ Eliminate trial and error
- ✓ Determine likely targets
- ✓ Reduce cost

Duplicate your physical process

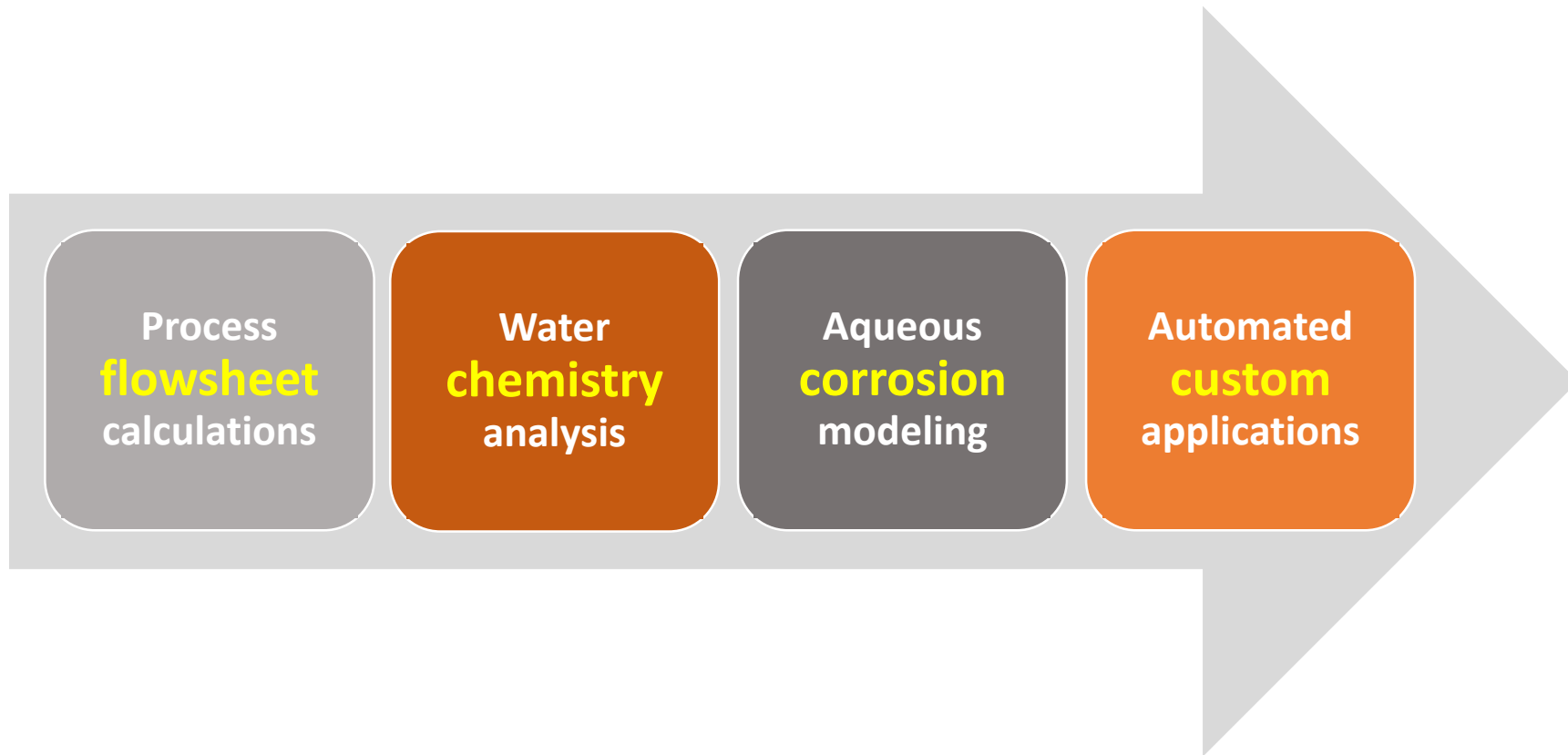
- ✓ Use mathematics and chemistry to develop a digital twin

Anticipate process changes before they occur

- ✓ Reduce process upsets and risk
- ✓ Increase yields
- ✓ Gain confidence with informed recommendations

OLI simulation brings competitive edge

To all aspects of industrial water treatment



Let's look more closely at each aspect in the following slides



1A. Electrolyte **flowsheet** simulation

In OLI Alliance Partner products



**OLI Engine
9.6 in:
Aspen Hysys
Aspen Plus
Proll
Unisim
Design**

**When combining with other
thermodynamic methods**

OLI Engine in our Alliance Partners

- Alliance Partners with Aspen, SimSci, Honeywell, PSE, SysCAD, IDEAS
- Easier learning curve
- **Remains an active OLI strategy**

**OLI Electrolytes are in multiple
unit operations**

- **Aspen Plus**
 - FLASH, MIX, HEATER, RADFRAC, and more
 - Access to EFLASH, EFRAC which are OLI specific ops
- **Aspen Hysys**
 - Many standard operations, Columns Use OLI Solvers
- **Proll**
 - Many unit operations, columns use OLI Solvers
- **Unisim Design**
 - Many standard operations, columns use OLI Solvers.



1B. Electrolyte **flowsheet** simulation

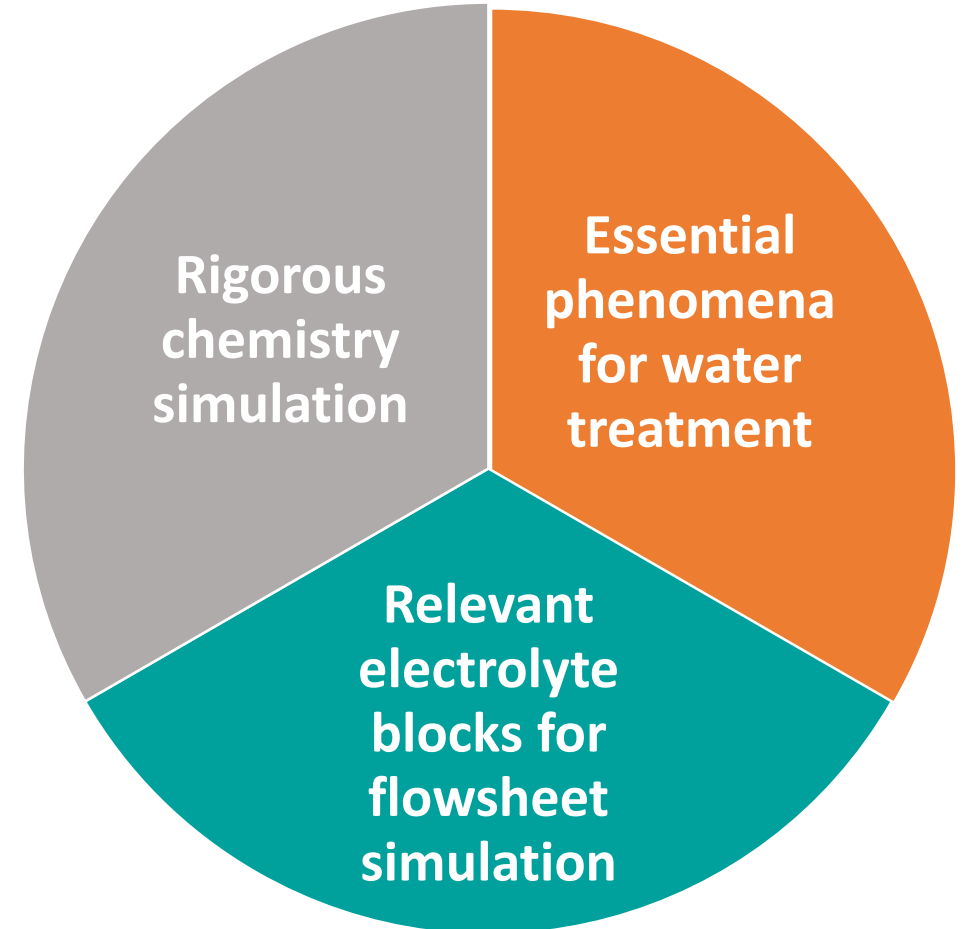
In OLI Flowsheet: ESP

**OLI
Flowsheet:
ESP**

For refining processes

OLI Flowsheet: ESP

- **Multiple units, recycle**
- **Fullest implementation of OLI technology (kinetics, ion exchange)**
- **Chemistry in Refining Overheads**
- **Other refining processes (gas sweetening, mercox, claus, desalter, etc.)**





2. Water **chemistry** analysis



**OLI Studio
Stream
Analyzer**

Equilibrium based
Solid-liquid-vapor-organic phase distribution

Multi-component systems
Physical & chemical property calculations

- Advanced mechanisms**
- Kinetics framework
 - Reduction / oxidation
 - Mass transfer
 - Surface reactions

- Advanced properties**
- ORP
 - Water activity
 - Transport properties
 - Osmotic pressure, etc.



Part of your
license

3. Aqueous **corrosion** simulation

**OLI Studio:
Corrosion
Analyzer**

Thermodynamics of corrosion

Real-solution Pourbaix
diagrams, taking all ion-ion
interactions into account

Uniform (general) corrosion rate

Computer-generated
polarization curves &
underlying, diffusion limited
anodic & cathodic reactions

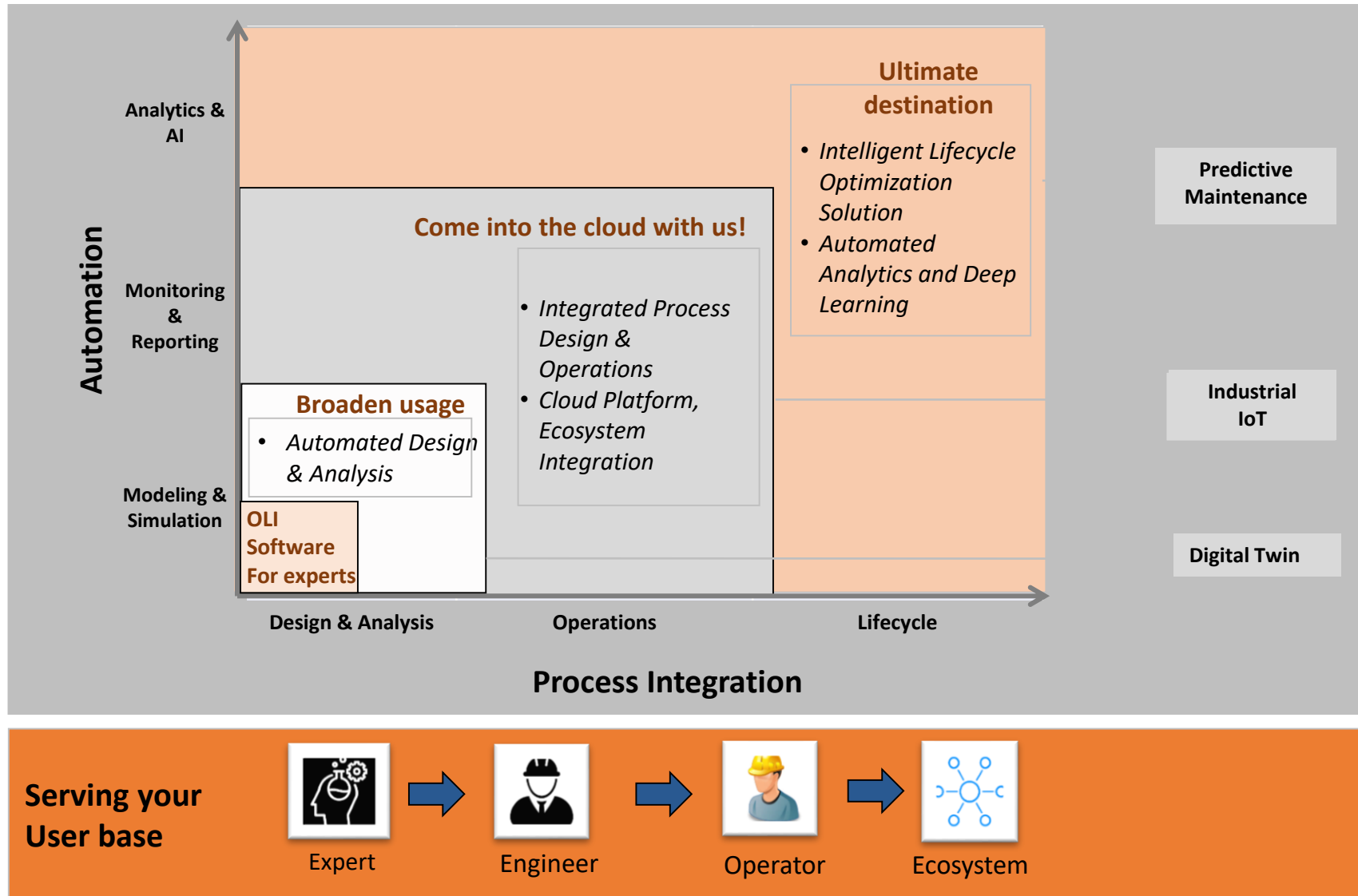
Localized corrosion

Corrosion potential vs
repassivation potential,
calculating the worst-case
pitting rate

Remaining asset life

Given time, pit depth, area, a
statistical model that calculates
time to failure

4. Custom applications of the future with OLI



OLI is seeking partners for pilot applications

to expand your use of simulation

to take full advantage of today's emerging technology!

What's new at OLI

OLI^s
studio

OLI^e
engine

OLI^t
tools

Tiered support service levels

- ✓ Bronze, silver, gold
- ✓ Access to OLI consultants
- ✓ Data validation service

Technical consultant check-ins

- ✓ What is working for you
- ✓ What would make OLI better?

V9.6 platform release

- ✓ New release planning cycle
- ✓ Better communication of new features

OLI Alliance Partner software

- ✓ Launching OLI Flowsheet: ESP in PRO/II, USD
- ✓ Possibly also the Studio

Service levels available

Combining training, support, consulting, data validation bundles



BRONZE

BASIC

*Installation,
Configuration,
Break-fix and Bugs*

Free with license
purchase



SILVER

STANDARD

*For building
confidence
in your electrolyte
simulation work*



GOLD

PREMIUM

*When you want
and need
mission-critical
success
in your work*



PLATINUM

SUPERIOR

*OLI onsite
training and
consulting to
ensure your
success*

Pre-paid Service Levels

OLI Technical Consultants

An additional benefit when you purchase a service level



OLI invests in clients who make OLI their strategy

- A dedicated technical consultant assigned to your account
- Periodic check-ins
- Open-ended dialog about what is mission-critical to you
- Someone to expedite your requests

Let's hear from you! Some areas to discuss

PROFILE

- Who (at each site) might use the software?
 - Which departments, groups, which products
- Any new users, new projects?
- Any current training needs?
- Any application building needs?

FEEDBACK

- What is on your wish list?
 - Chemistry
 - Calculations
 - Features
 - Process of working with OLI
- Priorities at your company that are good to know
- Gaps in the software capability













APPLICATIONS

- Would you like to use the software to:
 - Target lab experiments
 - Set operating conditions for equipment
 - Define best practices
 - Model processes
 - And / or ?

OPPORTUNITIES

- Where do you envision OLI having impact?
- Water treatment?
 - Corrosion simulation?
 - Process design or optimization?
 - Lab work?
 - Digital twin development? IoT?

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Thanks for your attention!