

Integrated Design Process

A Roadmap for Sustainability

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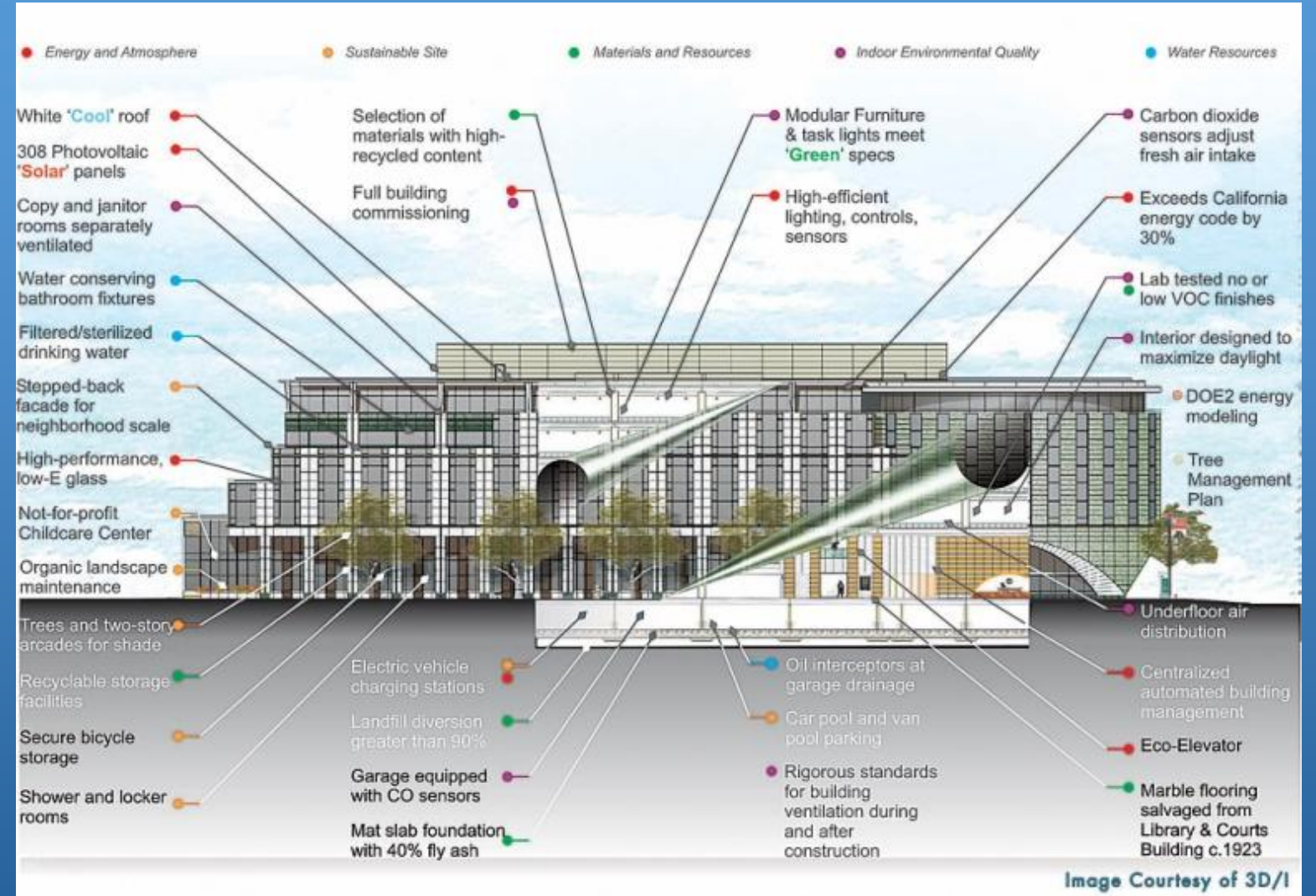
IPD vs IDP

- **Integrated Project Delivery (IPD)**
Delivery method for increased efficiency



IPD vs IDP

- **Integrated Design Process (IDP)**
Collaborative project delivery for realizing high performance buildings



The ultimate goal is the same...

Design and Delivery Methods



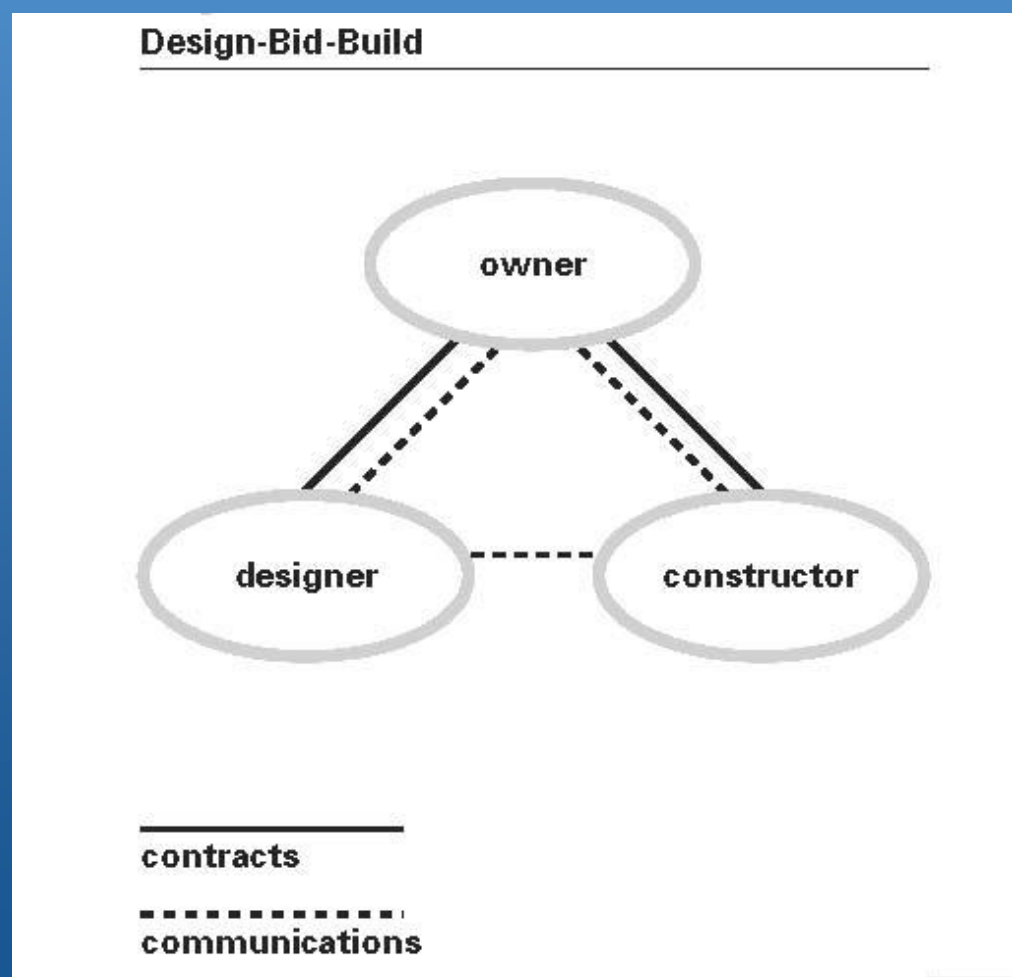
"I want you to draw up plans for a city that can be built in a day."

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Each popular delivery methods present unique opportunities and challenges with integration.

Design-Bid-Build

- 'Traditional' method
- Most prevalent delivery method in the US Construction Industry



Opportunities

- Design team control
- Owner takes advantage of open market competition

Challenges

- Little or no input from parties constructing the project
- Constructability and/or coordination issues discovered and resolved during construction
- Few opportunities for true integration
- No contractual relationship between Architect and Constructor

Multi-Prime

- Typically utilized within Design-Bid-Build
- Owner acts as General Contractor
- Owner holds contracts directly with trades

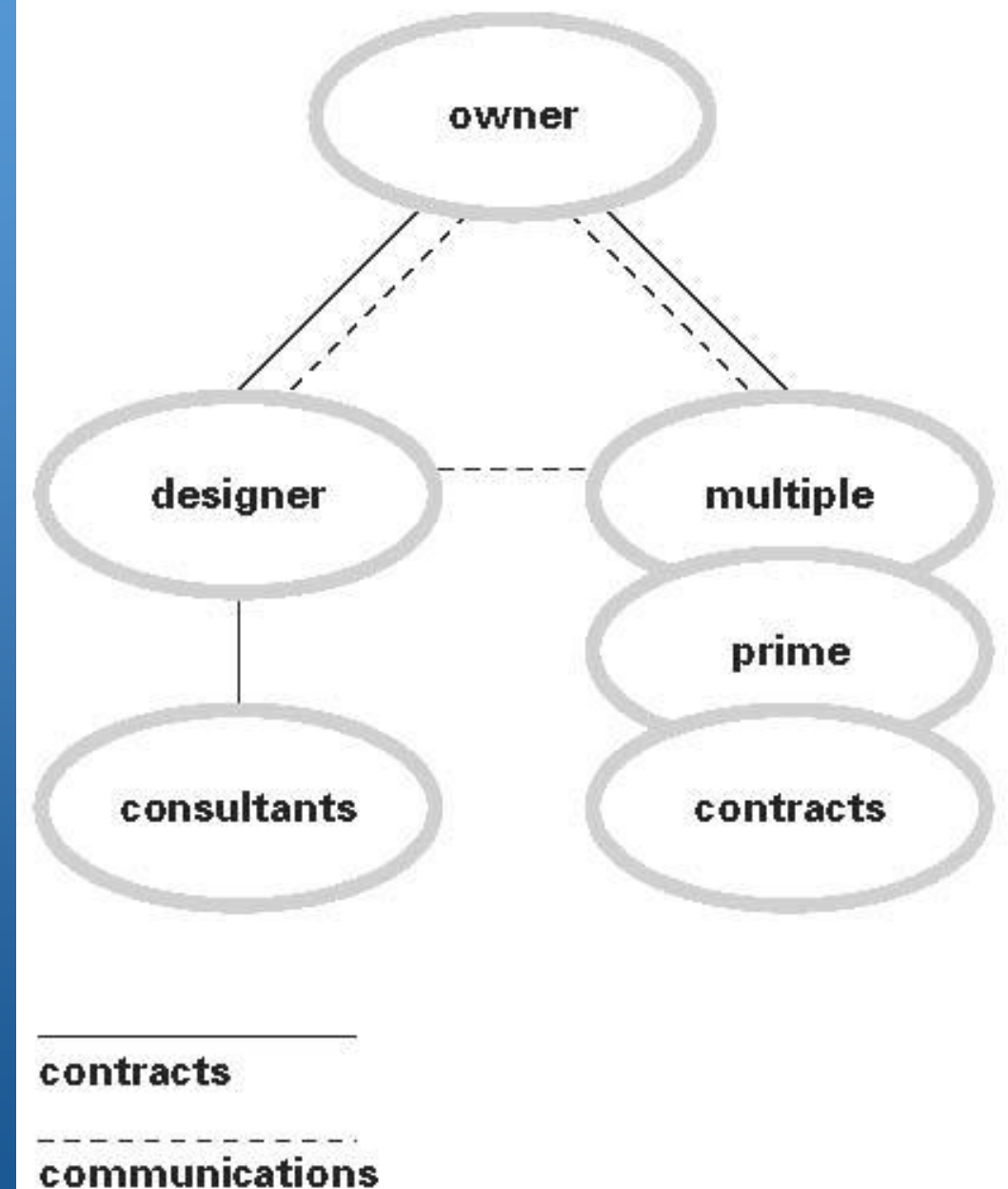
Opportunities

- Optimizes Owner's control
- Reduces construction cost through reduced fees

Challenges

- Owner control reduces equality of decision making
- Owner must have or acquire expertise in team building

Multi-Prime



Construction Manager at Risk

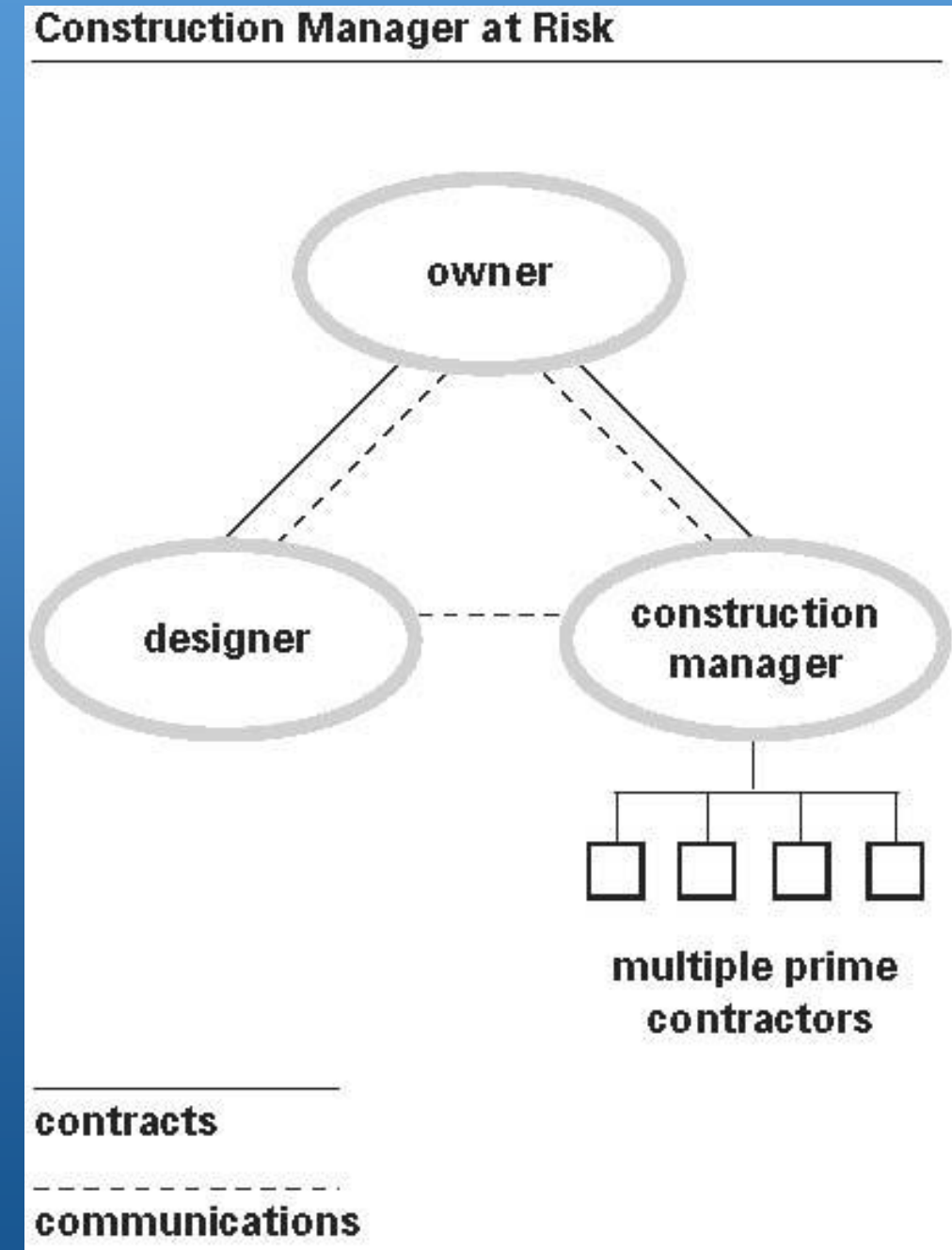
- CMc Construction Manager – Constructor
- CMa Construction Manager - Advisor
- Construction Manager hired early in design process to delivery early cost and schedule commitment

Opportunities

- Constructor serves as Construction Manager during preconstruction
- Owner, CM and Architect can establish project goals together early

Challenges

- Fourth party to the project as filter



Design-Build

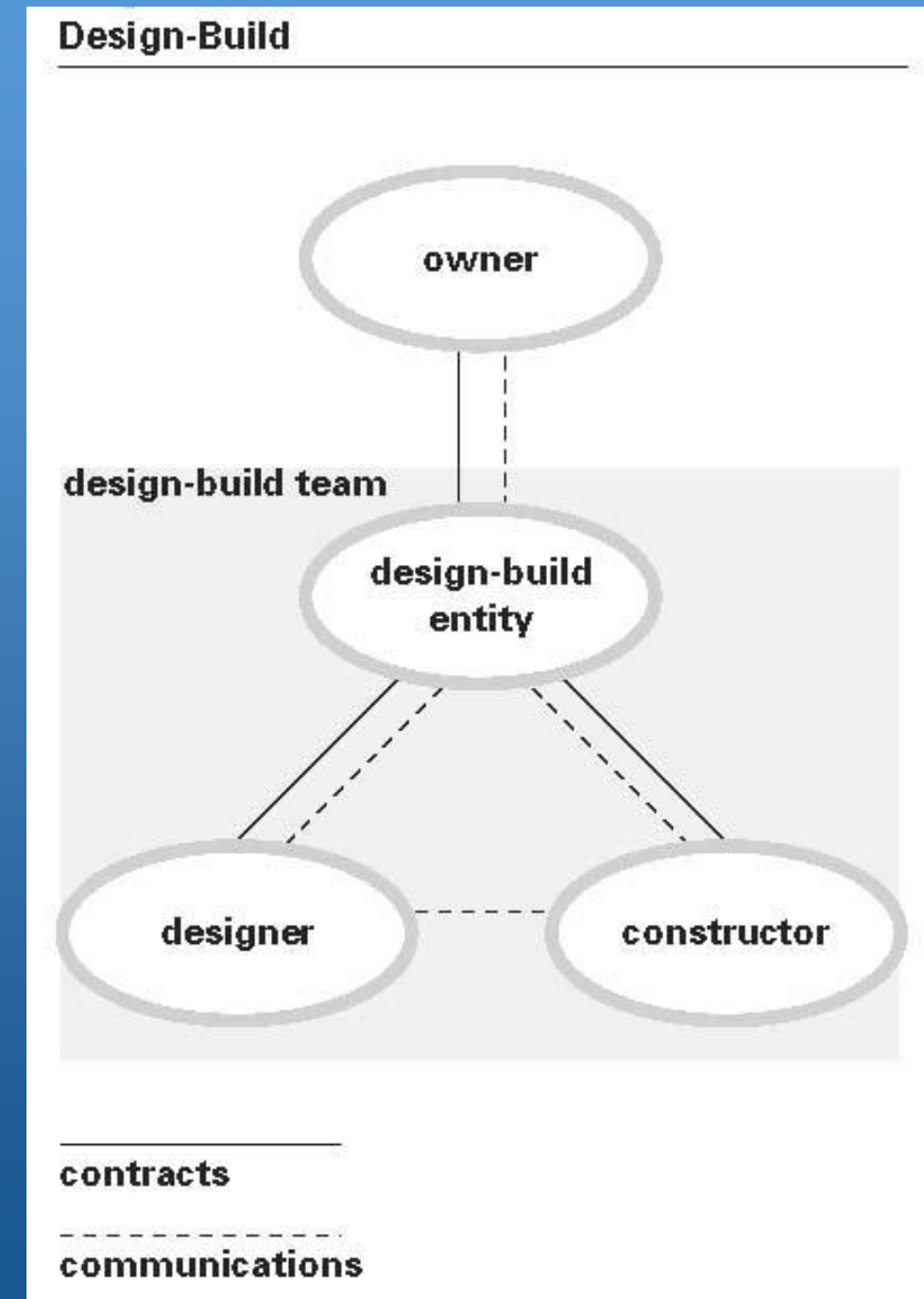
- Single point of responsibility for Owner regarding design and construction
- Transfers risk/coordination to one contractual entity

Opportunities

- Designer and constructor retained at same time
- Structure promotes focus on team success
- Collaborative efforts/modeling before costs are finalized
- Constructability reviewed throughout the design process

Challenges

- Owner reduces input after design process to reduce risk



IDP Overview

collaboration is key

- iterative, not linear or silo
- flexible, not formula
- different, not pre-determined
- ongoing learning and discovery



The “I” stands for *integrated!*

IDP is a Mindset

Mindset	Principle	Strategies
Inclusion and Collaboration	Broad Collaborative Team	Careful Team Formation
Outcome Oriented	Well-defined Scope, Vision, Goals and Objectives	Team Building
Trust and Transparency	Effective and Open Communication	Facilitation training Expert Facilitation
Open-mindedness and Creativity	Innovation and Synthesis	Visioning Charrettes Brainstorming
Rigor to Attention to Detail	Systematic Decision Making	Goals and Targets Matrix Decision-making Tools
Continuous Learning and Improvement	Iterative Process with Feedback Cycles	Post-occupancy evaluation Commissioning

Source: *Roadmap for the Integrated Design Process*, BC Green Building Roundtable

Establish Process

agreement on process and goals fosters teamwork

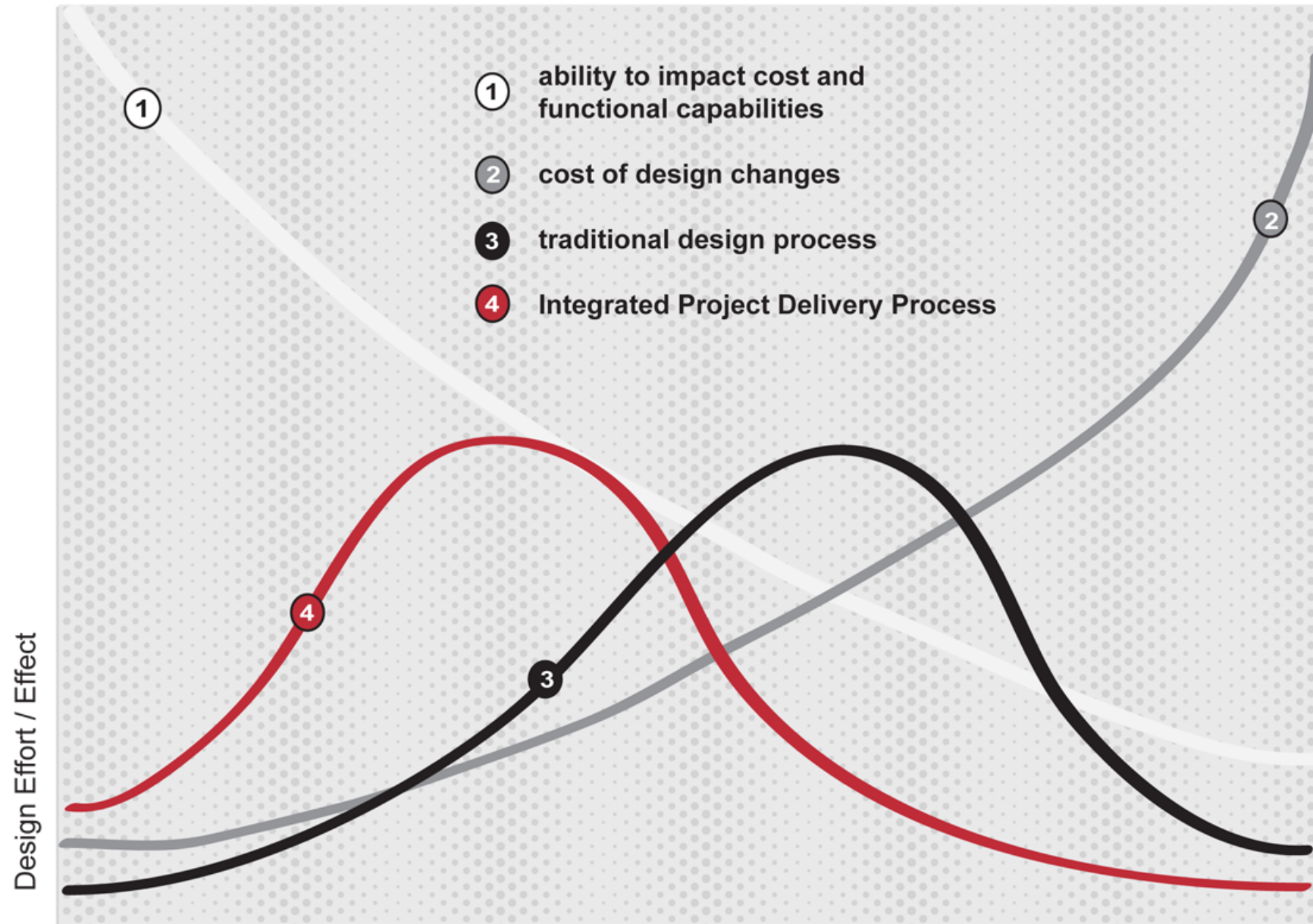
- Identify team members
- Three “E”s
 - everyone involved in every issue, early
- Establish meeting schedule, milestones and feedback loops



Design Team Level of Involvement

MacLeamy Curve

Time / Schedule



- ① ability to impact cost and functional capabilities
- ② cost of design changes
- ③ traditional design process
- ④ Integrated Project Delivery Process

Earlier involvement equals increased impact on project!

traditional

Pre-design

Schematic Design

Design Development

Construction Documents

Agency Permit/Bidding

Construction

Integrated

Conceptualization

Criteria Design

Detailed Design

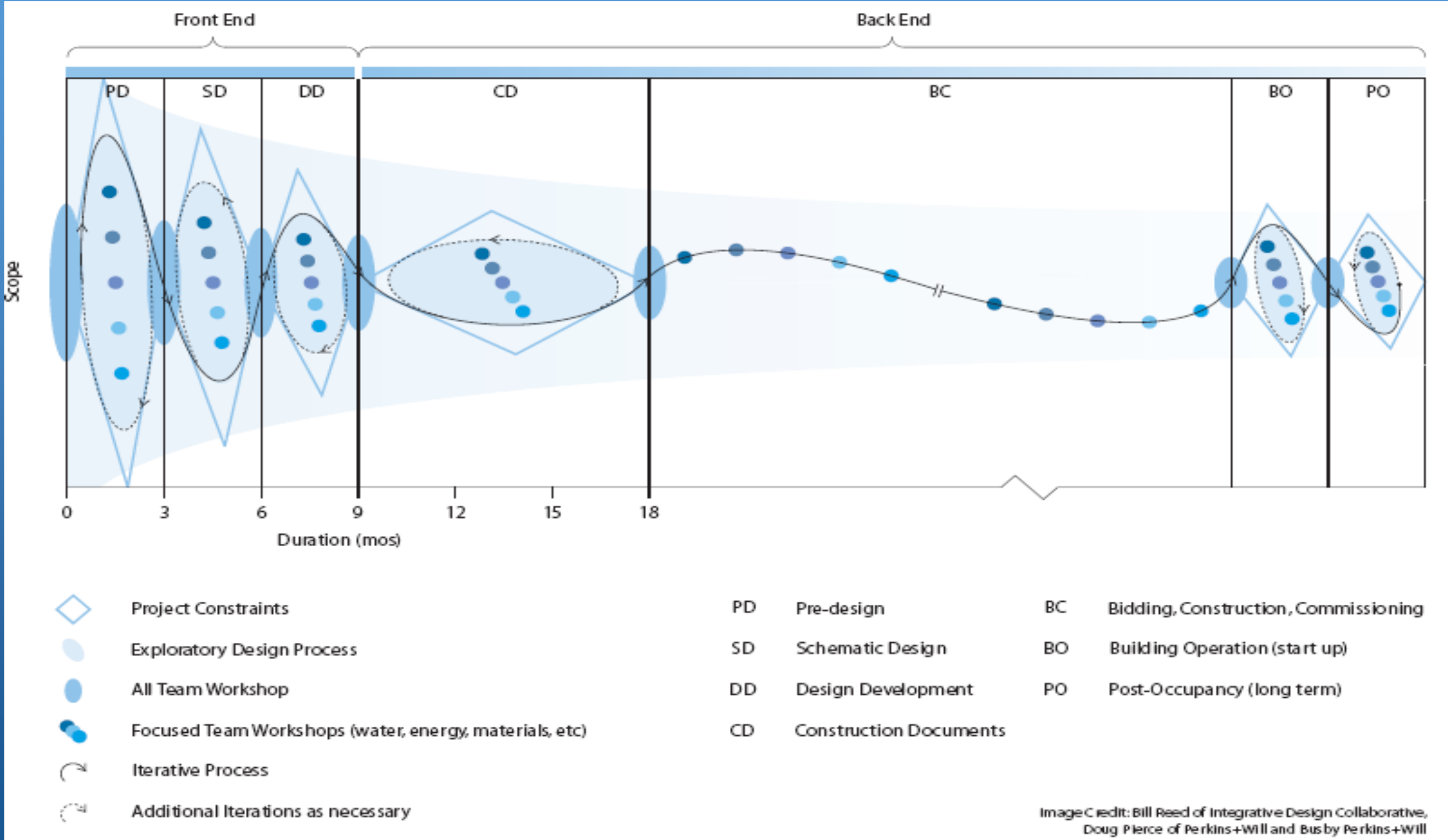
Implementation Documents

Agency Coord/Final Buyout

Construction

Source: "Collaboration, Integrated Information, and the Project Lifecycle in Building Design and Construction and Operation." (WP-1202, August, 2004)

Early Resource Loading



Source: *Roadmap for the Integrated Design Process*, BC Green Building Roundtable

IDP Process

for all stages of design

- **Coordinate the team** - members, vision, collaboration ...
- **Establish a foundation** - motivation, tools, performance ...
- **Plan key meetings** - charrettes, issue specific ...



A Comparison to Conventional Approach

Integrated Design Process

Inclusive from the outset

Front-loaded – time and energy invested early

Decisions influenced by broad team

Iterative process

Whole-systems thinking

Allows for full optimization

Seeks synergies

Life-cycle costing

Process continues through post-occupancy

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Conventional Design Process

Involves team members only when essential

Less time, energy, and collaboration exhibited in early stages

More decisions made by fewer people

Linear process

Systems considered in isolation

Limited to constrained optimization

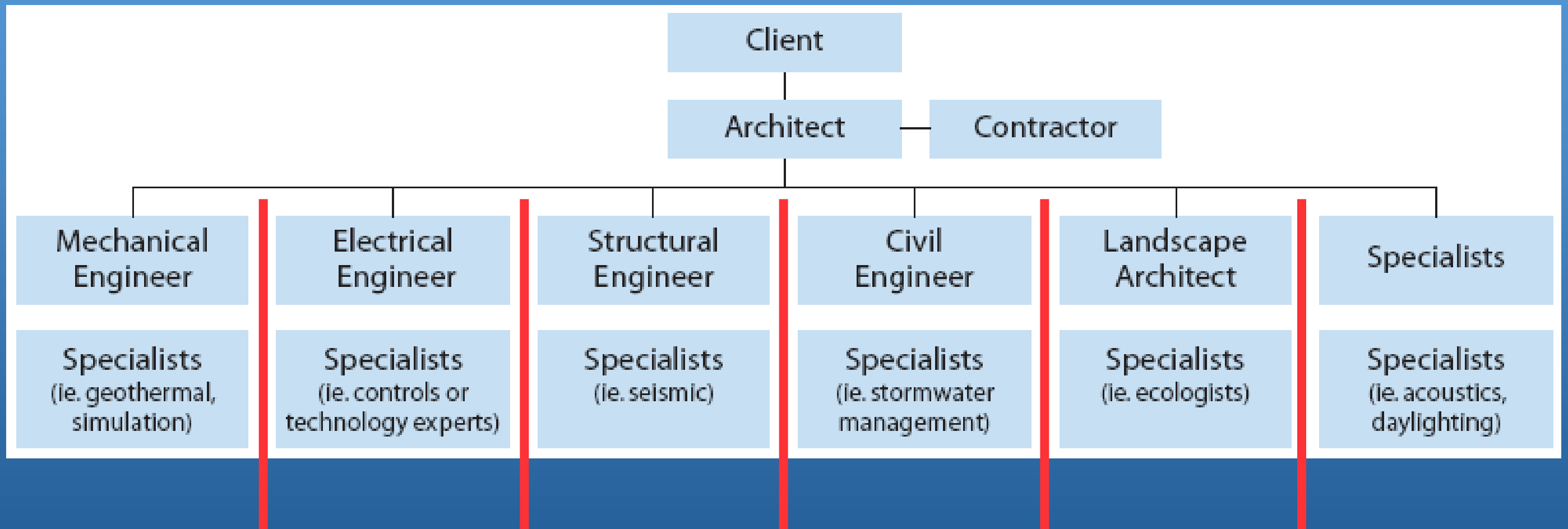
Diminished opportunity for synergies

Emphasis on up-front costs

Finished when construction is complete

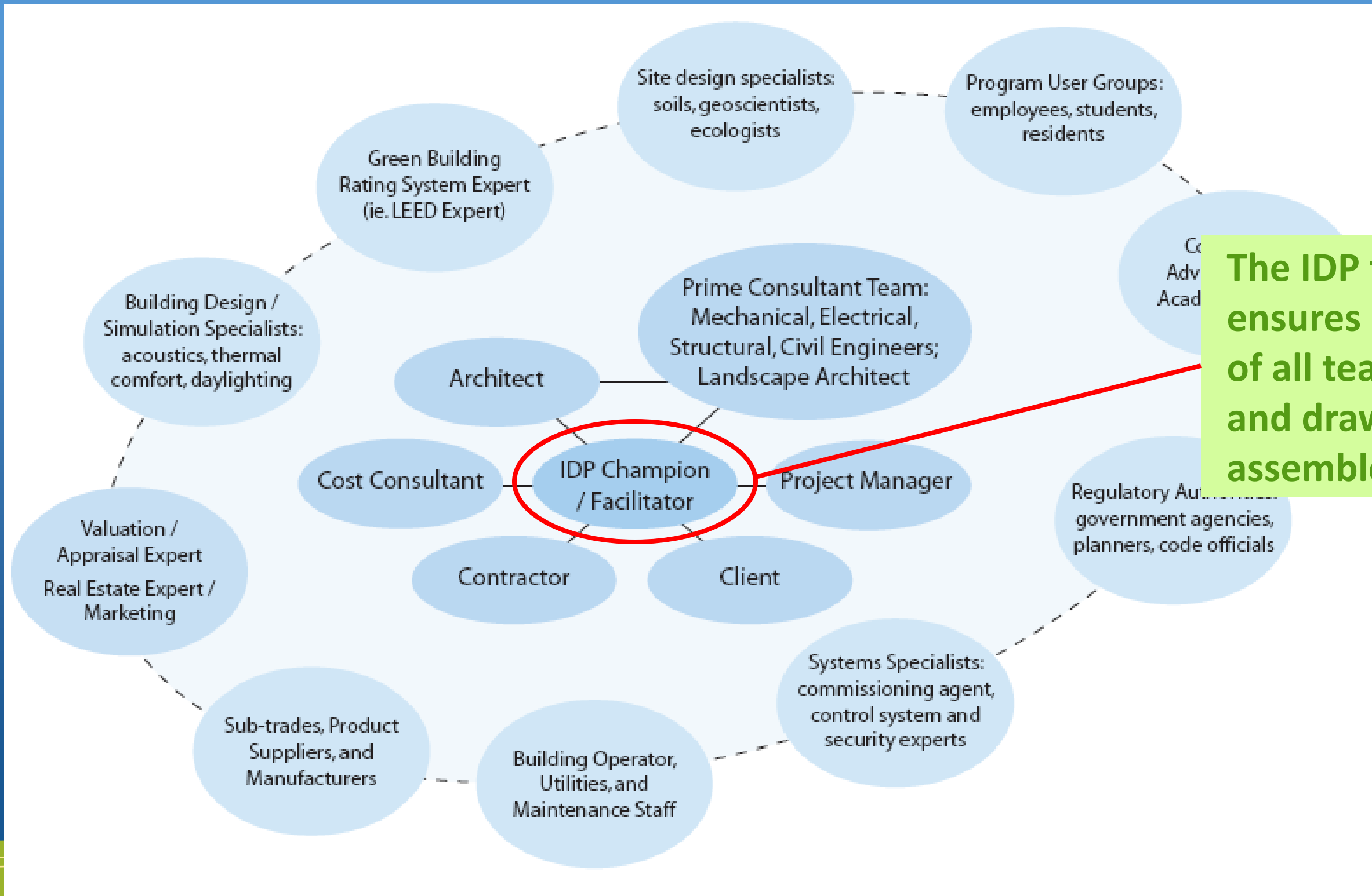
Source: *Roadmap for the Integrated Design Process*,
BC Green Building Roundtable

Conventional Team Organization



Structure naturally produces barriers to communication

Integrated Design Team Organization



The IDP facilitator ensures participation of all team members and draws out the assembled expertise

Key Issues for Effective IDP Teams

how to work together

- Responsibilities
- Relationships
- Communication
- Decision Making
- Authority
- Values
- Risk
- Fee Structure



Role of the Engineer

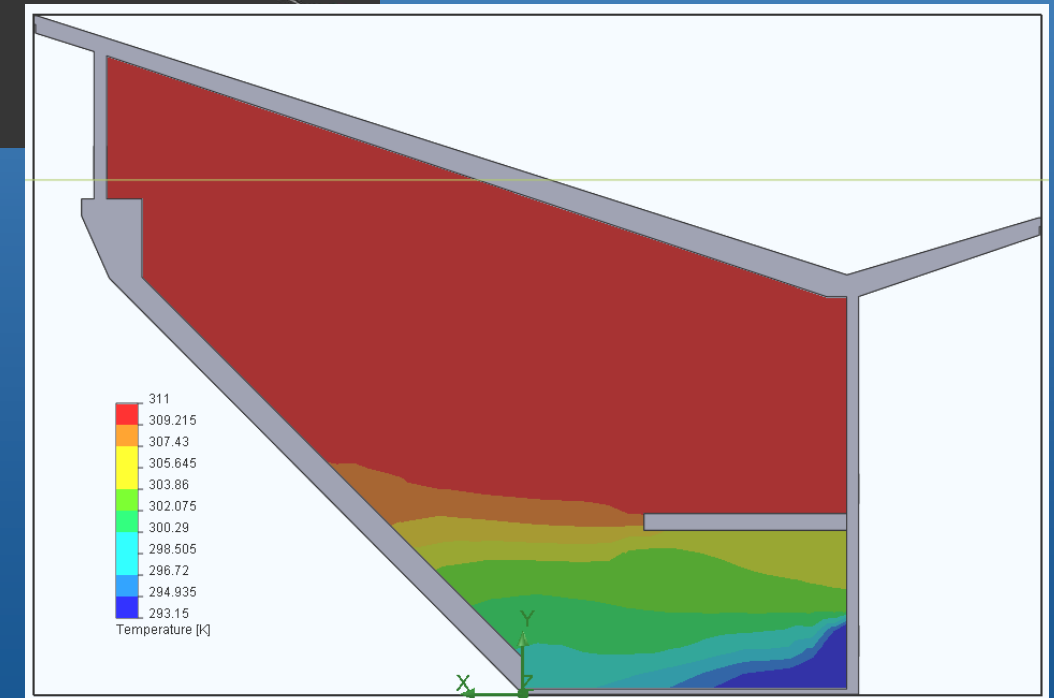
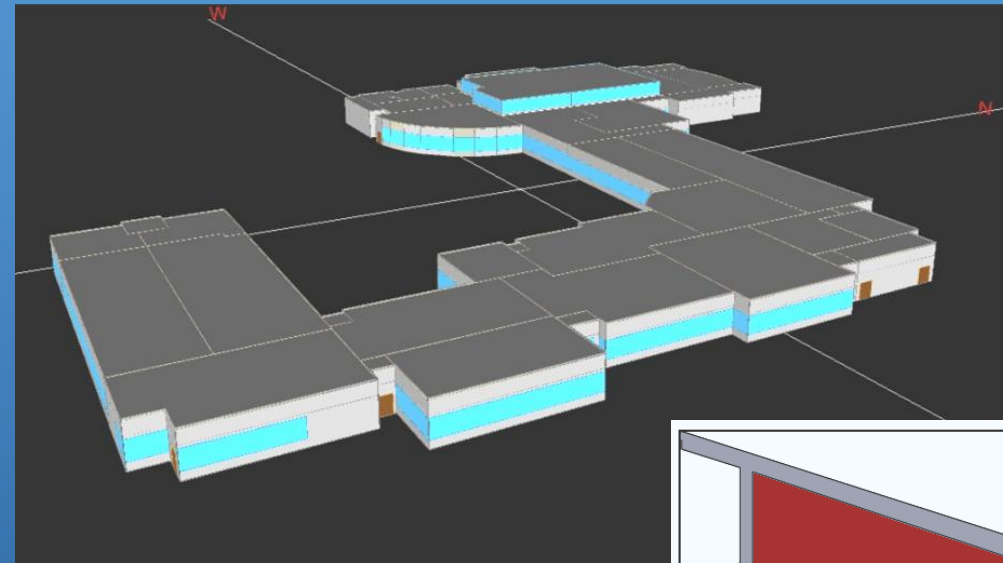
engineering the architecture

Expertise in simulation:

- Energy
- Daylighting
- Thermal Comfort

Expertise in Integration

- Climate-adaptive design
- Synergistic mindset
- Early stage contributions



Key Factors for Successful Integrated Design

how to meet our goals

- Owner Commitment
- Team Expertise
- Degree of Integration



Challenges to Integration

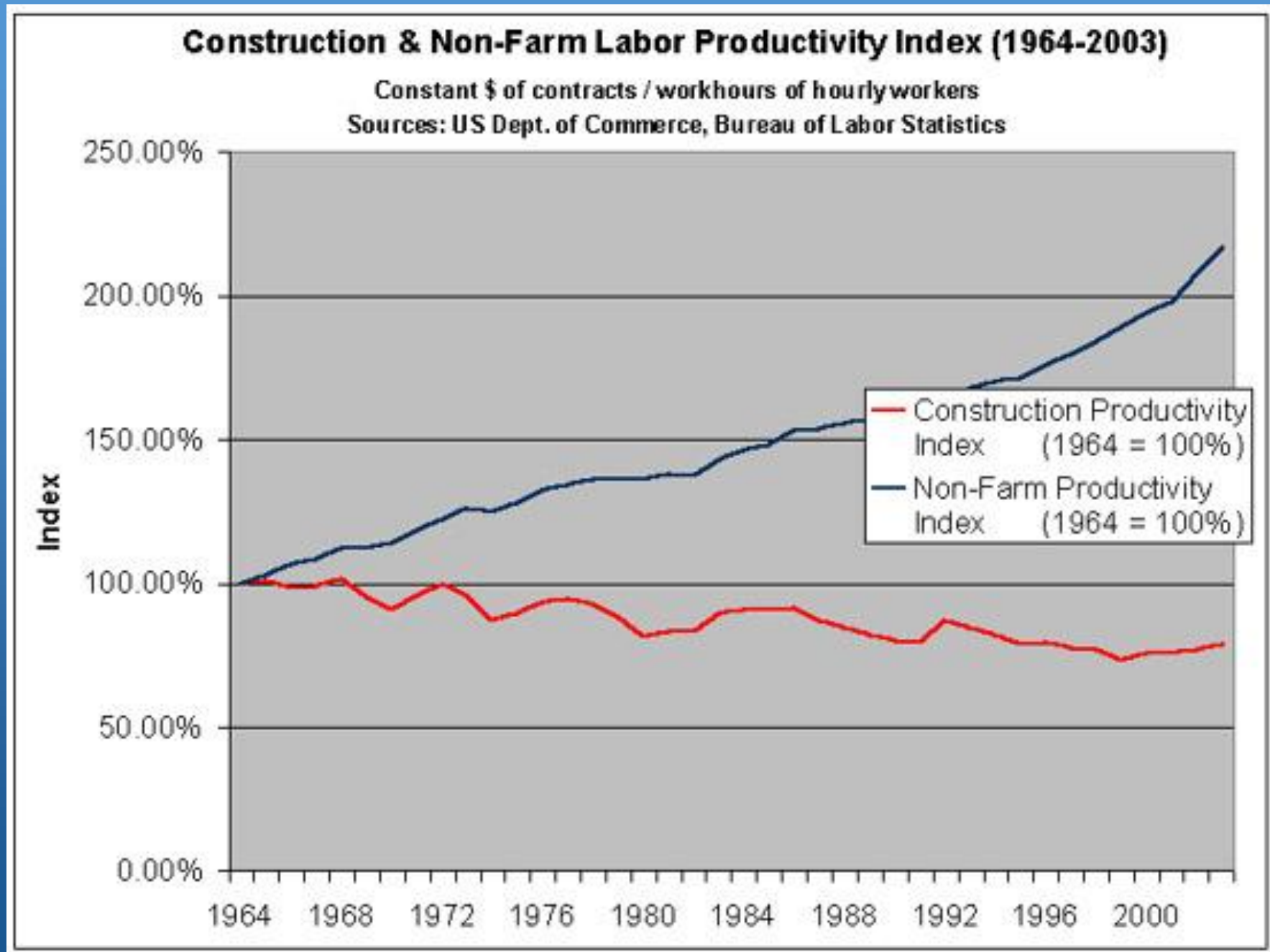
overcoming barriers

- **Changing current thinking**
 - Comfortable with status quo
 - Perceived (non)value
- **Contract / Risk**
 - Relying on others to achieve performance
 - Different fee structure
- **Design approach**
 - Archi-centric concept design
 - Competitions



- **Consultants**
 - Not prepared to add value early
 - Iterations not part of scope
 - Conquering mentality
 - Competitions / Proposals

IDP Benefits - Improving Productivity



IDP Benefits the Entire Project

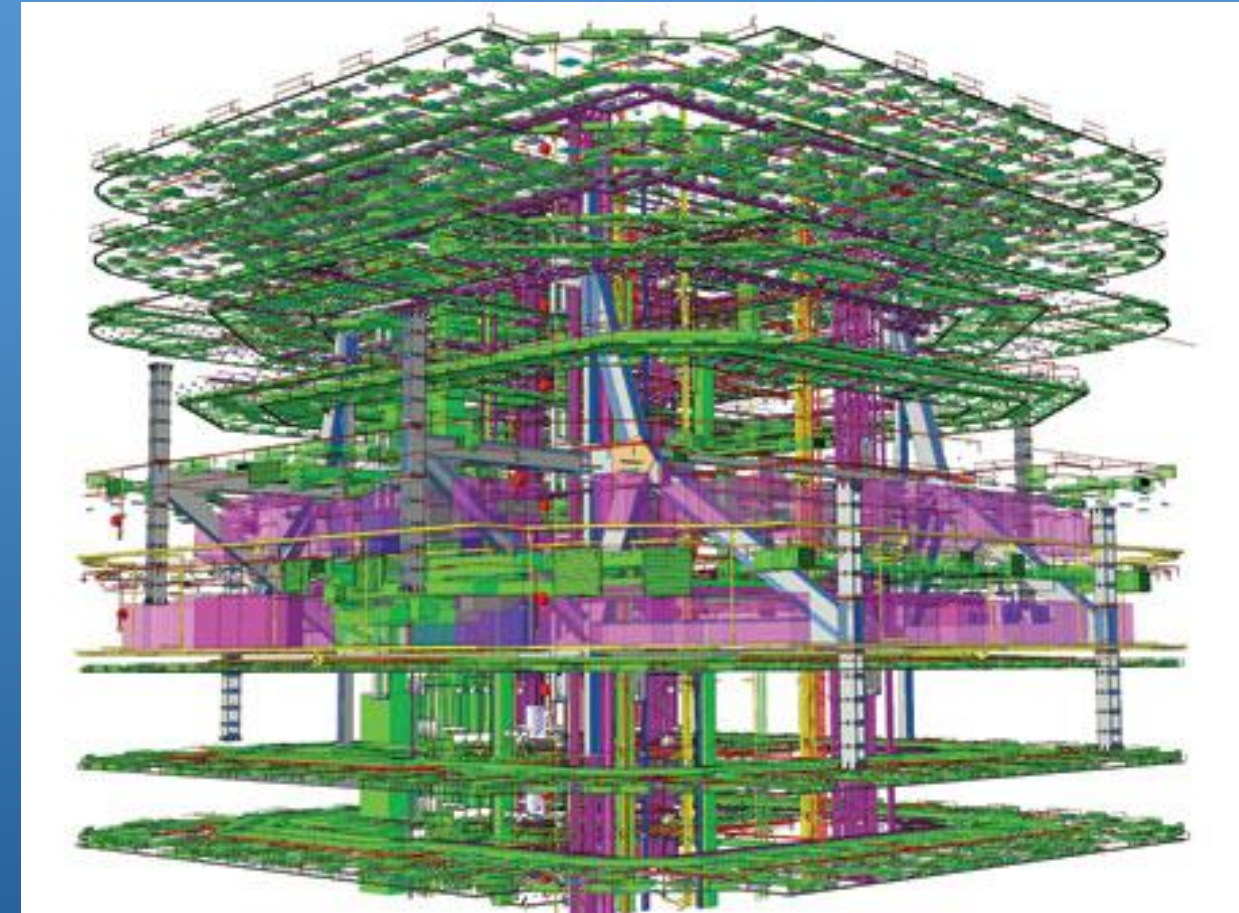
IDP Principle	Benefits of Successful IDP	Net Benefits
Broad, collaborative team from outset	Ensures necessary expertise is present when opportunities for impact are greatest. Harness team's best effort and collective wisdom.	Realization of challenging goals and objectives
Well-defined scope, vision, goals and objectives	Investing time up front ensures common understanding and 'buy-in'.	Realization of high-performance (sustainable) buildings
Effective and open communication	Builds trust and increases team's sense of ownership. Avoids disputes and harnesses a team's best effort and enthusiasm.	Realization of more optimally integrated solutions
Innovation and synthesis	Leads to innovation and synthesis, which allow the team to achieve the complex requirements of a high performance building.	Maximized benefits and quality
Systematic decision-making	Leads to better choices. Fosters the type of holistic and long-term thinking necessary for sustainable design	Minimized cost
Iterative process with feedback loops	Allows lessons to be learned from start to finish.	Good team relationships that may result in lasting partnerships for future projects

IDP Benefits the Owner

- **Reduced risk**
- **Early and open sharing of project knowledge streamlines communication**
- **Owner can effectively balance project options to meet business goals**
- **Better understanding of Owner's goals**
 - Schedule
 - Life Cycle Cost
 - Quality
 - Sustainability

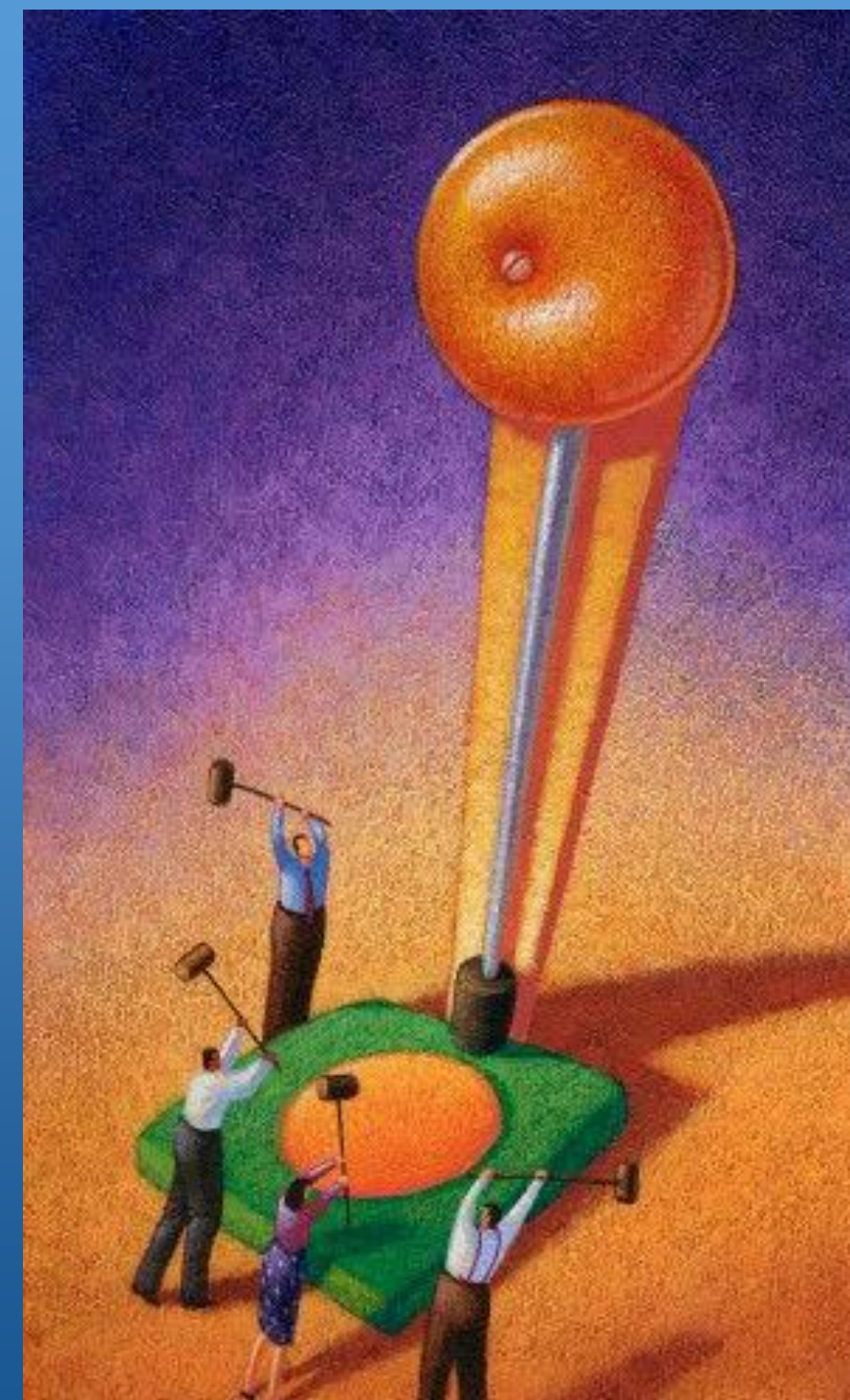
IDP Benefits the Constructor

- IDP allows Constructors to contribute their expertise in construction early in the process
- Opportunity for strong pre-construction planning to meet project goals
 - Construction Sequencing
 - Cost Control
- **Constructability**
 - Building Information Modeling (BIM)



IDP Benefits the Design Team

- Benefit from Constructor's expertise during design phase
- The increased level of effort during early design phases, results in reduced documentation time
- BIM – building information modeling
- Synergistic design approaches



Summary

what's next?

- Faster delivery
- Higher performance
- Return to Master Builder
- Change requires new roles



Thank You!

*Roadmap for the Integrated Design
Process*