Understanding Architecture: 2

- Components and interconnections are not sufficient to characterize an architecture
- Two additional ingredients of an architecture
  - Constraints on the components and interconnections
  - Patterns involving the components and interconnections
- Openness entails the constraints
  - Do not apply on the physical components directly

Architectural Style
Understanding Protocols

- Protocols encapsulate interactions
  - Connect: conceptual interfaces
  - Separate: provide clean partitions among logical components
- Wherever we can identify protocols, we can
  - Make interactions explicit
  - Enhance reuse
  - Improve productivity
  - Identify new markets and technologies
- Protocols yield standards; their implementations yield products
Motivating an architecture are requirements + availability (of power) - low cost

Traditional:
- Difficult to choose among the above without reference to requirements

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NETWORKING (BROADLY)

REQUIREMENTS
- AVAILABILITY
- MULTIPLE CONCURRENCY
- (HIGH) THROUGHPUT
- SECURITY & ENCRYPTION
- KEY EXCHANGE
- LOW COST
- GEOPHYSICAL COVERAGE
- LOW MAINTENANCE
- TRANSFER DATA (CONNECTIVITY)
- ERROR AVOIDANCE

TRAFFIC CONTROL: SECOND ORDER
- CONGESTION AVOIDANCE
- DEPLOYMENT MAINTENANCE

LAYERING

MIGHT NOT MULTIPLE PATHS

PROTOCOLS

MANY CONSEQUENCES
- LAYERING ON
- OTHER (IF DEFINE)
- STRUCTURES;
- COTS

MAY ONLY BE
- PARTIALLY
- ADDRESSED BY
- "TECHNICAL" PROTOCOLS

COULD BE "SOCIAL"
Architectural Examples

When viewed architecturally, each logical component class serves some important function

- **Power**: UPS
- **Network connectivity**
- **Storage**: integrity, persistence, recovery
- **Policy management**
- **Decision-making**
- **Knowledge and its management**

What are some products in the above component classes?