

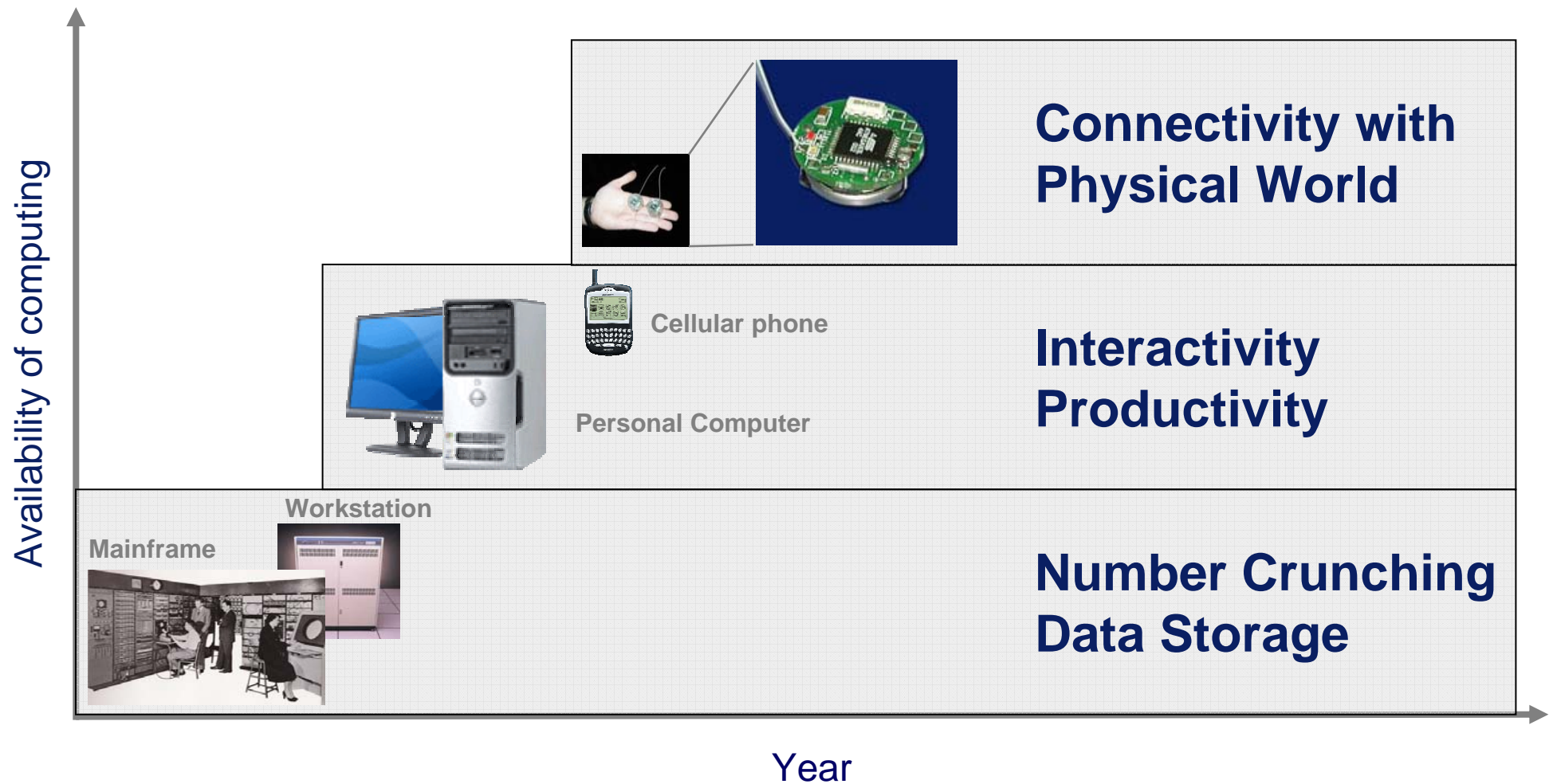


# Wireless Sensor Networks

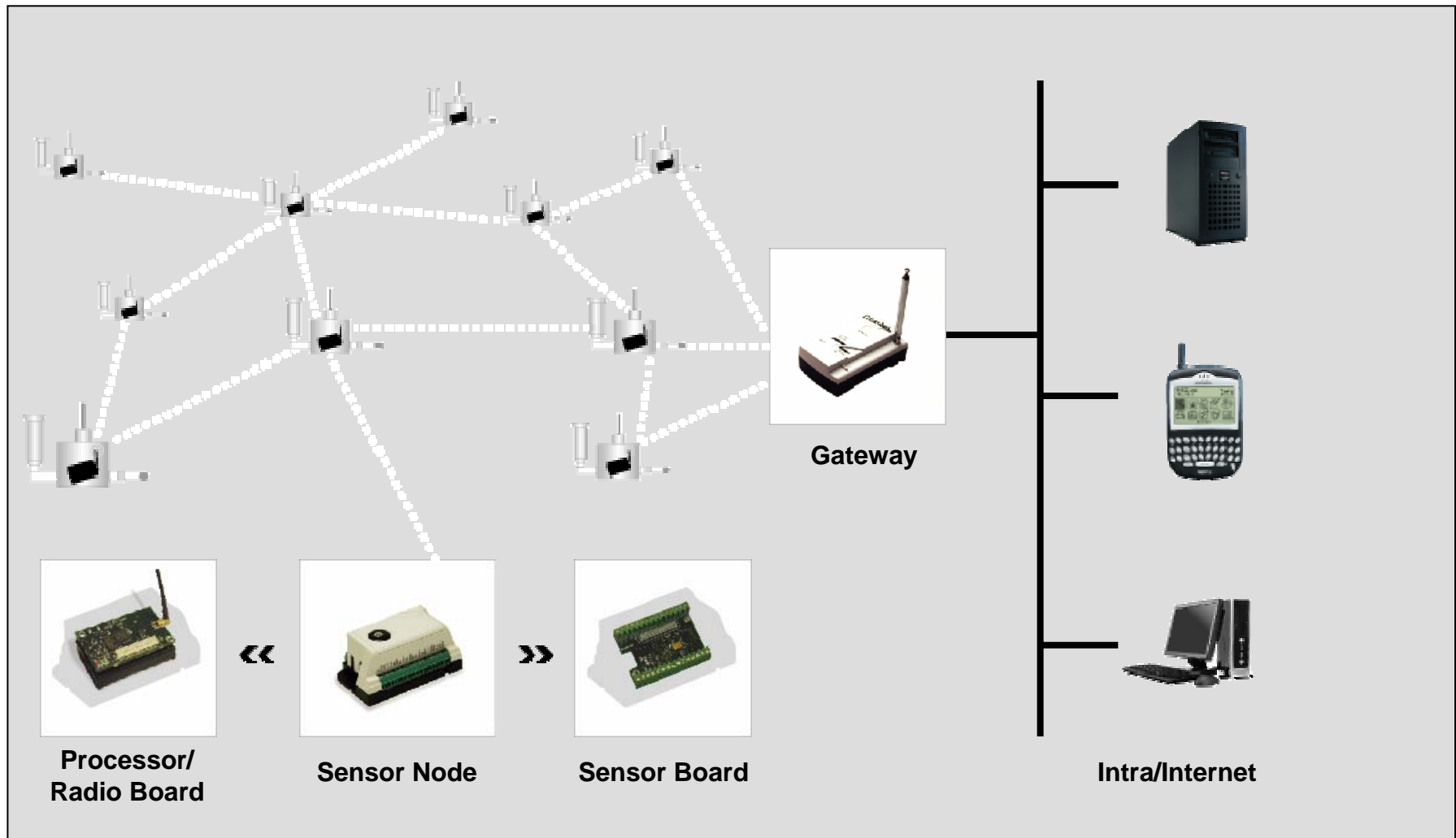
- The Physical Internet
- Case Studies
- How to Build WSNs



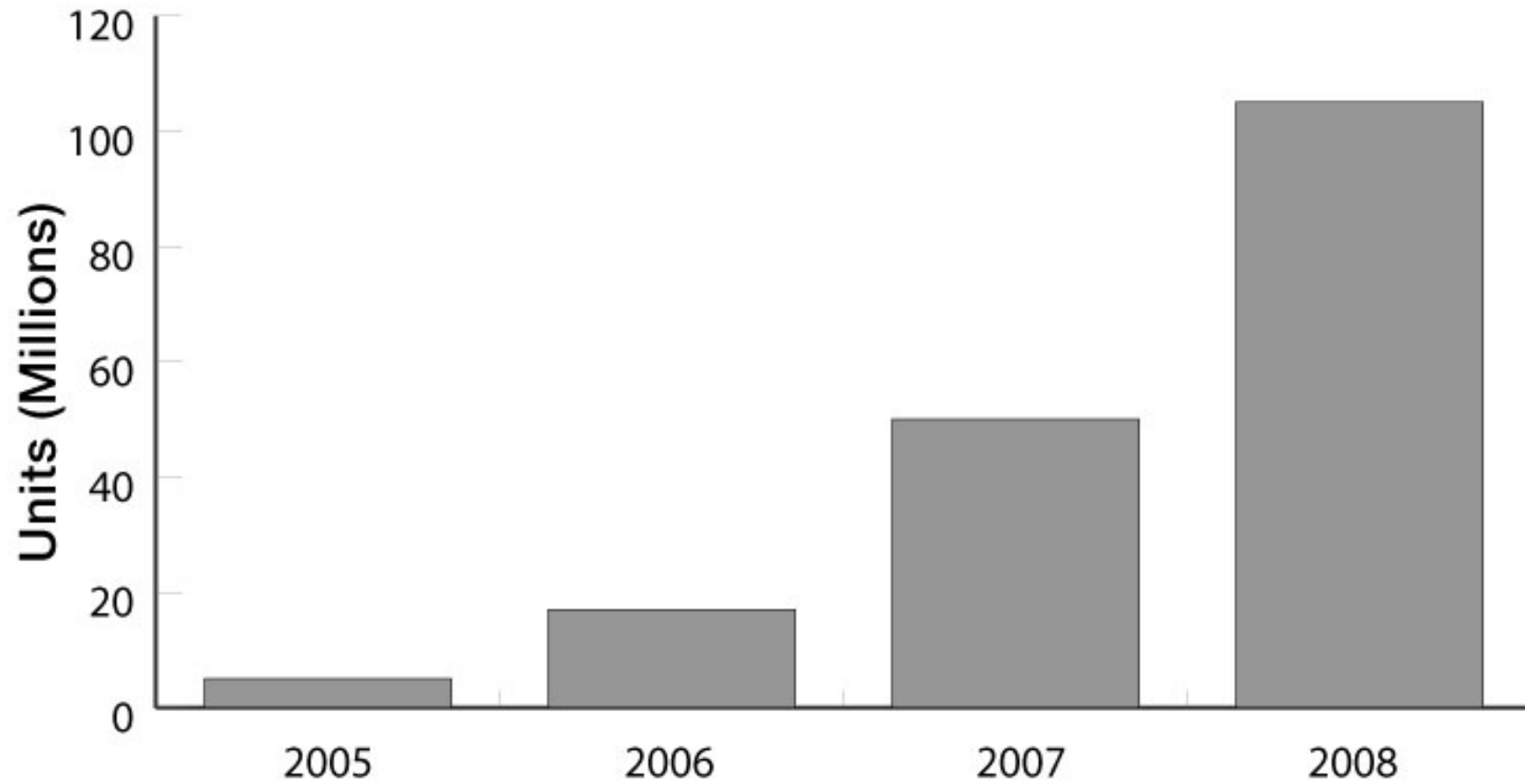
# The Physical Internet



# Wireless Sensor Network – Architecture



# Wireless Sensor Network Market Forecast



# Why Do Customers Deploy Wireless Sensors ?

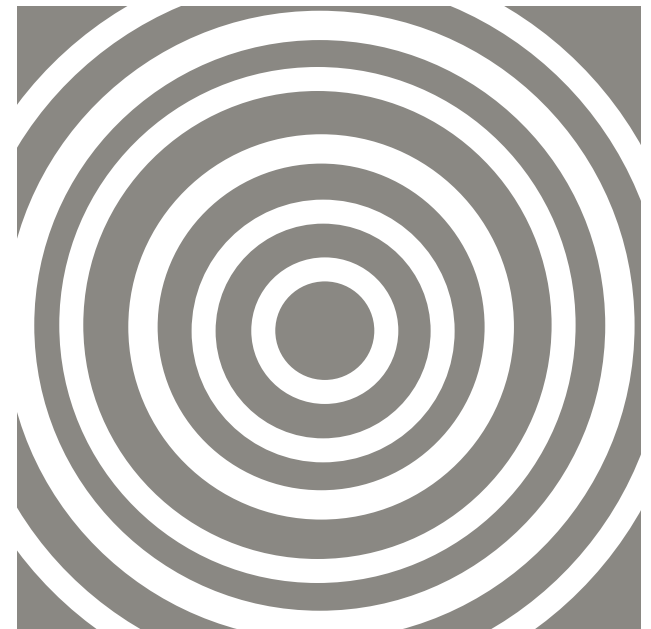


- 1) Lower cost of wiring
- 2) Networking of standalone sensors
- 3) New deployment paradigms where wiring is not possible



## Case Studies

- Tyco Thermal Heat Tracing
- Lifefitness Virtual Trainer and Machine Monitoring
- BP Predictive Maintenance on Rotating Equipment
- Grocery Store Cold Storage Temperature Monitoring

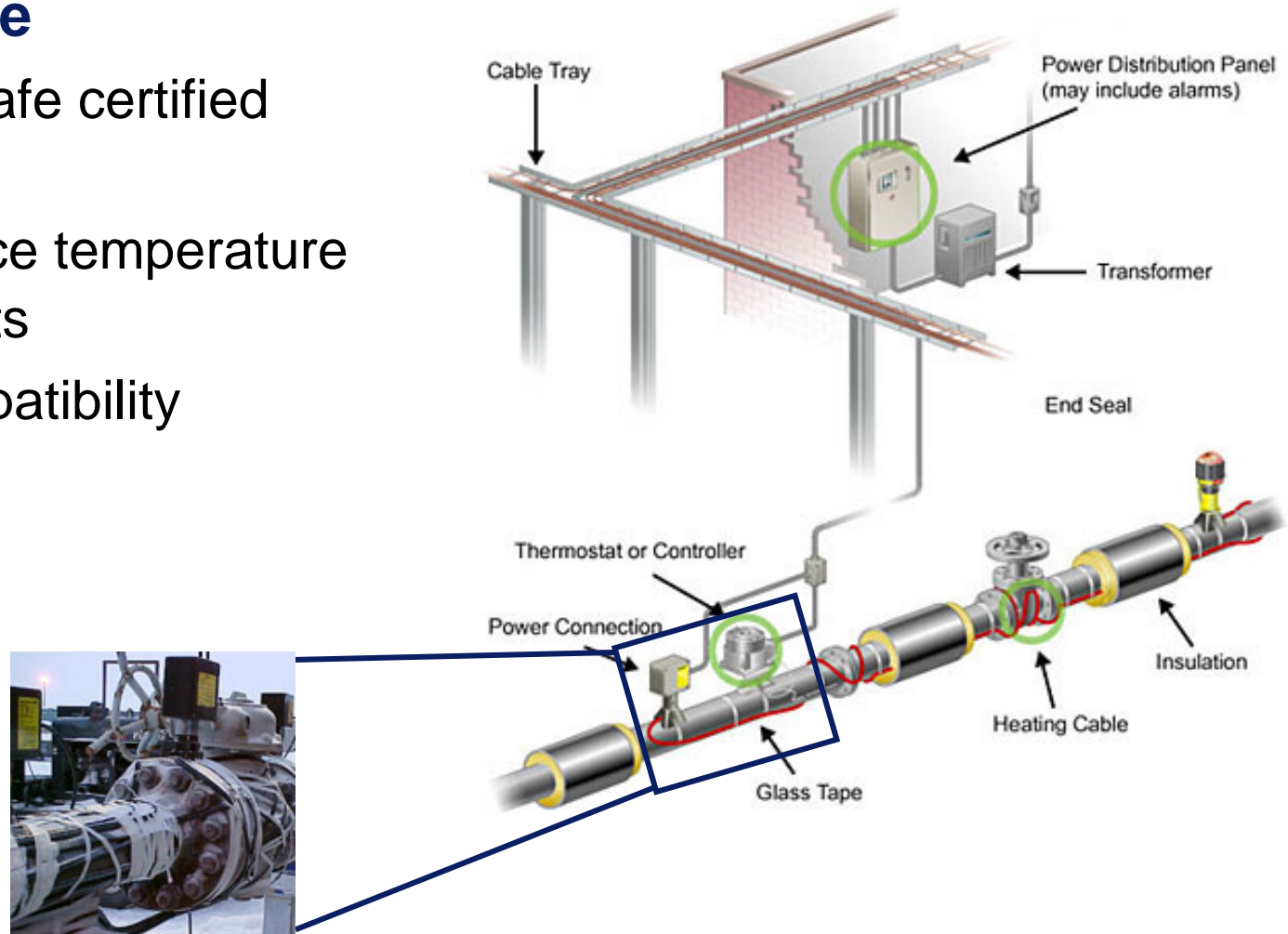


# Tyco / Thermal Controls' Industrial Heat Tracking

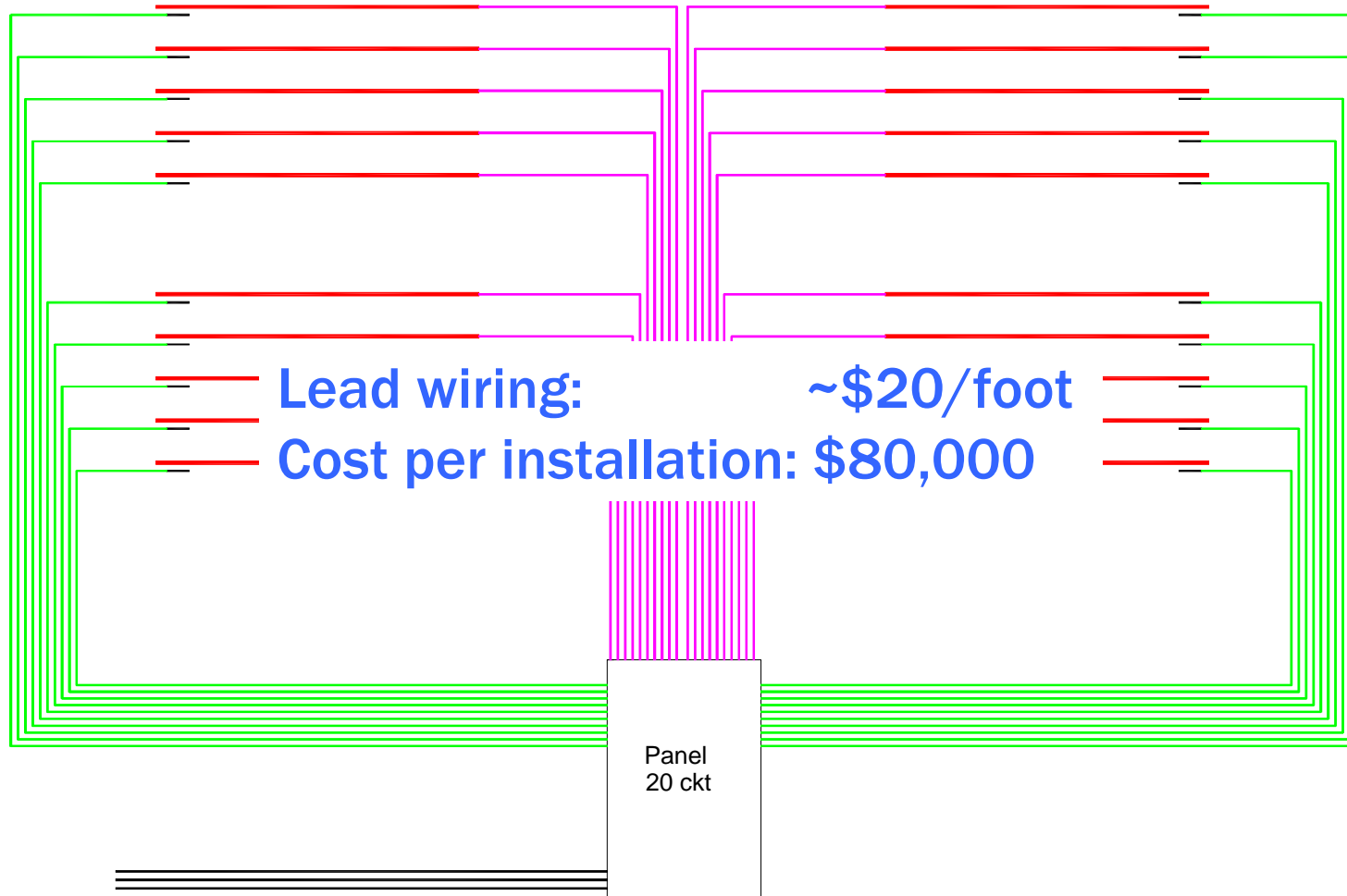


## RTD Sensor Node

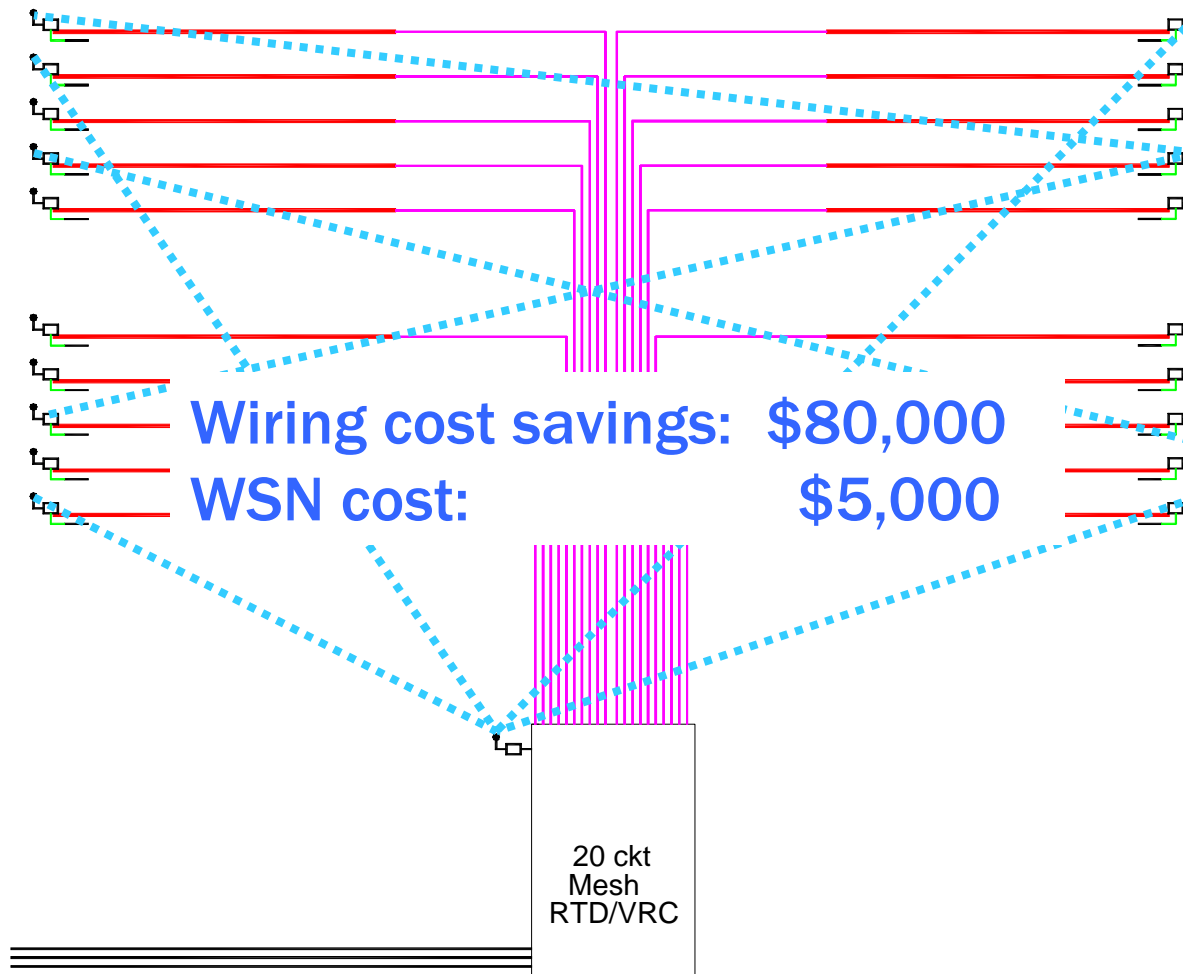
- Intrinsically-safe certified sensor node
- Two resistance temperature detector inputs
- Modbus compatibility



# RTD Lead Wiring



# Wireless Sensor Network



# Customer Case Study – Life Fitness



## ■ Task

- Life Fitness VIVO product line
- Wireless Network for Fitness Equipment to Download and monitor of personalized workout
- Monitoring of equipment usage

## ■ Results

- Increased product differentiation
- Lower total-cost-of-ownership



# Customer Case Study – BP



## ■ What

- Vibration monitoring on oil tankers
- Manual sensor reading replaced with wireless sensor network

## ■ Results

- Lower maintenance cost
- Proof of reliability of wireless sensor network in harshest environment
- Recognized with BP Helios Award

**theheliosawards**  
**partnership**  
**award winner**



# In-Store Temperature Monitoring



## ■ Task

- Automate temperature monitoring
- Reduce amount of food shrinkage
- Provide warning alerts 24x7

## ■ Benefits

- Reduced food shrinkage costs
- Reduced labor costs
- Corporate data access



Value Analysis				
NET VALUE	Y1	Y2	Y3	Y4
ROI (labor)	-26%	51%	129%	210%
ROI (shrink, est)	144%	395%	654%	920%
ROI (energy 2004 prices)	-51%	-1%	51%	104%
ROI (sum)	267%	645%	1034%	1434%



# How to build WSNs



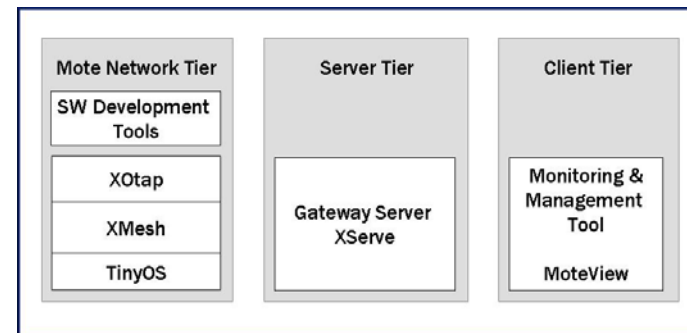


## Design Engineering Services, Support and Training

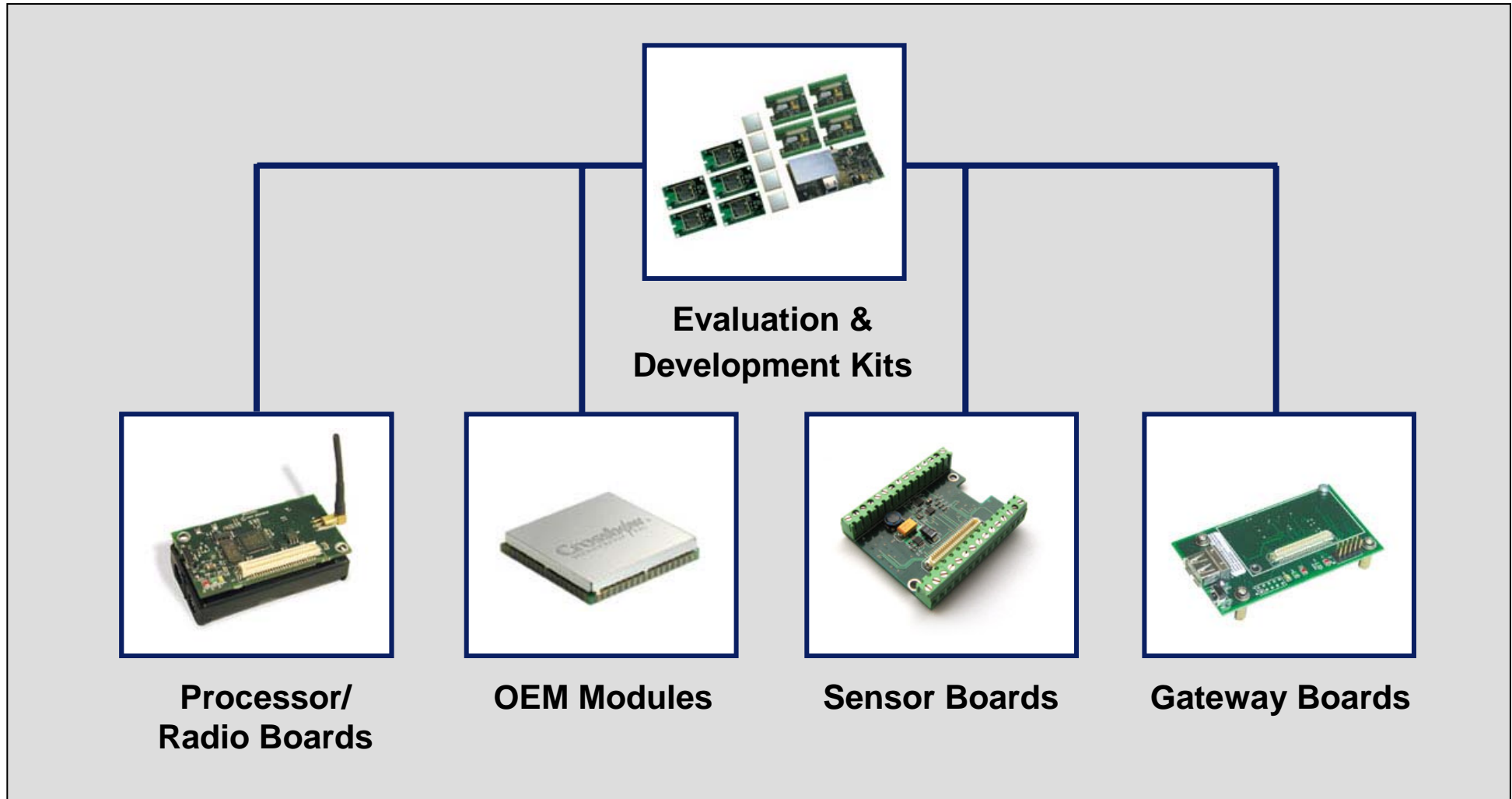
### Hardware Platform



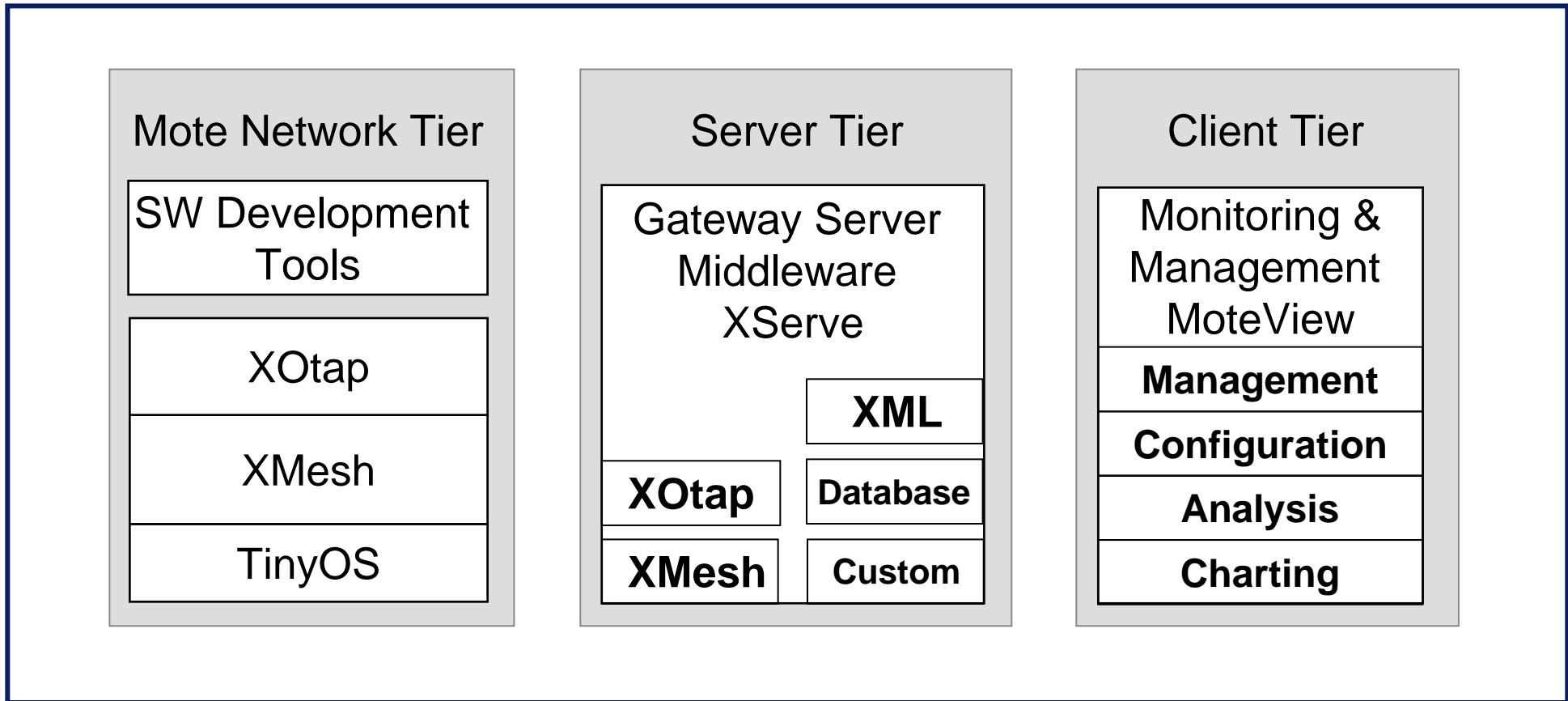
### Software Platform



# Hardware Platform



# Software Platform



## Hardware Platform

# Summary



- 1. Proven wireless sensor network platforms for fast system development**
- 2. End-to-end platform, including hardware, software and services**
- 3. WSN = Wireless + Sensors + Network Applications**

