The RMS View

Mining
- Streaming Data Mining
- Web Mining
- Content-based Image Retrieval
- Summarization

Recognition
- Human-computer Interfaces
- Multimodal Detection
- Statistical Computing
- Clustering and Classification
- Machine Learning

Synthesis
- Photo-realism
- Real-world Animation
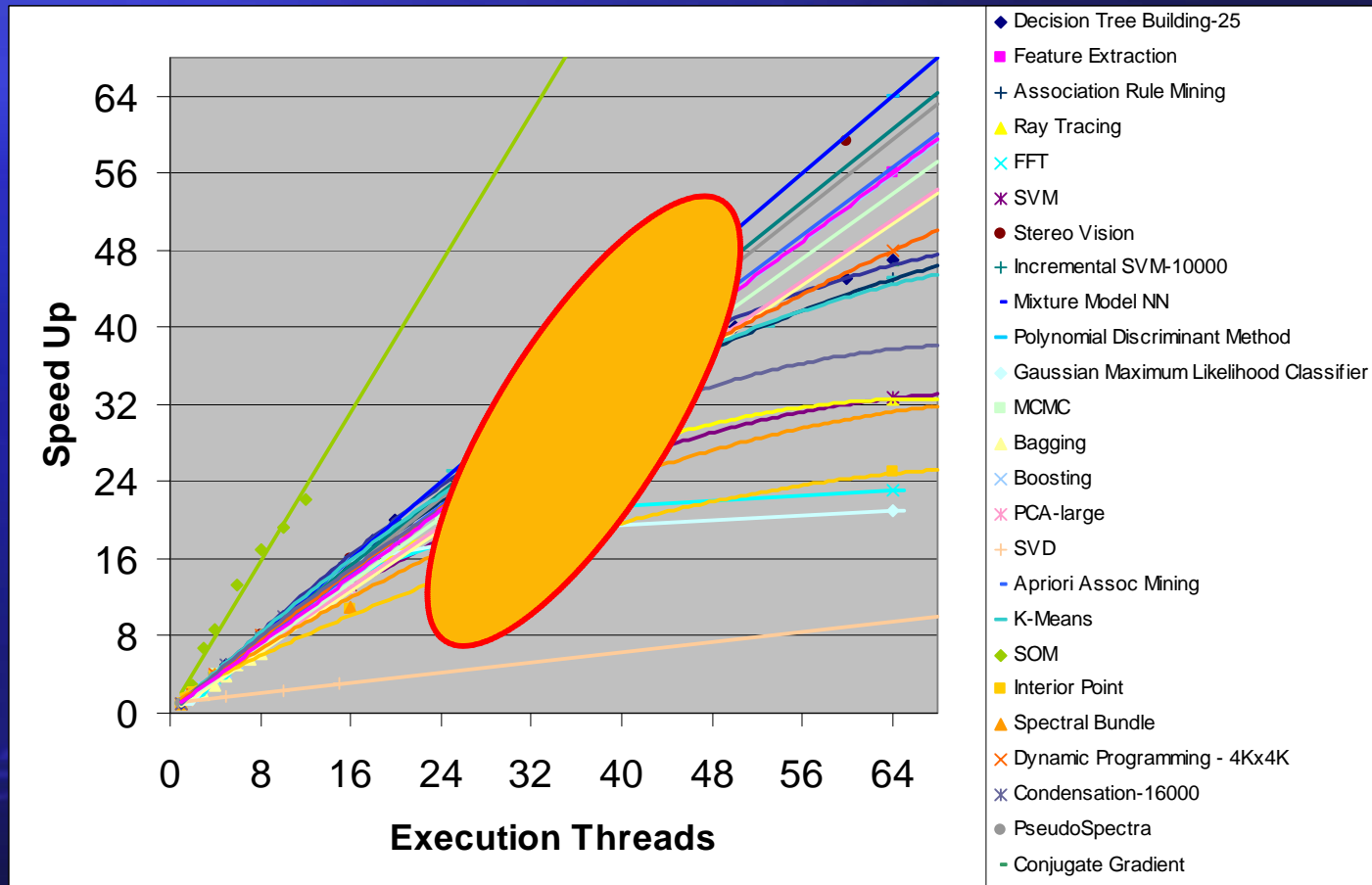- Audio/Video/Image Synthesis
- Document Synthesis

RMS: Emerging general purpose workloads that will drive the need high performance platform architectures

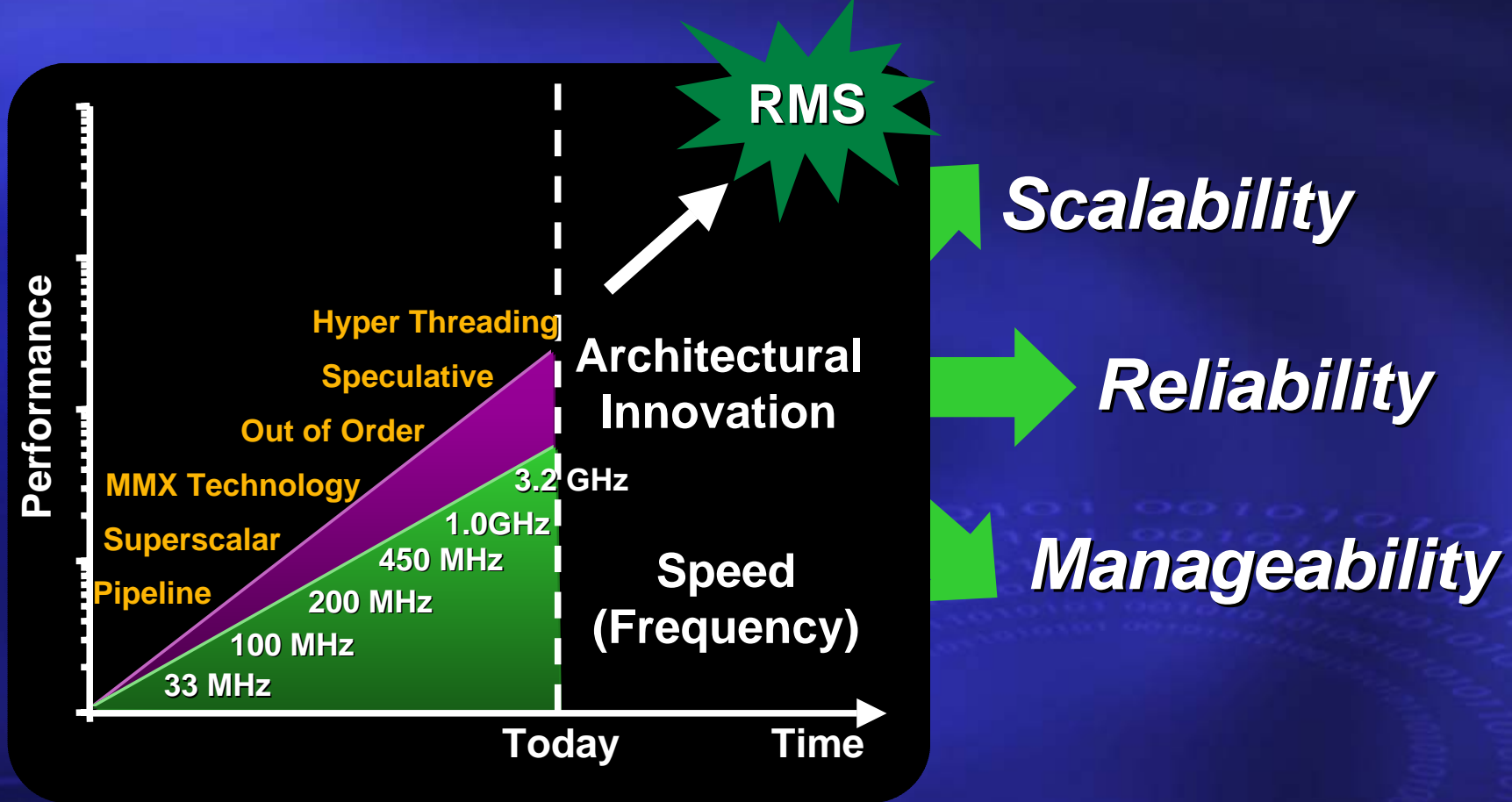# Thread level parallelism in RMS

Legend:
- Decision Tree Building-25
- Feature Extraction
- Association Rule Mining
- Ray Tracing
- FFT
- SVM
- Stereo Vision
- Incremental SVM-10000
- Mixture Model NN
- Polynomial Discriminant Method
- Gaussian Maximum Likelihood Classifier
- MCMC
- Bagging
- Boosting
- PCA-large
- SVD
- Apriori Assoc Mining
- K-Means
- SOM
- Interior Point
- Spectral Bundle
- Dynamic Programming - 4Kx4K
- Condensation-16000
- PseudoSpectra
- Conjugate Gradient

Speed Up vs **Execution Threads**

Curves derived from published sources based on CMP, GPU, SMP, and clusters

RMS workloads should scale well to 100s of execution threads
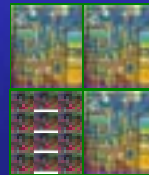
New Architectural Approach

Value = Performance + Architectural Innovation

Scalability

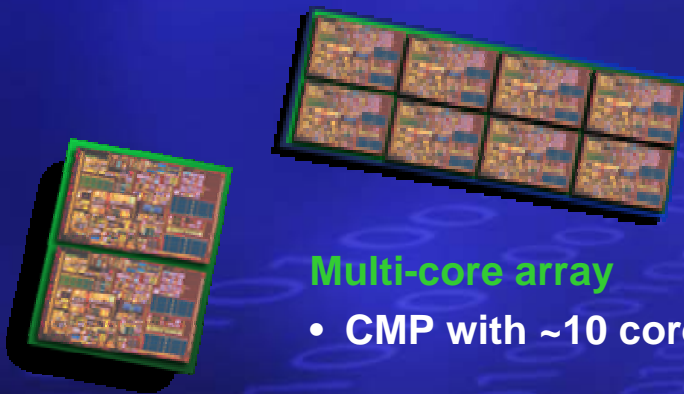Scalar plus many core for
highly threaded workloads

Large, Scalar cores for
high single-thread
performance

Many-core array

- **CMP with 10s-100s low power cores**
- **Capable of TFLOPS+**
- **Full System-on-Chip**
- **Servers, workstations, embedded…**

Multi-core array

- **CMP with ~10 cores**

Dual core

- **Symmetric multithreading**

Revolutionary

Evolutionary