



RadiSys.

DSPS Fest  
August 4, 2000

# Designing Open Standards Based Media Gateway

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# Abstract Summary

- **How to design an open standards based Media Gateway**
- **Emerging open standards in the industry**
- **How is RadiSys embracing them**
- **About RadiSys' Application Ready platform and other building blocks**

# 3Ws of VoIP?

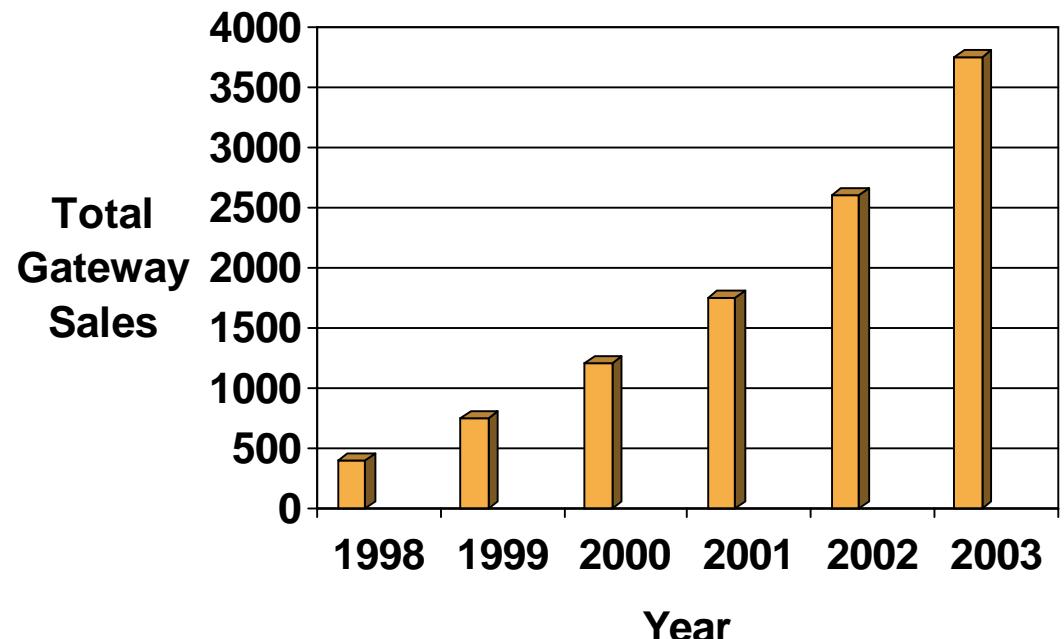
- **What?**

- Piggybacking voice traffic on to data traffic and bypassing these high-tariff regulated networks.

- **Why?**

- Cost Benefits
- Single Network

- **When?**



# Driving Factors in VoIP Applications

- **Reliability**

- High availability

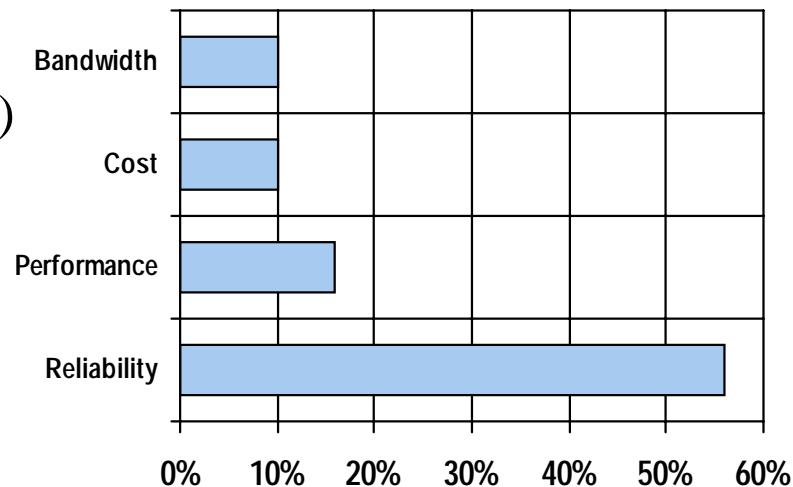
- **Performance**

- Voice quality (QoS)
- Density
- Interoperability
  - Signaling
  - Backward compatibility
  - Migration path

- **Price/performance (cost/port)**

- **Bandwidth usage**

## Concerns About Running Voice Over Data Network



Source: Forrester Research, July 1998

# What Impacts QoS?

- **Quality of Voice Compression**
- **Echo Canceller**
- **System Delay**
  - Jitter buffer
  - Bad frame masking
  - Processing delay
- **Network Delay**
  - Controlled by ISP/CO

# Open Standards

- **CompactPCI**
- **H.110 Telephony Bus**
- **RTOS**
- **Algorithms**
  - ITU-T
  - **DAIS**
- **Call Control Protocols**
  - IETF/TIPHON/ITU-T
    - MEGACO
    - H.323
    - SIGTRAN
- **Software Framework**
  - DSPBios (Planned Activity)

# What is DAIS?

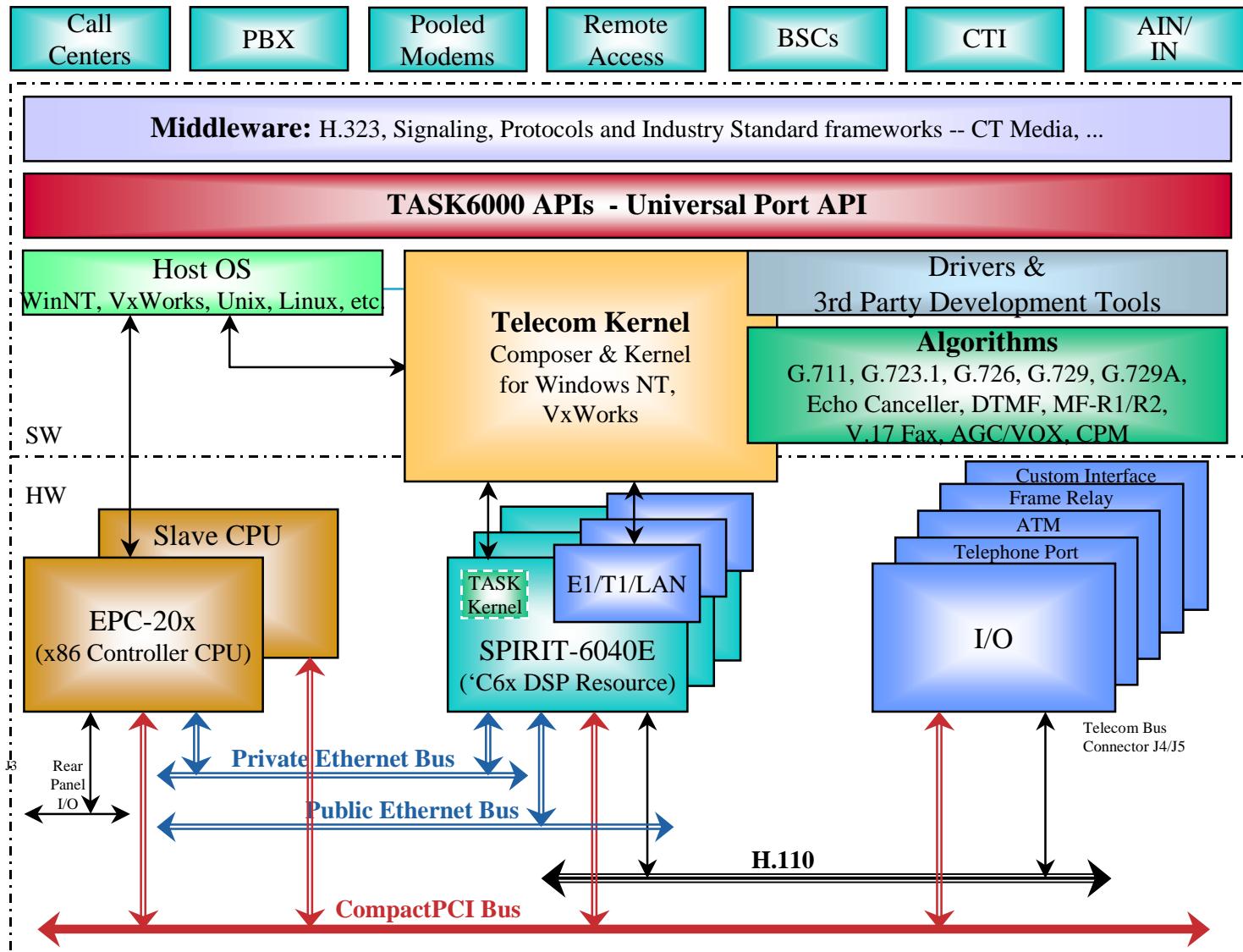
- **DSP Application Interoperability Standard from TI**
- **DAIS algorithms are easy to integrate in any application**
- **Clean performance characterization**
- **Defines the memory requirements of the algorithm**
- **Common API's -- easy to plug in**

# How Is RadiSys Embracing DAIS?

- **14 voice coders have successfully passed DAIS test !**
- **Working under TI's big umbrella -- eXpressDSP™ Technology**
- **APIs**
  - `G729ENC_encode(handle, pInBuf, pOutBuf)`
  - `G729DEC_decode(handle, pInBuf, pOutBuf)`
  - `G723ENC_encode(handle, pInBuf, pOutBuf)`

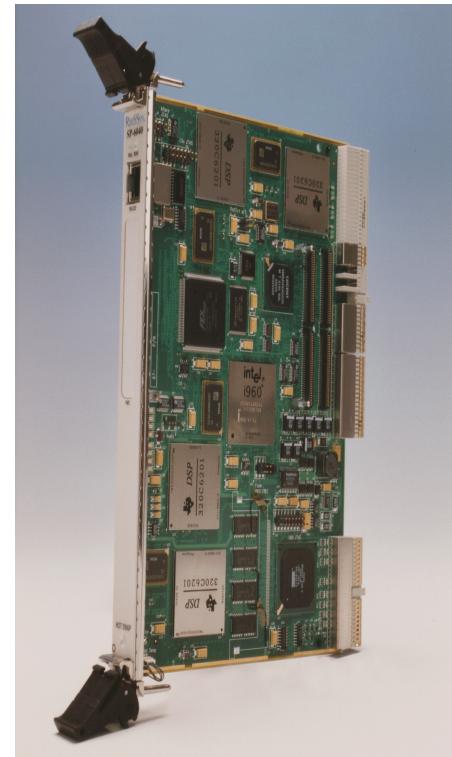
# TDM-IP Media Processing Architecture

## RadiSys Building Blocks



# SPIRIT Family

- **SPIRIT6020-PCI**
  - Two C6201 DSPs @ 200MHz ea.
  - i960RD as IOP
  - Targeted for Call Center/IVR/CTI applications
- **SPIRIT-6040E**
  - Four C6201 DSPs
  - i960RD as IOP
  - Up to 48 ch. Of VoIP
  - Dual 10/100BaseT
  - Up to Quad E1/T1 via PMC



# Voice Codecs & Telephony Algorithms

## Middleware and Protocol Stacks (under development)

### Telephony

AGC/VOX

Echo Canceller  
G.165/G.168\*

Comfort Noise  
Generator

DTMF Detector/  
Generator

CPT  
MF-R1, MF-R2

### Vocoders (ITU-T)

G.711

G.723.1

G.726

G.729

G.729/A

GSM

DAISed

### Fax

V.21

V.17 Group III

V.29

V.27ter

T.38

### Modems<sup>†</sup>

•V.90

•V.34

•V.42bis

\* Planned

† Through Partner. Not  
available today

Telecom Application Specific Kernel (with host API)  
UniversalPort, DSP resource management, QoS management

# Telecom Application Specific Kernel (TASK 2.0)

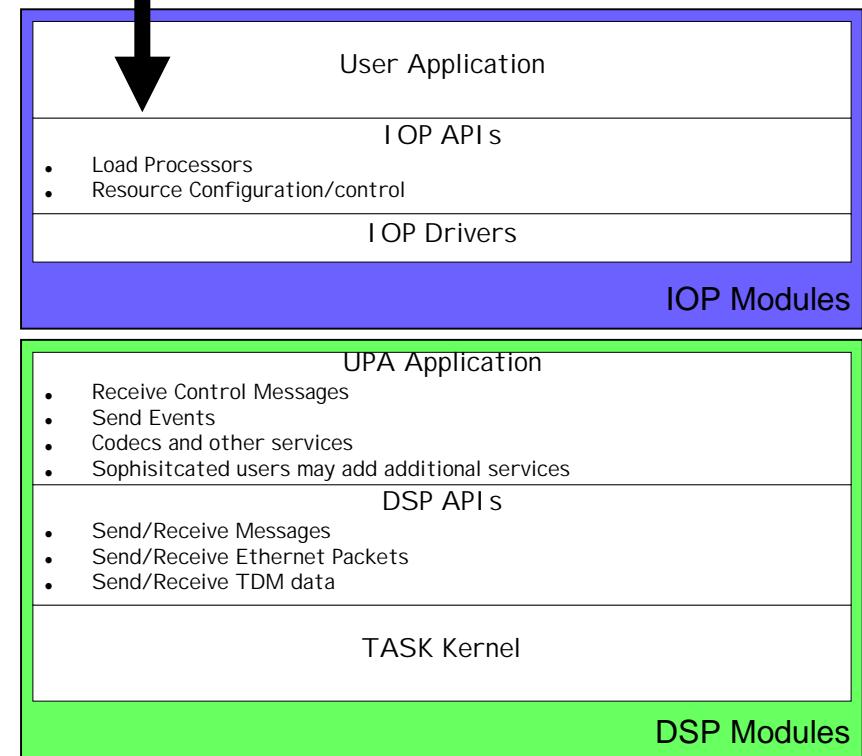
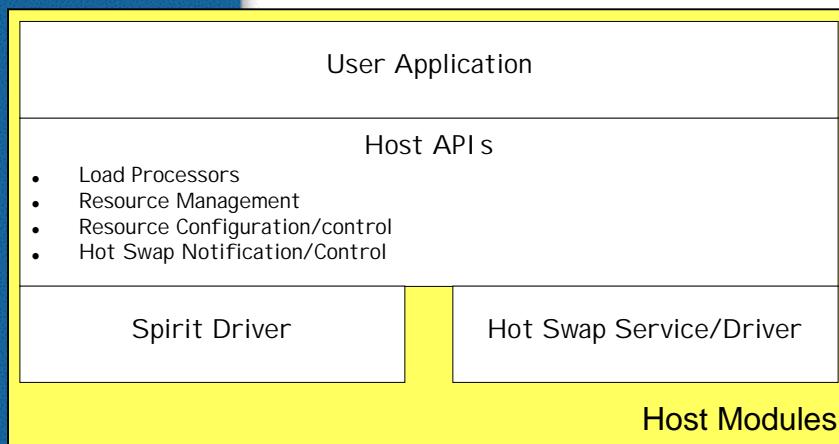
- **Application composer and a Real-time Telecom Kernel for 'C6x DSP**
- **Supports dynamic channel switching**
- **Universal Port API**
  - Flexible development environment for V/FoIP applications
  - No DSP and low level programming
  - Runs under VxWorks O.S
- **Resource Manager**
  - Host based API for management of all SPIRIT devices
  - Request a resource based on type and capabilities
  - Allocate a particular resource and register the capabilities which will be in use
  - Reallocate a resource with a different set of capabilities, which the RM will track
  - Free a resource
  - Display resource usage (version 3.0)

# TASK 2.0 Architecture

Host CPU

40% free  
for user  
Apps.

IOP/DSP



# Application Ready Platform

## Processing Engines

- DSP resources
- CPUs -- Master and Slave
- I/O (LAN/WAN)



## Algorithms

- Voice Coders
- Fax
- Telephony  
    (AGC/VOX, CPM,  
    CNG, DTMF)
- Echo Canceller

## Signaling

- MF R1/R2
- CAS/CCS

## Software

- BSP
- TASK 2.0

## Protocols

- H.323
- MEGACO
- SS-7

## Port/Develop Your Applications

- Trunking Gateways
- Signaling Gateways
- AIN/IN Services
- CTI/IVR
- and more...

## System

- Integration
- Chassis
- Backplane
- Power Supply

# Summary

- **Telecom is moving towards standardization**
- **RadiSys is working very closely with its partners, like Intel and TI, to make this happen**
- **DAISized all the voice coders**
  - Work on telephony algorithms in progress
- **RadiSys can provide an Application Ready Platform for VoIP/SS7 applications**