Z-Wave Introduction

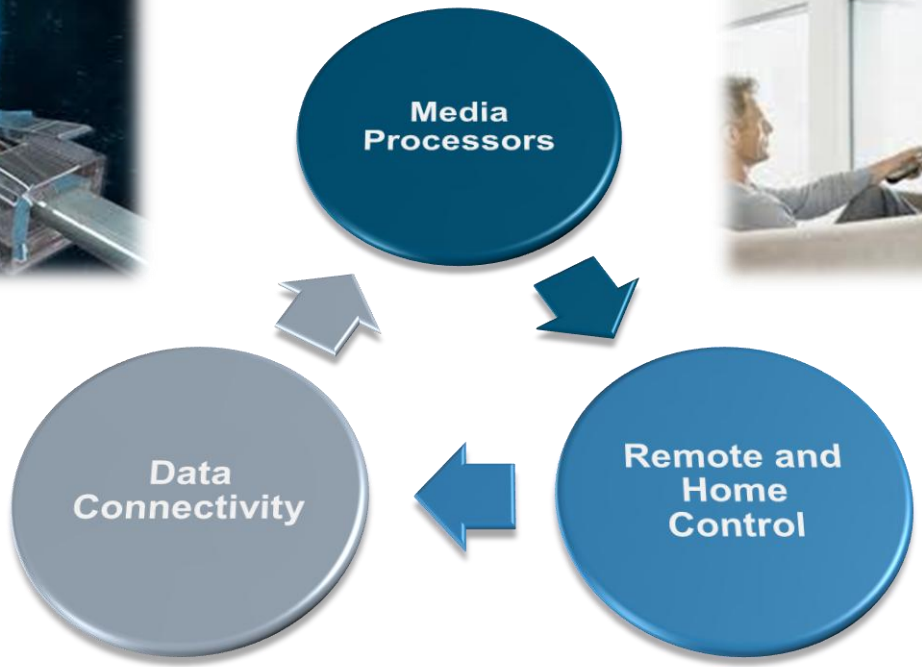
Sigma Designs

Powering the New Digital Home
www.sigmadesigns.com

SIGMA DESIGNS

Sigma and Z-Wave

- Z-Wave, key part of the "*Powering the New Digital Home*" Strategy
- Full turnkey solution for Service Providers and CE companies

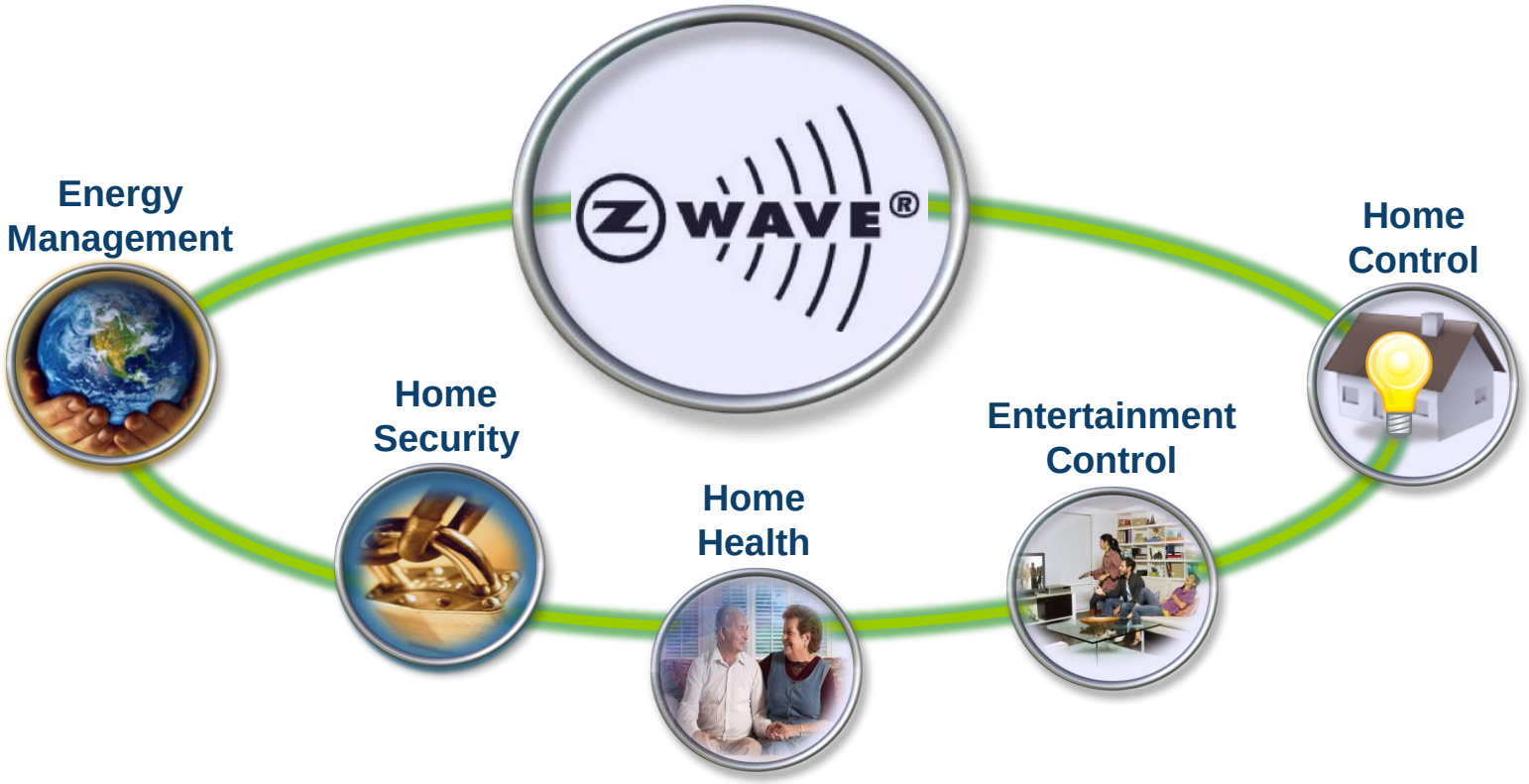


Agenda

- Z-Wave Market Overview
- Z-Wave Alliance
- Z-Wave Home Solutions
- Z-Wave Technology Overview
- Z-Wave Partners
- Summary

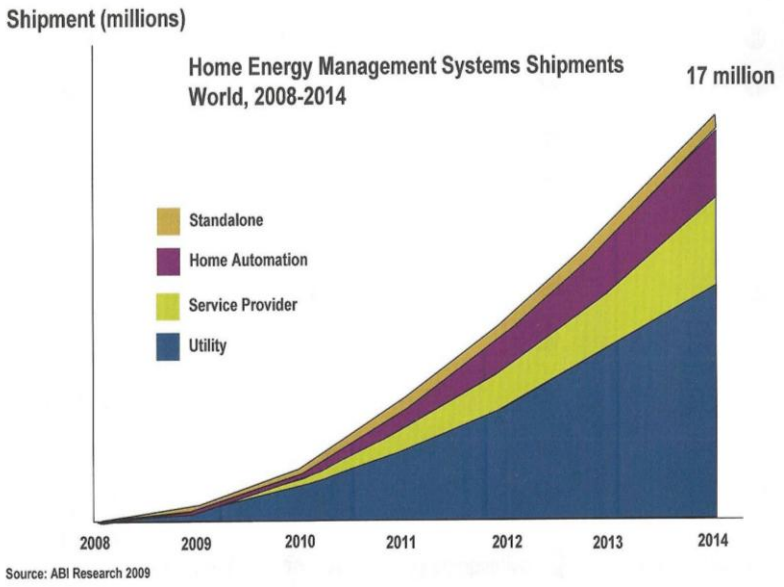
Z-Wave Market Overview

One Solution Does it All



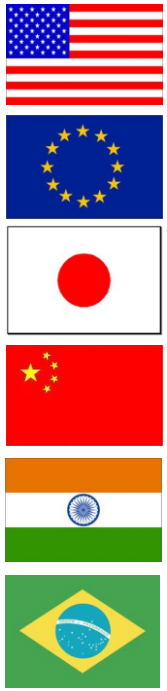
Now is the Time

- **Market data shows the trend**
- **Volume is rapidly increasing**
- **Technology is mature**
- **Products are available**
- **Channels are deploying**



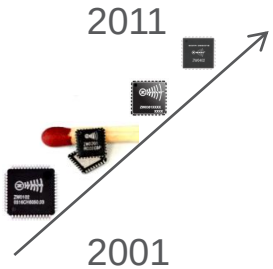
Z-Wave is on a Roll

- 2010 - Best year ever – 2 x from 2009
- 2011 - Beating expectations
- Global Success



Z-Wave is Proven

4th Gen HW/SW platform



450+ Certified products from leading OEMs

Available in all channels

- ✓ Retail
- ✓ Utility
- ✓ Security
- ✓ Pro-installer
- ✓ Service provider

Success Stories

Security

Click Here!

Click Here!

Commercial 1 – Click here!

Commercial 2 – Click Here!

Apple Commercial – Click Here!

Hospitality

Click Here!

65K Z-Wave devices Installed at the Wynn hotel

Service Provider

Click Here!

Best of CES – Click here!

Retail

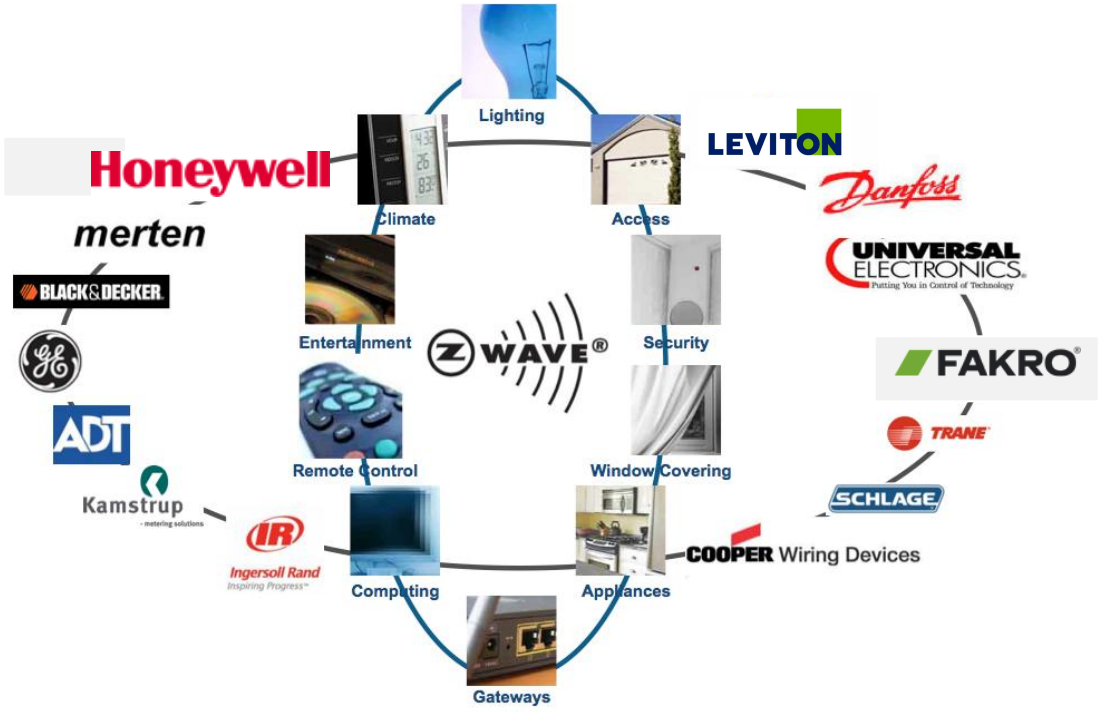
Click here!

Click Here!

Click Here!

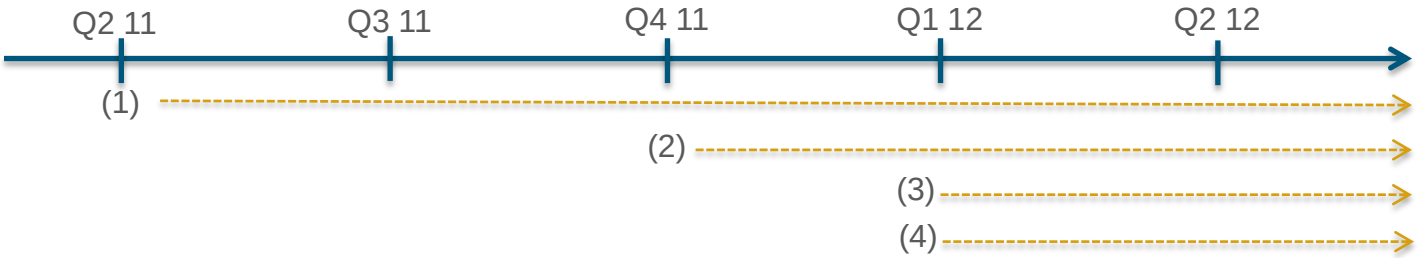
Everything Works Together

- **Only Z-Wave is fully interoperable**



Z-Wave is Opening Up

- Why now?
  - Very mature solution ☑
  - Proven success in providing interoperable solutions ☑
  - Market is ready ☑
- How?
  1. Introduce 2nd source partner ☑
  2. Open MAC/PHY through recognized standardization body ☑
  3. Introduce open SW stack through IETF (Internet Engineering Task Force) ☑
     - » With dual stack for legacy support
  4. Open up for device profiles ☑
- When?



Z-Wave Alliance

SIGMA DESIGNS

Z-Wave Alliance Mission

1. Promote consumer recognition of the Z-Wave brand as the trusted standard for wireless home control products and applications
2. Ensure interoperability between systems and devices from all Alliance Members
3. Provide a process for collaboration on future products and services.

Principal Members

More than 160 Z-Wave Alliance Partners

Z-Wave Home Solutions

SIGMA DESIGNS

Conserve Energy with Z-Wave

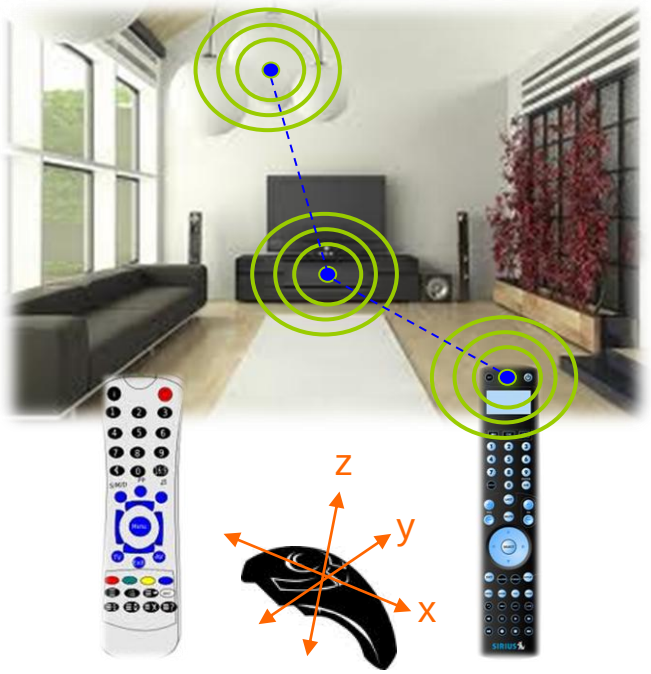
- **Control and monitor home energy usage through Z-Wave**
  - ➔ Real-time consumption
  - ➔ Respond to alerts from utility companies
  - ➔ Light on when entering the room
  - ➔ Remote thermostat adjustment

Z-Wave Advances Home Security

- **Z-Wave transforms passive alarm systems into active consumer control solutions**

- ➔ Turn on lights when approaching the house
- ➔ Arm/disarm directly from the door lock
- ➔ Remote access
  - Download temporary lock codes
  - Receive text alerts when lock is activated
- ➔ Remote monitoring
  - Stay informed through text message alerts

Control Your Entertainment



- **Z-Wave is the ideal AV control solution**

➔ One chips drives it all for very low cost
  - IR and RF
  - Key matrix
  - Display with meta data
  - Free space navigation

➔ No more line-of-sight issues for products behind cabinet doors

➔ Future proof investment
  - The technology integration will allow for both AV control and full Home Control

Robust Home Control

- **Z-Wave allows retrofit without special wiring**

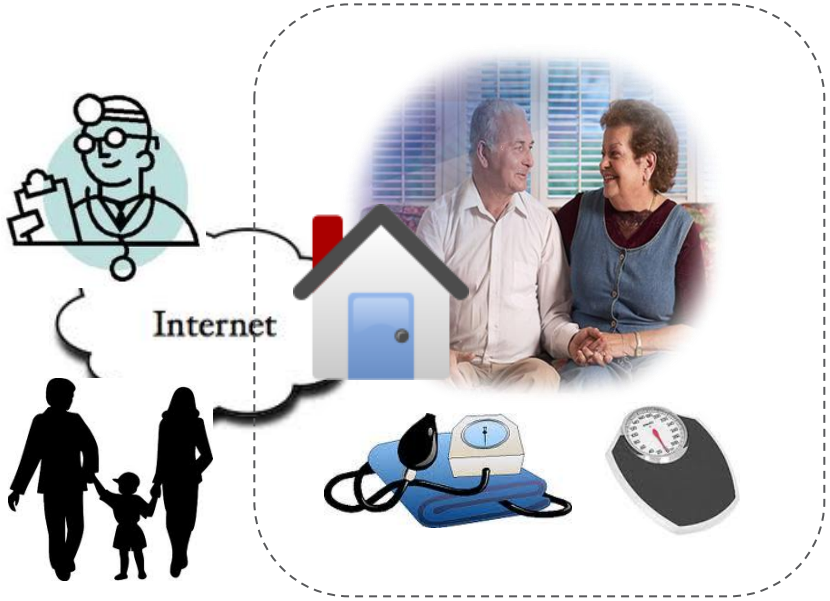
➔ Watch a movie – one button press will
- Lower shades
- Dim lights

➔ When leaving the house
- Turn off all lights and key appliance

➔ Automate lighting
- Configure schedules and timer event
- Burglar deterrent

Perfect for Home Health

- Doctors and hospitals want to monitor patients in their homes
- Seniors want to stay in their home as long as possible



- **Z-Wave provides the wireless infrastructure**

➔ Remote access to important medical data:
  - Weight
  - Blood pressure
  - Sugar levels
  - Medicine consumption

➔ Peace of mind
  - Relatives wants to stay informed
  - Seniors want to feel safe

Z-Wave Products 1/4

Energy gateways

Meter devices

Energy Modules

In Home Displays

Z-Wave Products 2/4

security panels/ gateway

Thermo - stats

Sirens

Sensors

Sensors

Entry Control

Valves

Z-Wave Products 3/4

Lightin g Control

Key Fobs

AV Remote

AV Devices

Special Control

USB Sticks

Z-Wave Products 4/4

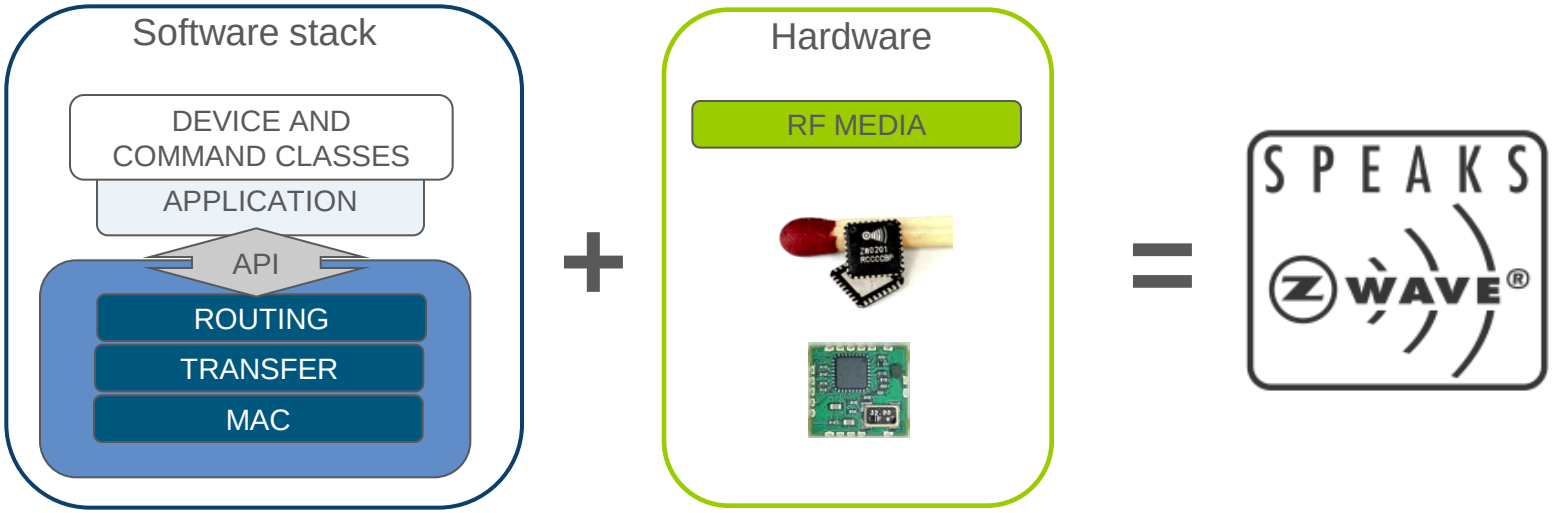
Z-Wave Technology Overview

SIGMA DESIGNS

Z-Wave is a Complete Solution

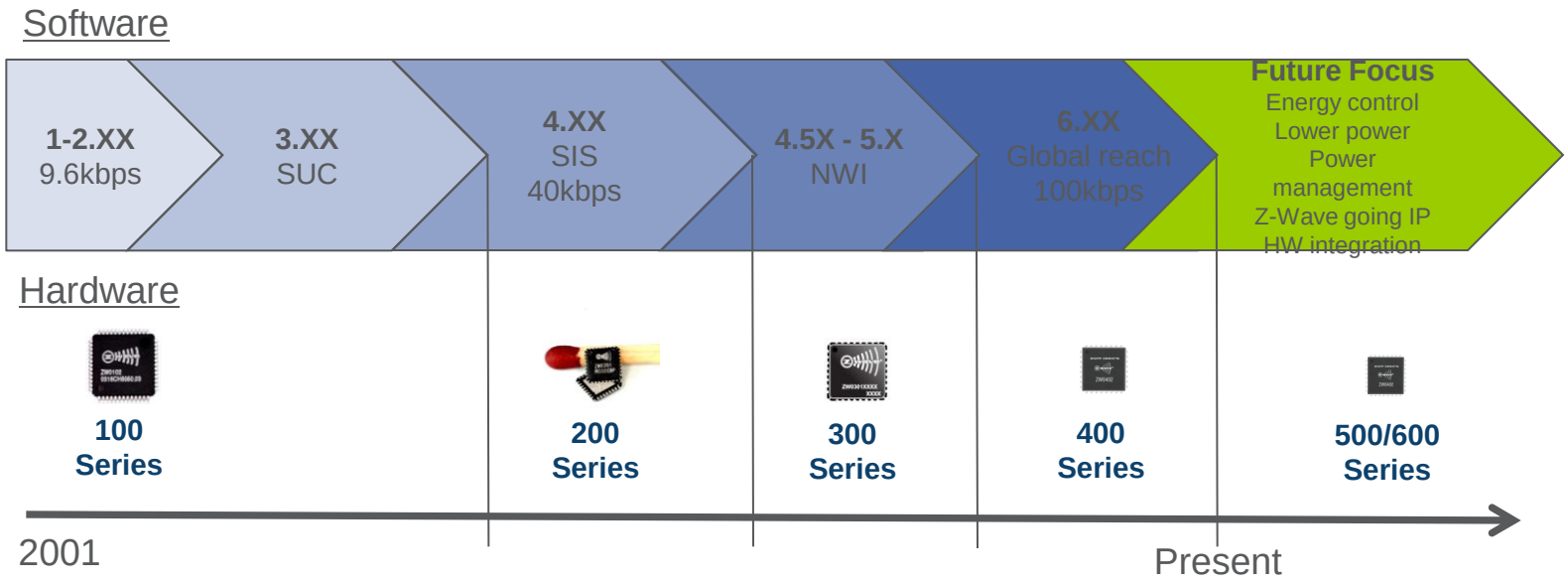
✖ Z-Wave is not just another RF chip

✓ Z-Wave is robust mesh networking solution for narrow bandwidth communication in the home



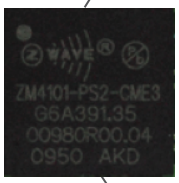
Superior Design

- Proven history of robust products in the field
- Compatibility between technology generations
- Guaranteed interoperability between end-consumer devices



One SOC Does it All

- The Z-Wave modules are optimized for control
- A true one-chip solution



Keyboard - matrix
IR learner
For remote controls

AD converter
For sensor applications

128 bit encryption
For secure products

USB slave
For low cost USB devices

TRIAC controller
For light dimmers

I/O pins
For LEDs,
Button and etc..

8051 Core
Program memory
RAM

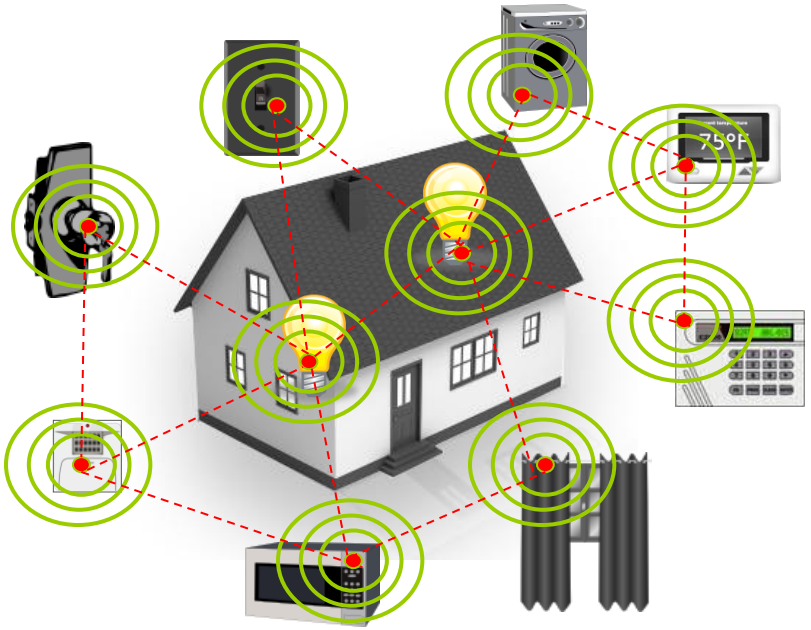
SPI, UART, USB
For connectivity

Timers
Wake up timer
Interrupt ctrl
Power management
Watchdog

RF transceiver
Channel diversity

Tailored for the Home

- **RF solution in single chip**
  - Sub – 1GHz
  - Frequency Agility
  - Rich set of peripherals
  - Multi speed: 40…100 kbps
  - Low communication latency
- **Wireless Mesh Networking**
  - Every node is a repeater
  - Extremely robust
  - Self healing
- **Extremely simple setup**
  - Plug & Play
  - Versatile support of installation tools
- **Ultra low power**
  - Ideal for battery powered sensors
  - Battery-to-Battery networks
- **Interoperable**
  - Proven Device and Command Classes
  - Comprehensive certification program



Modules

Feature	ZM3102	ZM4102	ZM4101
Image			
Type	Module (300)	Module (400)	Module (400)
Package	PCB Module 13x14mm		QFN64
Frequency (MHz)	868/908/921	868/908/921/952	
Bit rate (Kbps)	9.6/40	9.6/40/100	
Program memory (KB)	32 (Flash)	64 (OTP)	
SRAM (KB)	2	4	
Development RAM (KB)	None	12	
I/O	10		32
Key-Scan (# keys)	None		128
IR support	None		Transmit/Learn
UART/SPI	1/1		2/2
USB 2.0 slave	None		1
Security 128 bit AES	Yes SW only	Yes HW	
Tx RF Power (dBm)	-20 - 0	-20 - 3.5	
Rx sensitivity (dBm)	Down to -102	Down to -100	
Tx/Rx current (mA)	36/23	34/28	
Sleep current (uA)	2.5	3.2	
Battery to Battery (uA)	80	50	

Continuing to Innovate

- **Chips and Modules**

- **Unique SW features**

- **Z-Wave for IP (Z/IP) to meet future market requirements**

500 Series Highlights

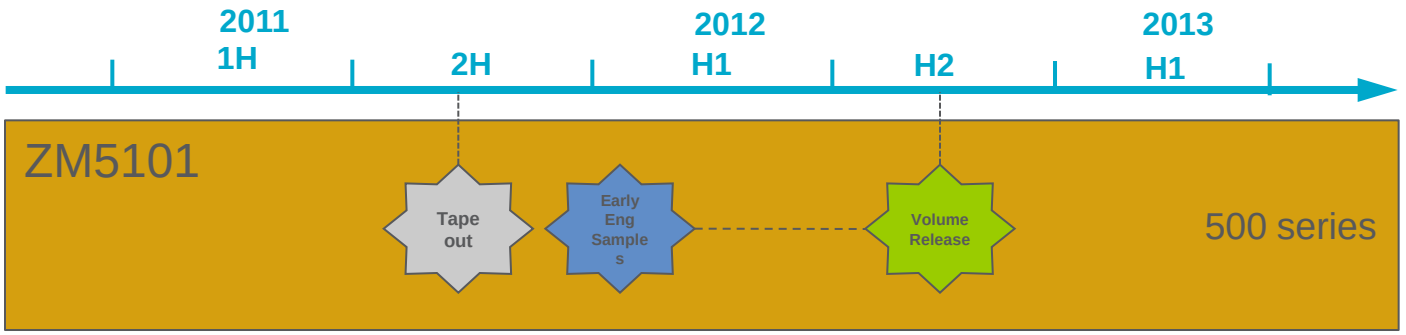
- Target applications
  - Z-Wave Sensors
  - Actuators
  - Simple controllers for Security, Energy and Entertainment

- 100% compatible with 400 series
  - Form factor – pin compatible
  - Application source
  - Application Binary

- Spec highlights
  - 128K byte Flash,
  - 16K byte SRAM
  - 1uA sleep current
  - Improved LO-Leakage

500 Series Roadmap

Tentative schedule

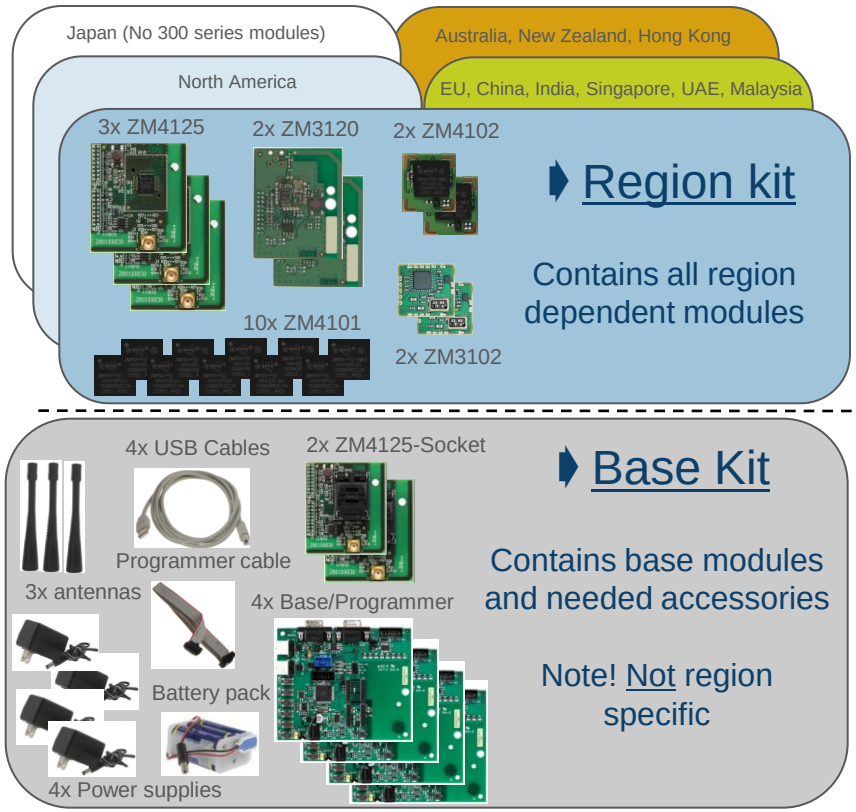


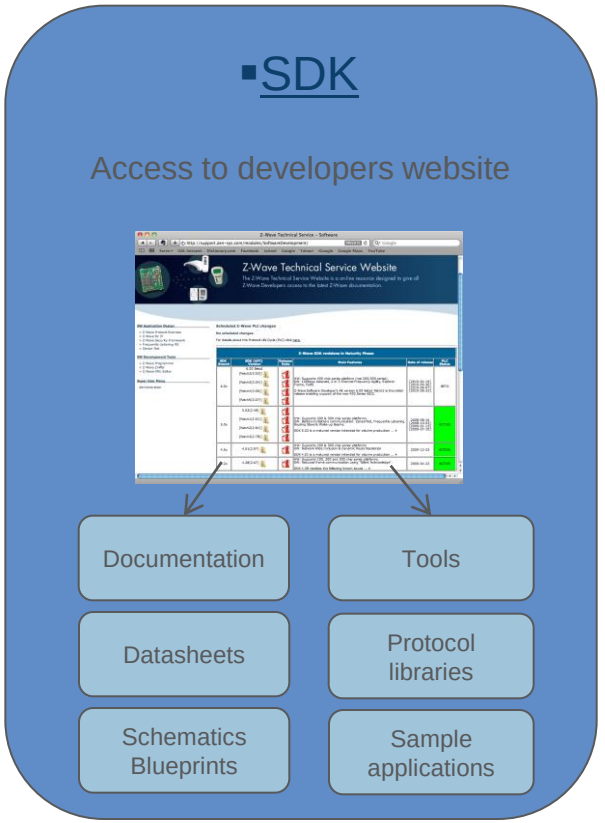
Z-Wave is going IP

- IP addressing has become a global requirement for all platforms
- Z-Wave is ready to meet the demand
- Positioned for the future without breaking interoperability
- Protocol stack using open IETF standards
  - 6LowPan
  - RPL routing
- Z-Wave will guarantee backward compatibility through
  - Dual stack
  - Opening up for the Z-Wave device and command class framework

Z-Wave Devkit Structure

- A Z-Wave developers kit is required for SW and HW development





Ordering the Devkit

- The Z-Wave module and dev-kits are available at Sigma distributors and Digikey – www.digikey.com/zensys

Full Devkit - $3000,- : 1 x Region kit | 1 x Base kit | 1 x SDK

Individual region kits - $300,- : Japan | North America | EU, China, India, Singapore, UAE, Malaysia | Australia, New Zealand, Hong Kong

Individual Base kits – $2700,- : Base kit

Individual SDK - $1500,- : SDK

- KEIL PK51 compiler is not part of the Z-Wave devkit
- Required for Embedded Z-Wave applications
- Digikey price - $3295,-

Z-Wave Partners

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Channel Partners

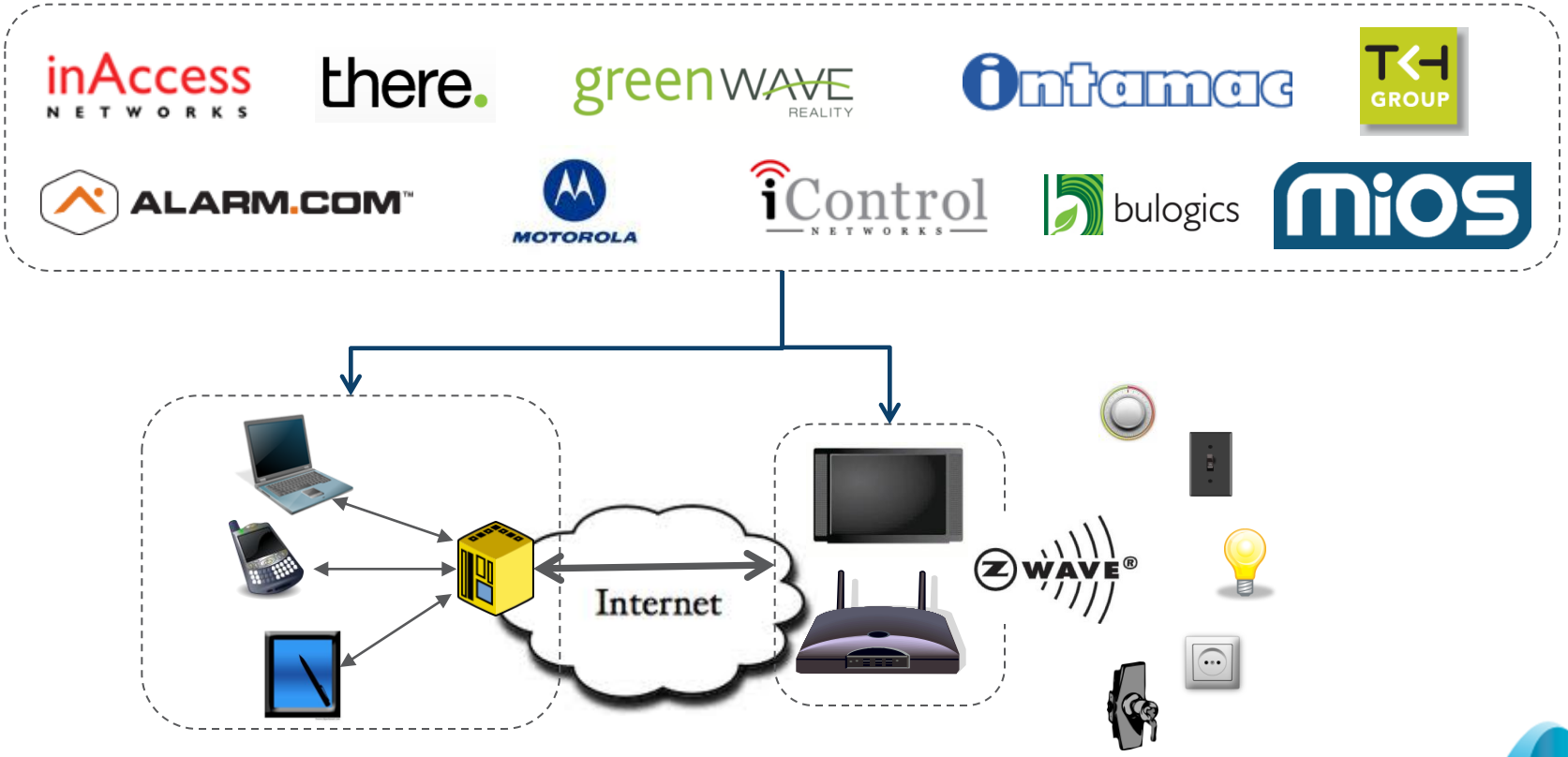
- **Service providers**

- **Retail**

- **Pro installer**

SW Partners/Integrators

- Z-Wave software partners are experts in enabling Z-Wave control anywhere on any platform



Z-Wave ODMs

- The ODMs complete the Z-Wave turnkey solution
  - Gateways
  - Lighting products
  - Energy products
  - AV products

Development Partners

Prevas	http://www.prevas.dk/
seluxit	http://www.seluxit.com/
Logos Design A/S	http://www.logos.dk/
data respons EMBEDDED SOLUTIONS	http://www.datarespons.com/
twisthink DESIGN TECHNOLOGY STRATEGY	http://www.twisthink.com/
bulogics	http://www.bulogics.com/
DEVELCO	http://www.develco.com/

Summary

SIGMA DESIGNS

Summary

- Largest ecosystem with more than 450+ certified products
- Most active alliance with key OEMs
- Availability in all channels
- Very easy to use

- Lowest integration cost
- Most robust and proven technology
- Committed support from start to product launch
- Only solution that guarantees interoperability

- Roadmap positioned for continued success

Thank you!