Overview of Keysight Device Modeling Solutions

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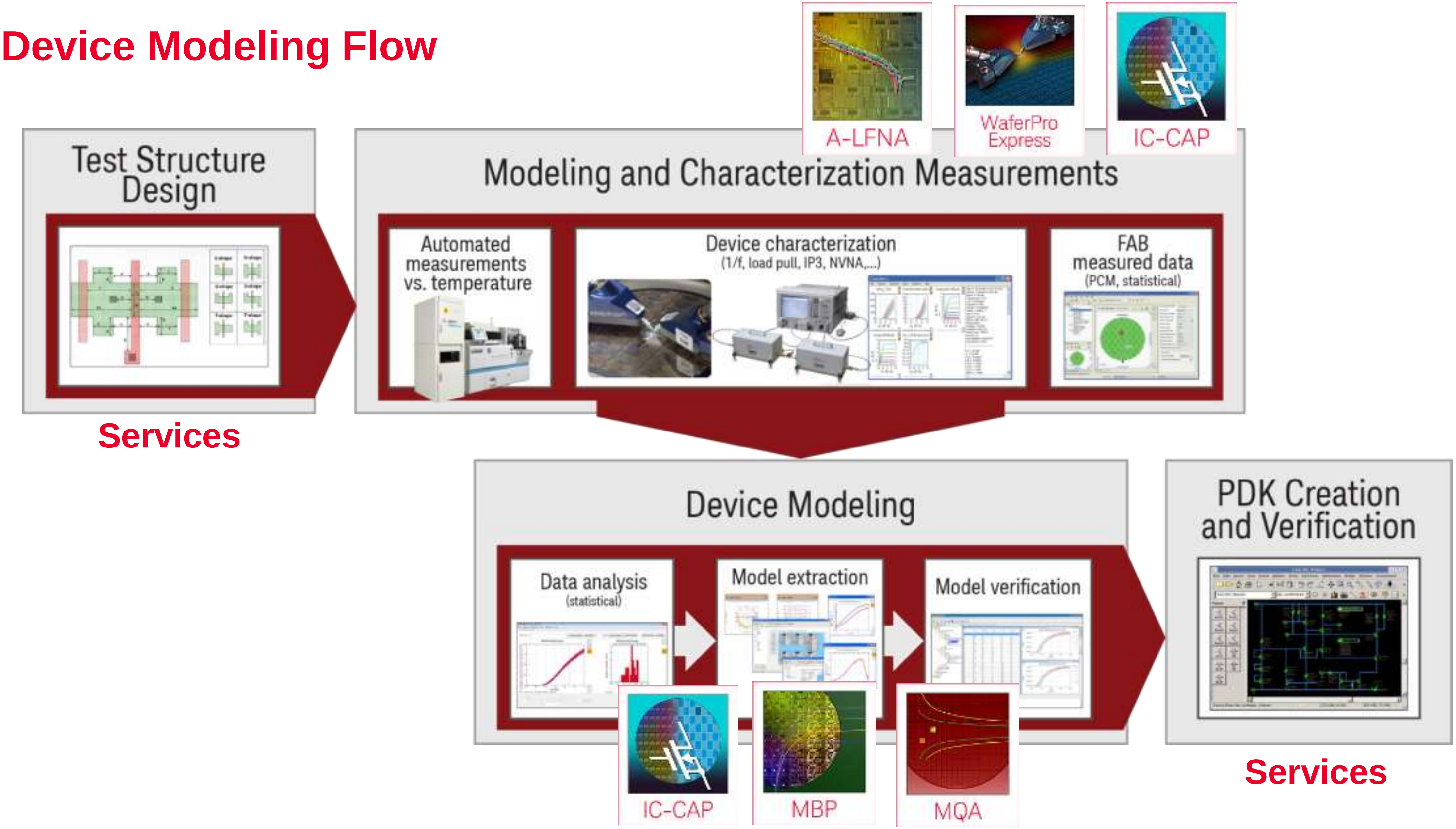
Device Modeling Flow



A-LFNA

WaferPro Express

IC-CAP

Test Structure Design

Services

Modeling and Characterization Measurements

Automated measurements vs. temperature

Device characterization
(1/f, load pull, IP3, NVNA,...)

FAB measured data
(PCM, statistical)

Device Modeling

Data analysis
(statistical)

Model extraction

Model verification

IC-CAP

MBP

MQA

PDK Creation and Verification

Services

PathWave Device Modeling (IC-CAP)

Turn Key Modeling Solutions

- RF Extraction Modules (HBT, FET, HEMT)
- CMOS Modeling Packages

Open and flexible environment

- Wide choice of simulations
- Programming (PEL & Python)
- Powerful Optimization
- Advanced Graphic Capabilities

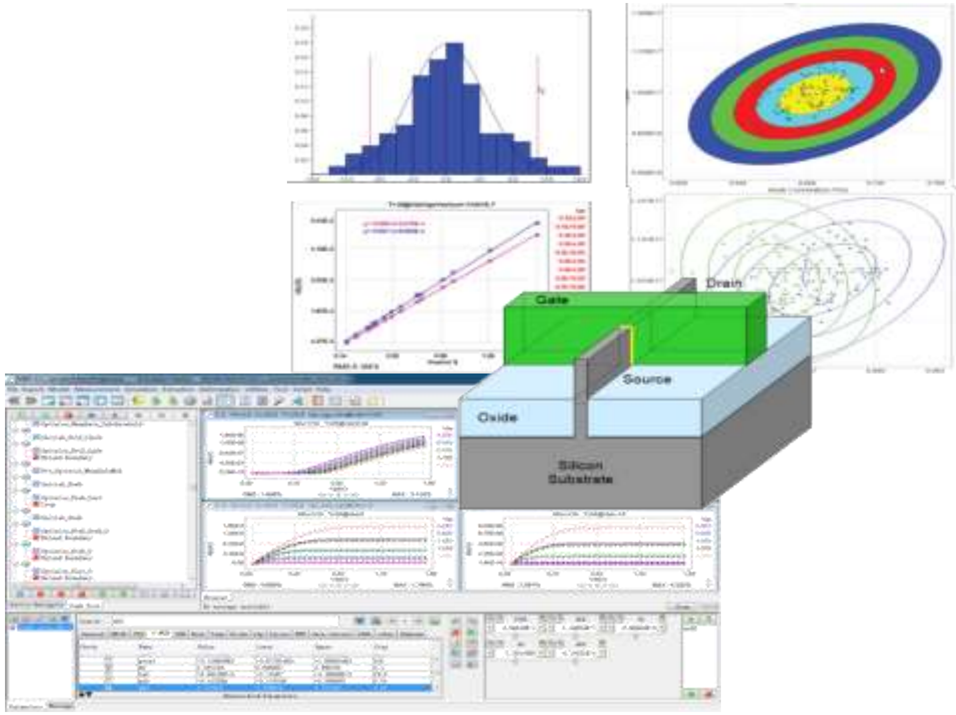
Measurement Solutions

- Extensive Library of Instrument Drivers
- Automated Measurements
- Efficient Data flow and storage

- **Be productive** from day one
- **Customize** and add your IP
- **One platform** for both measurement and modeling, DC and RF

PathWave Model Builder (MBP)

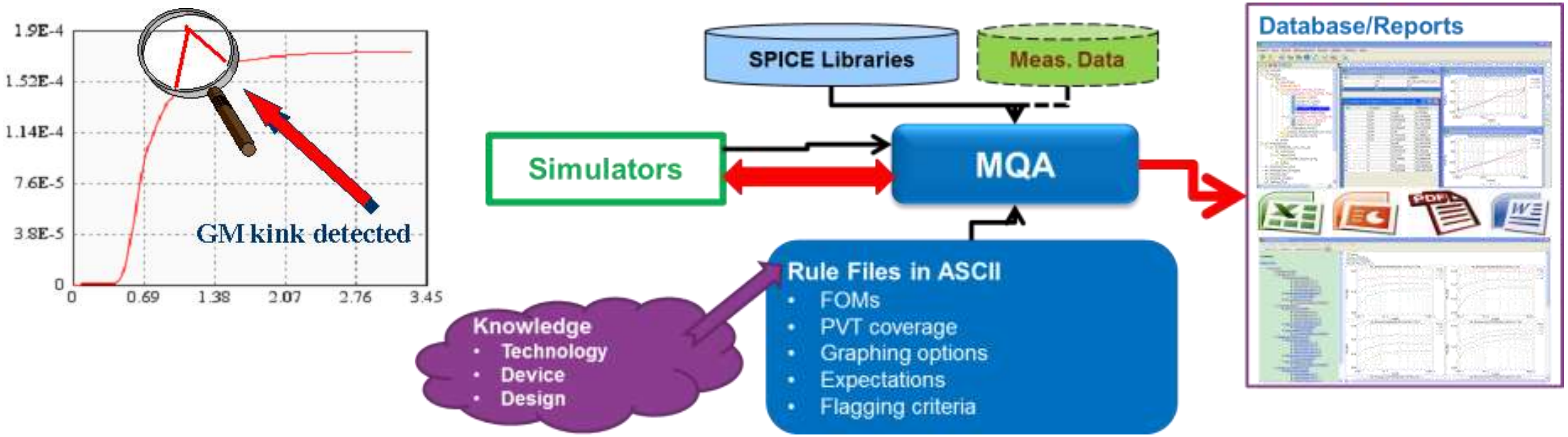
- Automated extraction packages for industry standard models
  - MOS: BSIM-CMG, BSIM-IMG, BSIM-SOI, BSIM-BULK, BSIM3/4, PSP, HiSIM2, HiSIM_HV, etc.
  - BJT: Gummel–Poon, VBIC, HICUM, Mextram
- Turnkey solutions for specialty modeling
  - Statistical & mismatch model extraction
  - Layout proximity effects (LPE) modeling
  - HVMOS/LDMOS modeling
  - Scalable Inductor modeling
  - Corner library generation



PathWave Model QA (MQA)

A SPICE model quality assurance tool that

- Assists modeling experts to perform comprehensive model QA with innovative knowledge-based, rule-driven approach
- Helps designers understand and qualify SPICE models/libraries of ever growing complexity



SPICE Libraries

Meas. Data

Simulators

MQA

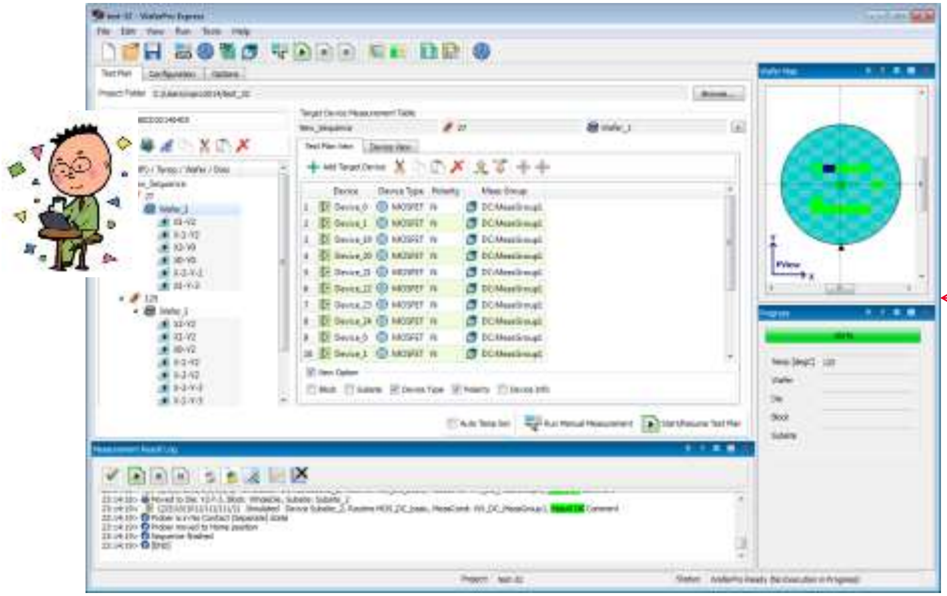
Database/Reports

Rule Files in ASCII
- FOMs
- PVT coverage
- Graphing options
- Expectations
- Flagging criteria

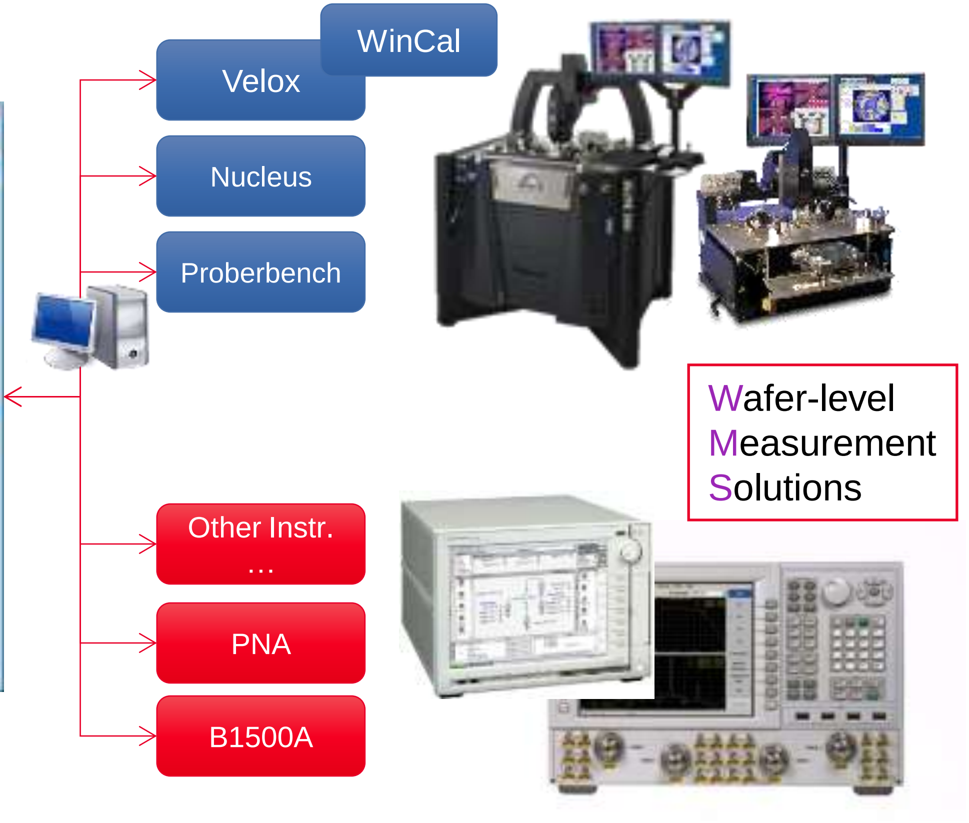
Knowledge
- Technology
- Device
- Design

PathWave WaferPro (WaferPro Express)

A new easy to use, yet flexible and powerful software platform to control **automated wafer-level measurements** of devices and circuit components.



WPE unified software environment



Velox

WinCal

Nucleus

Proberbench

Other Instr. …

PNA

B1500A

Wafer-level Measurement Solutions

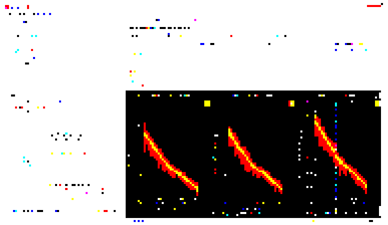
E4727B Advanced Low-Frequency Noise Analyzer (A-LFNA)

PXIe
Chassis (M9019A, M9010A)
Embedded PC (M9037A)
Digitizer (M3102A)

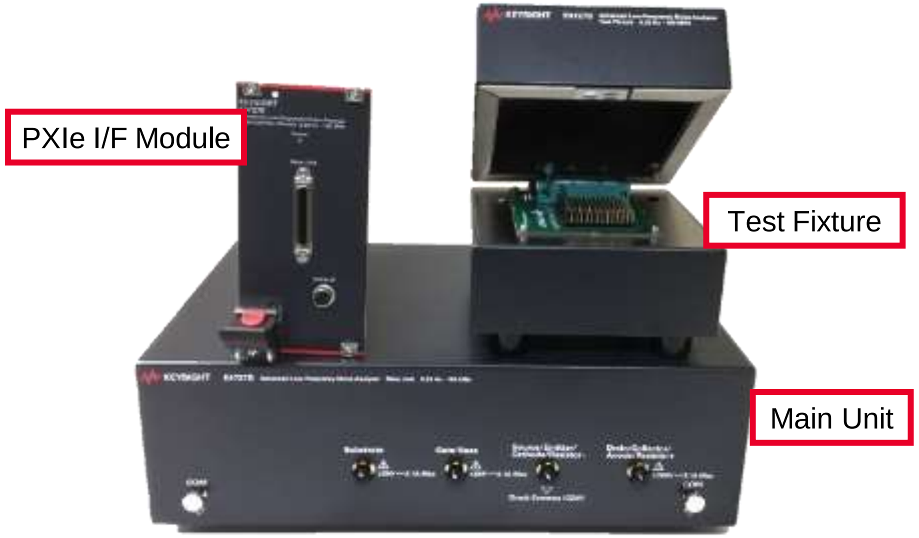
SMU for DC Bias
(B1500A, E5270B etc.)

SG for System Cal
(33621A, 33622A)

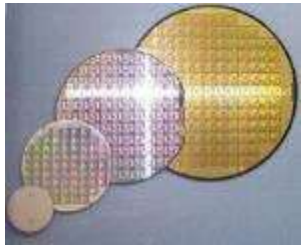
Software
W7802B



Advanced Low-Frequency Noise Analyzer HW
E4727B



Wafer Probers
FormFactor etc.



** DC Analyzer and the Wafer Prober are not included in the system*

Device Modeling and Consulting Services

SPICE Parameter Extraction Services	• Parameter extraction by customer device data • On-wafer/Package device measurement & Parameter extraction • Large signal verification • Device model conversion (i.e. BSIM to PSP) etc.
Device Modeling Knowledge Transfer	• Device model training • Device model customization • Device model accuracy improvement • Simple device model development • Modeling technique training • Modeling technique / flow consulting • TEG design assistance • Modeling tool customization • Device model QA service include QA rule customization, QA checking and report generation etc.

Thank you